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April 30, 2014

Achieving Climate Neutrality in Menlo Park

A communitywide strategy for Menlo Park

A working draft prepared for Menlo Spark

Redstone Strategy Group is a leading advisor to private foundations and non-profits worldwide. We help clients identify their highest-return investments, track and learn from results, and continually improve their efforts to solve urgent social problems. Our approach combines substantial experience across all sectors of philanthropy with deep appreciation of our clients' knowledge and expertise. This allows us to collaborate effectively with clients as they improve their ability to achieve social good and learn from their results.

Table of Contents

Achieving Climate Neutrality in Menlo Park

A communitywide strategy for Menlo Park

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Executive Summary

Menlo Spark began when a small group of community members with diverse interests and experience joined together to explore opportunities to promote long-term economic vitality, equity, and quality of life in Menlo Park while addressing the urgent threat of climate change. We believe that Menlo Park, with its highly engaged citizenry and unique resources in the heart of Silicon Valley, can be a national leader in sustainability and climate action, generating massive local benefits while serving as an example to similar cities and towns across the country. Moreover, a large-scale community-led movement, including partnerships with business, government, and philanthropy, has the potential within a decade to put Menlo Park well on the path towards achieving the bold goal of climate neutrality.

Menlo Spark will be a nonprofit initiative that collaborates with the city government, businesses, and residents to ensure the success of the community's efforts on climate and sustainability-related issues. By helping to weave together the network of projects and initiatives in the city that may contribute to sustainability, Menlo Spark will support a more unified strategy for progress towards the ultimate goal of climate neutrality.

To support this initiative, the William and Flora Hewlett Foundation commissioned this report to identify opportunities and strategies for Menlo Spark. The report is a working draft to engage community members in a productive discussion about what direction Menlo Spark should take to achieve community goals. Rather than representing final answers or solutions, the report aims to inspire a network of civic-minded individuals and organizations to unite and develop the solutions they want to see within their own community. As Menlo Spark gets under way, it will continue to grow and evolve to suit Menlo Park's needs.

Overview of report

This report is the product of several months of community engagement, research, and analysis. It is informed by several sources. First, we conducted an extensive series of interviews with members of the Menlo Park community, ranging from elected officials and government staff to business leaders and residents. Second, we interviewed local environmentalists and sustainability experts, as well as prominent climate, sustainability, and green technology experts and business leaders across the country. Finally, we gathered research and analyzed data to identify pathways to success for Menlo Park.

The report was drafted by a team from Redstone Strategy Group, a strategy consulting firm focused on social and environmental issues within the U.S. and around the world. Redstone has expertise developing strategies for foundations, nonprofit organizations, and governments, covering a variety of topics including energy, health, education, and economic development. The Redstone team was led by

a Menlo Park resident and drew on the resources of the firm's California office, headquartered near Menlo Park.

The body of the report proceeds as follows:

1. **Introduction:** This chapter presents Menlo Spark's vision, summarizes the dangers of climate change and the benefits of acting early to achieve sustainability, and outlines the reasons why Menlo Park can be a visionary national leader on climate action.
2. **Reaching an ambitious goal:** This chapter establishes that reaching the goal of climate neutrality is possible through a straightforward set of five steps. It presents examples of successful policies and projects and points towards potential resources and opportunities to advance Menlo Park's efforts.
3. **Achieving benefits across the community:** This chapter addresses community engagement, a crucial factor in ensuring that the technical steps discussed in section two progress from concept to implementation. It demonstrates the strong benefits of sustainability for a variety of community goals and constituencies, highlighting several priority initiatives and next steps community members interested in each goal can spearhead.
4. **Making change happen:** This chapter details how Menlo Spark will catalyze local climate action by supporting community needs and setting a series of intermediate goals that will escalate in scale and complexity over time. It then explains how Menlo Park can lead an influential and promising national network of small cities and towns, beginning with partnerships in Silicon Valley and California and then reaching out to likeminded communities across the United States.

Key takeaways

This report emphasizes several key themes for the community to reflect on as it begins to build Menlo Spark:

- **Menlo Park must act now to maximize the benefits of greater sustainability and avoid the devastating consequences of unmitigated climate change.** As the problems of climate change loom increasingly large in the future, Menlo Park and similar cities will eventually be required by state and national mandates to pursue more aggressive climate action. By being an early adopter, Menlo Park can seize limited opportunities to ease its inevitable transition to greater sustainability, including grant funds and partners interested in supporting a test bed for innovation.
- **Accelerated progress within a decade towards climate neutrality is realistically feasible.** The technical solutions necessary to achieve climate neutrality already exist for most issues, or are rapidly being developed and tested. Although implementation will not be easy, a comprehensive understanding of the pathway to climate neutrality can ensure that individual

solutions all coordinate to further progress towards the goal. Five known steps can take Menlo Park to climate neutrality (Figure ES1):

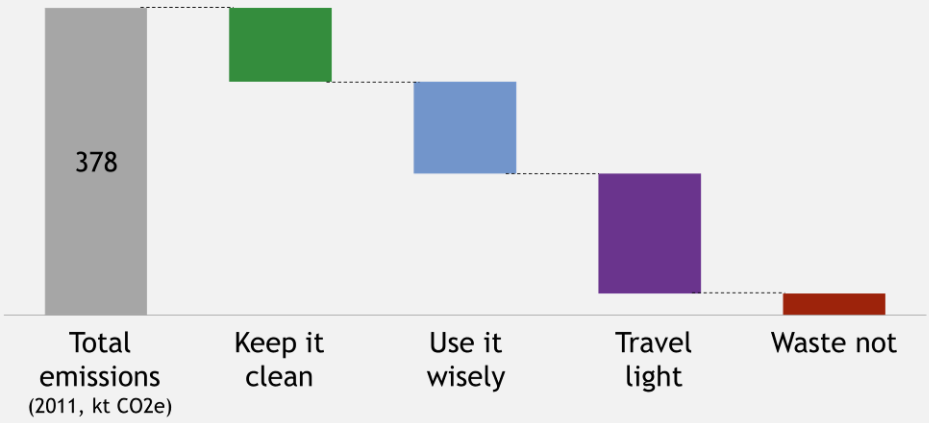
1. *Keep it clean:* Transition to clean renewable energy sources
2. *Use it wisely:* Improve energy efficiency
3. *Travel light:* Increase driving alternatives and promote efficient vehicles
4. *Waste not:* Eliminate new waste, and manage existing waste
5. *Clean up the leftovers:* Offset emissions until neutrality is reached

For each and all of these steps, it is essential that the community come together as a powerful united coalition to achieve the technical solutions

Figure ES1

Steps to climate neutrality

Share of mitigation per step based on Menlo Park's 2011 emissions profile



- **Sustainability is necessary not only because of climate change, but also because it is a key component of a broader community vision for prosperity.** Sustainability is not a stand-alone goal separate from the community's other interests. Rather, climate efforts further a broad spectrum of goals, not just environmental goals, and create a space for all constituencies and interests to play important roles in local leadership. Menlo Park should embrace new sustainable solutions to achieve longstanding goals such as:
  - Safe, smart, and healthy kids
  - Economic vitality and innovation
  - Strong neighborhoods, peaceful streets, and historic preservation
  - Equitable and inclusive prosperity
  - Responsible governance and robust city services
- **Community will and leadership is needed to achieve meaningful change.** To build momentum, Menlo Spark should begin with a few high-profile projects focused on community engagement as well as emissions impact. These initiatives could include:

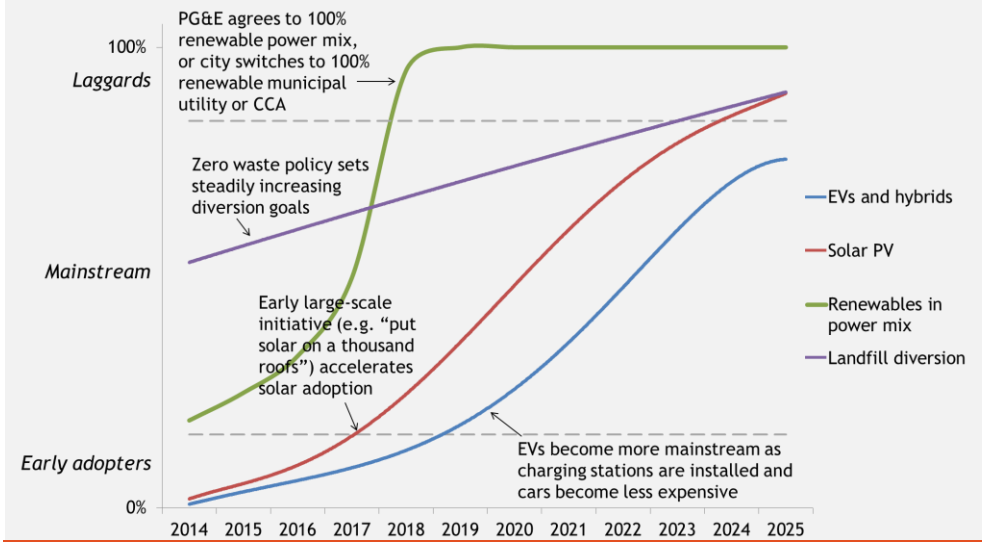
- High-visibility energy and transportation projects with schools and municipal buildings
- The implementation of state and federal programs that help businesses and residents
- A signature initiative to transform part of Menlo Park into a zero net energy district and brand the city as an incubator for green technologies and policies

Over time, Menlo Park can steadily increase communitywide commitment to sustainability and shift green technologies from a subset of early adopters to the mainstream. Figure ES2 shows the potential progression of a few key green solutions. Some policies, such as a switch to a utility that provides entirely renewable power, can catalyze rapid mainstream adoption of a particular solution. Other goals, such as increasing solar installations, will require more gradual efforts that can be spurred by major projects like an initiative for "solar on a thousand roofs."

Figure ES2

Potential adoption curves for green solutions

Percent penetration



- **Menlo Park's creativity has the potential to be a beacon for similar communities around the world if it embraces its potential as a test bed for innovative approaches and comprehensive solutions.** Although Menlo Park alone accounts for a tiny share of total emissions in the U.S., Menlo Spark could spur changes that have an enormous impact on emissions through partnerships, regulatory changes, and the establishment of best practices. Menlo Spark will begin by finding opportunities within Menlo Park to demonstrate best practices before working to extend these practices across

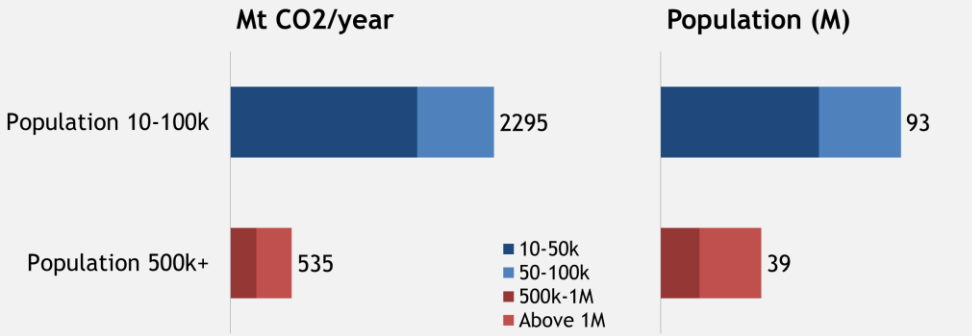
the city. It will then aim to replicate its success in other cities in Silicon Valley, followed by California and then the rest of the U.S.

- **Climate leadership depends on small cities like Menlo Park.** A coalition of small cities across the United States could present an even greater emissions mitigation opportunity than working with big cities. Cities like Menlo Park, with populations between ten and fifty thousand people, are responsible for more emissions and are home to a greater share of the U.S. population than cities with 500,000 people or more (Figure ES3). Therefore, Menlo Park's efforts should drive a larger movement of likeminded small cities with tremendous potential for emissions reductions.

Figure ES3

Small cities account for more emissions and represent a larger share of the population than big cities

Cities and towns in urban metropolitan areas[1]



Next steps

This report is intended to begin a conversation among community leaders, businesses, funders, experts, and government officials about what activities Menlo Spark should pursue and how the community can come together to achieve its goals. As you read the report, we encourage you to reflect on the following questions:

- Where do you see yourself fitting into Menlo Spark?
- What messages resonate most strongly with you, and what initiatives do you find most exciting?
- What lessons can Menlo Spark learn from the success or failure of previous community movements you have seen in Menlo Park?
- Who do you know within the Menlo Park community that would be excited about various parts of this initiative, and how can you help them get involved?
- What do you see as the most urgent or promising initial goals, and how do you see the timeline for progress unfolding in the medium and long term?

- Do you know of funding or specific resources that Menlo Spark should aim to secure?
- Do any connections outside of Menlo Park come to mind as potential partners, and how can you help facilitate a partnership?

Menlo Spark needs your support to grow into an exciting, successful, and sustainable long-term movement. We hope this report provides guidance as you consider your relationship to sustainability, potential projects you would support, ways in which you can play a leadership role within the community, and next steps you can take to help turn Menlo Spark's vision into a reality.

Introduction

Menlo Spark envisions a thriving community

Menlo Park is a welcoming city known around the world as a hub for innovation. Since its founding in the mid-nineteenth century, the city has enjoyed a strong tradition of historic preservation, and its city logo bearing the California live oak tree exemplifies its commitment to the environment.

As Menlo Park looks to the future, Menlo Spark envisions a community that continues to adapt to challenges and seize new opportunities to thrive. Menlo Spark seeks to promote economic stability and equity in Menlo Park. It will strive for strong economic vitality while balancing the preservation of Menlo Park's heritage. Menlo Park's residents should continue to enjoy a high quality of life, with quiet, close-knit communities, high achieving schools, and a clean and peaceful environment.

Menlo Spark aims to put Menlo Park on the bold path to becoming a climate neutral community while increasing local economic prosperity and equity

In order to preserve the city's heritage and quality of life, and protect the city's future, Menlo Spark aims to put Menlo Park on the bold path to becoming a climate neutral community while increasing local economic prosperity and equity. Menlo Spark's goal is for Menlo Park to have policies and projects in place by 2025 that confidently demonstrate the entire city will reach net zero. Menlo Park will work to achieve climate neutrality for emissions sources including its buildings, vehicles owned by residents, and waste produced within the city, and it will decrease over time reliance on offsets to reach carbon neutrality. This effort will serve as an example for communities around the world.

Menlo Park must act quickly to ensure that it remains on the cutting edge, rather than wait to catch up later. Situated at the heart of Silicon Valley, Menlo Park can serve as an important pioneer of climate neutrality within the United States and demonstrate to the rest of the world American strength in innovation and responsible environmental stewardship.

To achieve this change, a deeply engaged, knowledgeable, and committed group of community leaders, in partnership with city government and business, created Menlo Spark. This coalition of community members represents a diverse collection of interests across Menlo Park. However, they all agree that Menlo Park can promote

Community values Menlo Spark's vision will support	
Clean air for children	Innovation and discovery
Good jobs	Tree-lined streets and gardens
Lower energy bills	Bike routes and walking paths
Equity and inclusion	Clean energy for homes and businesses
Economic vitality	Financial security for the city
Engaged citizens	High-performing schools

local economic opportunities and ensure a sustainable future for residents, while contributing to global climate action and setting an example for thousands of similar communities around the world.

Menlo Park has a wealth of incredible resources readily available, including a passionate community of residents, an adjacent major research university, clean technology companies, venture capital firms, large philanthropies, and global companies. As a result, Menlo Park is uniquely prepared to seize this opportunity for the community to shape its own future.

Climate change is happening and it is serious

Climate change is an urgent crisis that is happening, that is caused by people, and that is having an impact on Menlo Park.

"Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia"
-Intergovernmental Panel on Climate Change, 2013

The scientific evidence of human-induced climate change is clear. Warming that has already occurred, measuring nearly one degree Celsius above preindustrial levels, is decreasing crop yields, melting glaciers, damaging coral reefs, and exacerbating extreme weather and natural disasters. If warming reaches the critical threshold of two degrees Celsius, the planet will face coastal flooding that will cause water shortages, widespread species extinction, massive agricultural shortages, the destruction of major cities, and calamitous extreme weather.[2]

Prompt action is necessary to contain the warming caused by existing and new greenhouse gas emissions and to protect the world future generations will inherit. According to the Intergovernmental Panel on Climate Change (IPCC), evidence of human influence on climate change continues to grow stronger and is now virtually undisputable. Since the mid-twentieth century, it is nearly certain that humans have been the dominant cause of observed warming of the atmosphere and oceans, primarily through increases in greenhouse gas concentrations and other human-caused forcings.[3] In the U.S. alone, annual greenhouse gas emissions are projected to increase from 7.2 gigatons of CO2e to 9.7 gigatons by 2030.[4]

Menlo Park and California will face many severe challenges if people continue to exacerbate climate change (Figure 1). Warming will cause the continued loss of snowpack in the Sierra Nevadas, leading to a smaller and less stable water supply. The severe drought California experienced in 2013 to 2014 will become commonplace, heat waves will decrease air quality and

Figure 1

Effects of climate change in California


Loss of snowpack in the Sierra Nevadas decreases water supply


Heat waves harm air quality and create health problems


Wildfires become more severe and dangerously uncontrollable


Drought disrupts agriculture and food supply


Habitat damage leads to loss of local wildlife and nature


Sea level rise destroys coastal infrastructure

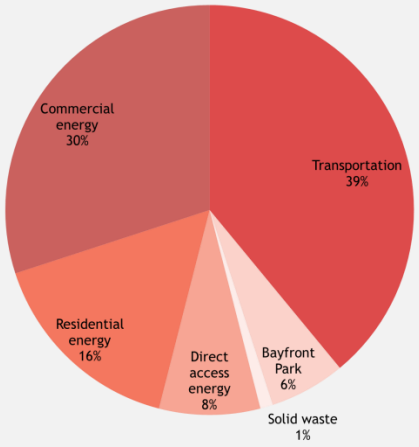
create health problems for residents, and more severe wildfires will become dangerously uncontainable. A rise in the level of the San Francisco Bay would threaten key commercial and residential areas like the M2 industrial area and Belle Haven, as well as transportation infrastructure and the West Bay Sanitary District's water treatment plants. The local food supply would be substantially disrupted by declining agricultural productivity in California and globally, as well as by altered wildlife migration patterns and species loss.[5] These issues will be particularly damaging to underserved communities without the resources to adapt to such dramatic threats.

Menlo Park is well prepared to do its part to combat the advance of climate change while reaping local benefits. The city has completed greenhouse gas inventories to determine the city and community's greenhouse gas emissions. Figure 2 shows Menlo Park's community-wide greenhouse gas emissions by source. Less than one percent of Menlo Park's emissions come directly from municipal operations, so efforts to curb emissions must focus on the broader community. In 2011, the power (54%) and transportation (39%) sectors were the overwhelming drivers of emissions, which totaled 377,669 tons of carbon dioxide equivalent (CO2e) across all sectors.[6]

Figure 2

Menlo Park communitywide emissions

Percent by source (total=377,669 tons CO2e), 2011



Sources: Energy data from PG&E, transportation based on gasoline sales reported by Menlo Park's Finance Department, solid waste from CalRecycle, and Bayfront Park from Fortistar

Direct access energy is purchased directly from non-PG&E providers by power consumers and includes both commercial and residential, but is largely commercial.

If Menlo Park follows its current pattern of energy consumption, vehicle usage, and waste generation, its emissions will only continue to grow over time.[7] In order to reach the statewide target set by AB 32 (reducing greenhouse gas emissions to 1990 levels by 2020), Menlo Park must abandon business-as-usual to reduce its emissions to 27% below 2005 levels by 2020, requiring a 2.5% to 3% annual reduction. Early strategies to achieve reduction include increasing participation in the Energy Upgrade California program and providing rebates for energy audits, improving bicycle accessibility, and improving energy efficiency for municipal facilities and appliances.[8]

The focus of Menlo Park's existing climate action plan is meeting the AB 32 goal. However, Menlo Park has yet to outline a strategy to ambitiously exceed California's minimum requirements and reach climate neutrality over the long term. Early accomplishments in the implementation of strategies recommended in the city's climate action plan demonstrate the community's commitment to reductions and

momentum for continued success. For example, nearly half of existing city streetlights were replaced with energy efficient LED bulbs by the end of 2013, a visible sign of the city's progress.[9] The city's adoption of the Reusable Bag Ordinance and Polystyrene Food Ware Ordinance is another prominent symbol of environmental efforts, despite having relatively small emissions mitigation benefits.[10] Facebook, which is headquartered in Menlo Park, has successfully implemented an employee shuttle program that has increased the percentage of employees commuting by single-car alternatives to nearly 50%.[11] Similarly, alternative transportation incentives provided by Stanford University have reduced the share of staff and faculty (many of whom live in Menlo Park) who commute alone by car from nearly three-quarters to below half.[12] The Hewlett Foundation in Menlo Park gave $52.5 million in grants for climate and environmental philanthropy in 2013, making it one of the largest climate funders in the U.S.[13] In 2008, Kleiner Perkins Caufield & Byers launched a $500 million Green Growth Fund to support the scaling of green companies, as well as a $700 million dollar fund that includes investments in early stage greentech entrepreneurs, setting a positive example for other Menlo Park-based Sand Hill Road venture capitalists.[14]

Menlo Park's city government, residents, and businesses appear ready to take action to put the city on the path towards net zero. Menlo Spark will build on these early successes to catalyze movement towards the bold goal of climate neutrality.

There are solutions, and Menlo Park can be a leader

As federal and national climate policies become increasingly stringent, Menlo Park will inevitably be required to transition to greater sustainability. Most directly, California's movement towards a net zero energy and climate neutral mandate is clear. Since AB 32 passed in 2006, new legislation has gradually increased the demands on local communities to account for emissions. For instance, 2008 saw the passage of SB 375, the Sustainable Communities and Climate Protection Act, which requires the integration of sustainability into regional transportation plans.[15]

Through deliberate and ambitious investments in mitigation, the world can dramatically decrease its carbon emissions while amassing long term profits

By acting preemptively, Menlo Park can reap substantial benefits and guide its own development, rather than being forced to comply in the future without the time and freedom to adapt in a way that maximizes positive local effects. Proactive mitigation and adaptation can help avert future crises, as exemplified by the result of delayed pension reform for city employees: in order to combat growing shortages in pension funds, voters in Menlo Park approved Measure L, a ballot initiative raising the retirement age and lowering pension benefits, and avoiding future city bankruptcy.[16]

Through deliberate and ambitious investments in mitigation, the world can dramatically decrease its carbon emissions while amassing long-term profits. According to the private-sector consulting firm McKinsey & Co., comprehensive mitigation efforts would reap a net profit for society: on average, the abatement of one ton of CO2e saves $8 compared to business as usual. In other words, the

majority of emissions reductions are profitable to pursue.[ii] [17] Within the U.S. alone, the Rocky Mountain Institute has mapped a pathway to $5 trillion in savings by 2050 through the elimination of oil, coal, and nuclear energy usage.[18]

In Fort Collins, accelerated investment in energy-related assets and infrastructure compared to business as usual could result in a net benefit of $260 million for the community by 2030. At the same rate as Fort Collins, Menlo Park could generate $1,750 in benefit by 2030 for every resident, totaling over $57.5 million.

City-level analyses also support the technological feasibility and economic benefits of moving quickly towards sustainability. For example, in Fort Collins, Colorado, the Rocky Mountain Institute estimates that accelerated investment in energy-related assets and infrastructure compared to business as usual could result in a net benefit of $260 million for the community by 2030. By 2050, the economic benefit compared to business as usual could reach a stunning $2 billion.[19] At the same rate as Fort Collins, Menlo Park could generate $1,750 in benefit by 2030 for every resident, totaling over $57.5 million.[iii] [20] Although investments in sustainability may seem costly in the short run for cities like Menlo Park, there is little doubt that these investments will generate economic benefits within just a few decades.

Because few cities have defined climate neutrality as a goal, and fewer have made tangible progress towards that goal, Menlo Park can play a significant leadership role

Adaptation and resilience

Mitigation and adaptation are two strategies to manage the effects of climate change which should be carefully pursued in tandem.

Mitigation refers to efforts to decrease emissions in order to lessen the impacts of climate change over time. Mitigation efforts are by definition proactive.

Adaptation refers to efforts to prepare for the effects of climate change, both those that are already happening or are inevitable due to existing emissions, and those that could potentially be mitigated but are still possible threats.

Resilience is often used to describe adaptation efforts that successfully strengthen and prepare cities for climate-related disasters, but means more broadly the ability to manage and recover quickly from shocks.[21]

A comprehensive climate action strategy can include balanced solutions for both mitigation and adaptation.[22] Water resources in California are a good example. The 2013 to 2014 drought can likely be attributed in part to global warming.[23] In response, farmers received lower allotments of water from the water district, and the water officials announced an effort to capture and store rain recently fallen in anticipation of continued shortages in 2015.[24] These efforts represent adaptation strategies. At the same time, California is pursuing aggressive greenhouse gas emissions reductions through AB 32 mandates, which are intended to lessen future global warming and therefore prevent the exacerbated drought conditions which would occur in the business as usual scenario. These reductions are mitigation efforts—attempts to prevent future problems.

In some cases, a single solution can achieve both adaptation and mitigation benefits. For instance, green building retrofits decrease emissions from building-related sources such as heating systems. At the same time, retrofits can also incorporate adaptation strategies that can enhance building resilience to changes in temperature, air quality, fires, or flooding from sea-level rise.[25]

[ii] The average abatement cost across all abatement levers, including those that are costly, is negative $8 per tCO2e. 35 percent of abatement measures are profitable, 40 percent cost between zero to $27 per tCO2e, 10 percent cost between $27 and $55 per tCO2e, and only 15% cost more than $55 per tCO2e.

[iii] Per capita benefit is based on $260 million/population of 148,600 in Fort Collins. Total benefit is based on Menlo Park population of 32,900.

among cities moving towards greater sustainability. Menlo Park is already world-renowned for its innovation through venture capital firms and technology companies. By seizing the opportunity to pursue exciting new technology and policy solutions, Menlo Park can attract substantial funding and support for its climate actions. Many investors are seeking opportunities to support promising green technologies through demonstrations of their viability at pilot sites (such as green companies backed by Kleiner Perkins' Green Growth Fund). Menlo Park can showcase the economic and climate benefits of different practices, as well as paths to scale through community engagement. Economic prosperity stemming from greater sustainability will also benefit not only parts of the city that have boomed in recent years but all parts of the city from Sharon Heights to Belle Haven. Additionally, as Menlo Park's green reputation spreads, the city will become an even more attractive place to live and do business.

Menlo Park must act today to secure long-term benefits for the future. Because climate efforts are considered progressive now, rather than simply mandatory as they will be in the future, Menlo Park can take advantage of myriad programs available to support early adopters. This will decrease the short term costs of investments in efficiency improvements. For example, California permits the use of property assessed clean energy (PACE) financing that substantially alleviates the up-front economic burden of energy and water efficiency improvements to existing properties.[26] Another example is the New Solar Homes Partnership, a program of the California Solar Initiative that provides financial incentives and other support to home buyers that construct energy efficient solar homes.[27]

Additionally, continuous turnover in buildings and vehicles present opportunities to start anew with efficiency. Rather than investing in a building that will require expensive retrofitting in the future to meet emissions requirements, developers can design buildings that meet zero net energy goals from the beginning, often at costs that do not substantially exceed budgets for less efficient buildings. When residents purchase new vehicles, they are eligible for rebates for purchasing electric vehicles and hybrids, in the form of federal tax credits and the California Vehicle Rebate Project.[28]

However, these incentives are unlikely to remain in place in the future as sustainable technologies become more widespread. For example, the U.S. Treasury 1603 Program, which provided cash grants of up to 30% of investment costs for renewable energy

What does a climate neutral goal mean?

Climate neutrality is achieved by using renewable energy that does not generate greenhouse gas emissions and balancing the release of any remaining greenhouse gases with an equivalent amount that is sequestered or offset.

Carbon neutrality applies only to carbon, not all greenhouse gases.

Zero net energy is a term applied specifically to energy use, most often in buildings. This means that a combination of energy efficiency and renewable power generation allows the building to produce as much energy as it consumes, or that offsets are purchased to compensate for any non-renewable energy consumed.

Zero net energy and carbon neutrality are key components of achieving the broader goal of climate neutrality.

projects, expired at the end of 2012.[29] If Menlo Park hopes to maximize the resources and support it receives for green investments, the time to act is now.

The transition to climate neutrality is inevitable. Menlo Park must seize control now and channel its efforts to maximize economic benefits

The transition to climate neutrality is inevitable. Menlo Park must seize control of the direction of its adaptation now and channel its efforts to maximize economic benefits, rather than delay and force future generations to suffer expensive negative outcomes. As a city with a reputation for innovation and a strong community with the experience, skills, and financial resources to support this effort, Menlo Park's plan and initiatives will serve to catalyze change not only within the city, but across hundreds of comparable communities that have committed to addressing climate change.

A challenging goal is crucial to capture the imagination of the community

Reaching an ambitious goal

Climate neutrality is achievable

Menlo Spark's ambitious goal of being on a clear path to climate neutrality by 2025 is bold yet realistically possible. A challenging goal is crucial to capture the imagination of the community, galvanize local participation, and attract the support of key players in philanthropy, technology, business, government, and other institutions. Furthermore, planning explicitly now for the ultimate goal of climate neutrality will help the city develop a long-term solution and ensure that a holistic goal unites short-term efforts.

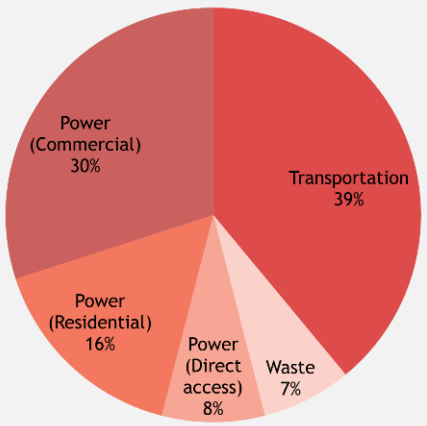
In recent years, a boom in the development of clean, energy efficient technologies has led to wider availability of potential solutions, alongside decreases in cost and greater interest in innovative business models for implementation. Although implementation will not be easy, the technical solutions are already backed by expert analyses on best practices and plausibly achievable goals for adoption.[30] In the many cases where solutions already exist and are being deployed, Menlo Park can seize the opportunity to raise their profile and combine best practices. In relatively uncharted territory, many solutions are likely to be found within a decade, and Menlo Park can play an important role in helping to discover and deploy those emerging technologies.

Blazing the path to climate neutrality will certainly be a challenge. Therefore, Menlo Park will focus in the near term on building support for the medium to long term by bridging the diverse interests of constituencies in the city and strengthening partnerships with others interested in pioneering innovation and sustainability. The remainder of this section briefly summarizes the technical steps necessary to achieve climate neutrality, while the next section elaborates on the short term route to a community unified behind this technical effort. As a result, this section's examples are drawn primarily from outside Menlo Park, while the next section highlights more local initiatives within the city.

Figure 3

Menlo Park communitywide emissions

Percent by source (total=377,669 tons CO2e), 2011



Menlo Park can embark on the path to climate neutrality through five steps

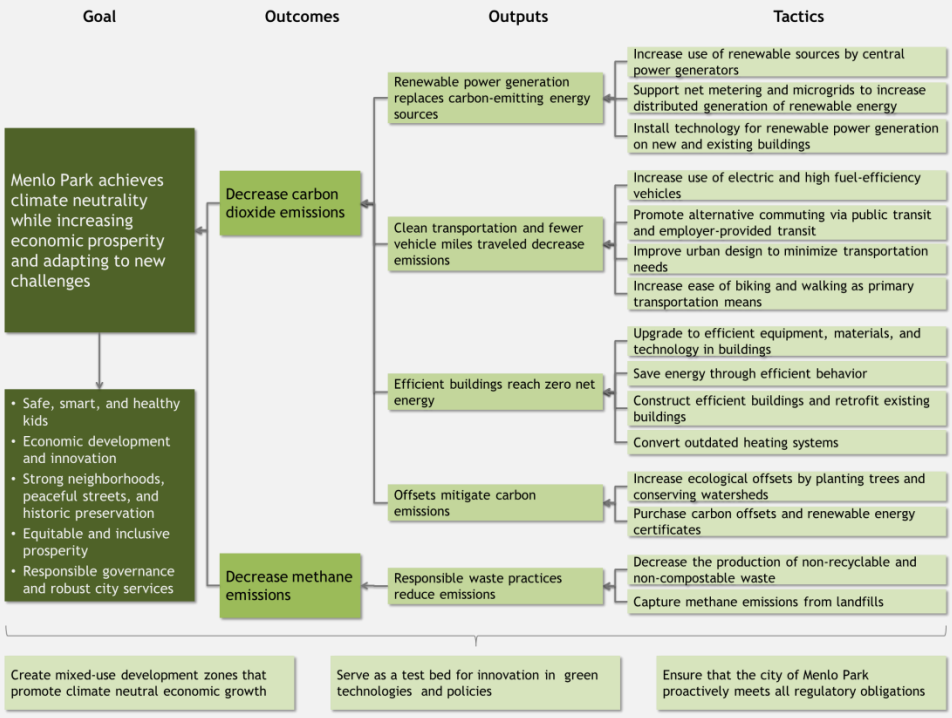
Emissions in Menlo Park are driven by

three primary sectors: power, transportation, and waste (Figure 3).[31] Achieving climate neutrality will require a combination of solutions across all these sectors, increasing energy efficiency to reduce consumption and waste while increasing renewables to address energy needs.

Based on the sources of Menlo Park's emissions, Figure 4 summarizes the necessary components of the pathway to climate neutrality. By carefully considering how the pieces of Menlo Park's climate issues and their potential solutions fit together, the city can achieve transformative change that will bring it to the ambitious goal of net zero. A detailed technical analysis to map technical solutions to exact mitigation figures could be conducted in the future as a complement to the logical pathway to zero. However, Menlo Park can move towards neutrality as long as it understands all the components that must be addressed.

Figure 4

Pathway to climate neutrality



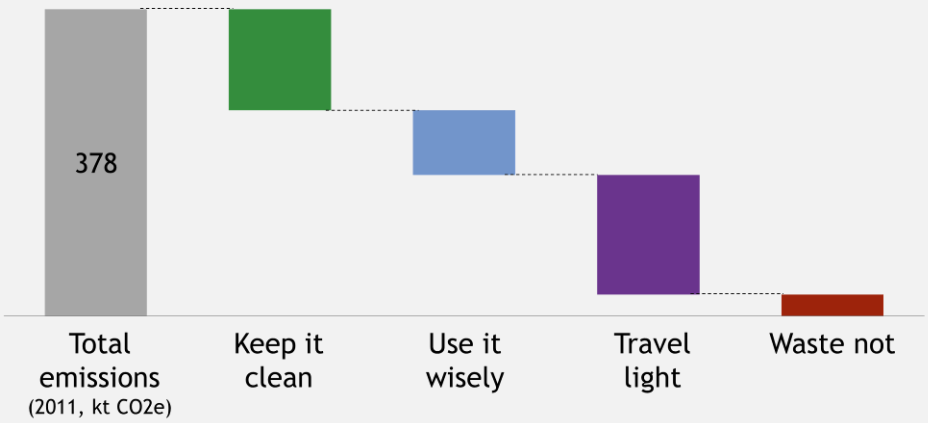
To that end, Menlo Park can pursue five steps to reach climate neutrality (Figure 5):

1. *Keep it clean:* Transition to clean renewable energy sources
2. *Use it wisely:* Improve energy efficiency
3. *Travel light:* Increase driving alternatives and promote efficient vehicles
4. *Waste not:* Eliminate new waste, and manage existing waste
5. *Clean up the leftovers:* Offset emissions until neutrality is reached

Figure 5

Steps to climate neutrality

Share of mitigation per step based on Menlo Park's 2011 emissions profile[iv] [32]



For each and all of these steps, it is essential that the community come together as a powerful united coalition to achieve the technical solutions

For each and all of these steps, it is essential that the community come together as a powerful united coalition to achieve the technical solutions. The next chapter of this report elaborates on how the community can own each of these steps and emerge greener, stronger, and more prosperous.

Although other communities have begun to take action on each of these steps (Figure 6), no community like Menlo Park has ever managed to combine all of these into a comprehensive solution—meaning that Menlo Park could place first in the race to climate neutrality.

Step one: Keep it clean

In order to meet residents' and businesses' energy needs while decreasing harmful emissions, Menlo Park must accelerate its transition to clean renewable energy sources. The city could pursue several potential means to move towards a completely renewable power supply (Figure 7):

Figure 6

Example: Fort Collins (CO)

Goal based on technical analysis of feasible solutions for accelerated climate action

Achieve 80% reduction in CO2 emissions from 2005 levels by 2030, two decades ahead of the city's original 2050 target

- Reduce building energy use by 31%
- Carbon neutral electricity system
- Reduce transportation energy use by 48%

Source: Rocky Mountain Institute, 2014

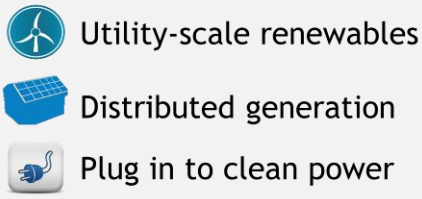
[iv] Keep It Clean and Use It Wisely: emissions from commercial, residential, and direct access energy, totaling 54%. Use It Wisely: 39% of reductions for the energy sector, based on the Rocky Mountain Institute's estimate for Fort Collins' possible reduction through building energy use.
Travel Light: emissions from transportation, totaling 39%.
Waste Not: emissions from solid waste and Bedwell Bayfront Park, totaling 7%.

Increase the use of renewable energy sources by central power generators

Because Menlo Park is served by Pacific Gas and Electric (PG&E), a cooperative partnership with PG&E would be the least disruptive means of achieving renewable power. Approximately half of PG&E's current power mix is already derived from renewable or greenhouse gas-free sources. By 2020, PG&E aims to reach a third renewables, in line with California's Renewables Portfolio Standard.[33]

Figure 7

Keep it clean



As clean energy providers and individual power source installations separate from the primary utility grid are becoming widespread and competing with traditional utilities like PG&E, Menlo Park could offer PG&E the opportunity to experiment with the modification of its business model. While completely renewable power provision through PG&E may be difficult to achieve, PG&E has demonstrated some willingness to support progressive energy and sustainability efforts. For example, PG&E launched its Zero Net Energy Pilot Program in 2010 to support California's goal that all new residential and commercial buildings be zero net energy by 2020 and 2030 respectively.[34] Additionally, PG&E will purchase two-thirds of the power generated at the Ivanpah Solar Electric Generating System, the world's largest solar thermal farm, which opened in the Mojave Desert in February 2014.[35] Ivanpah houses over 300,000 mirrors capable of providing 392 megawatts (MW) of solar thermal power to 140,000 homes.[36] Ivanpah employs solar thermal technology developed by BrightSource Energy, a company housed in Oakland which is backed by Menlo Park-based venture capital firm Draper Fisher.[37] Finally, PG&E representatives have publically stated their interest in clean power, such as solar installations, even speaking alongside environmental organizations like the Natural Resources Defense Council.[38]

A broader appeal for PG&E to provide one hundred percent clean energy to the entire city of Menlo Park will require greater commitment from the company, but could occur if Menlo Park positions itself as a mutually beneficial pilot opportunity for PG&E to learn and prepare for the future. Utility companies in other states have begun to set examples for greater renewable generation. For example, a $200 million, 120 megawatt project near Pueblo, Colorado will more than double the amount of solar power Xcel Energy currently sources and produce enough power for over 31,000 homes when it is completed in 2016.[39]

The other path to attain renewable central power is establishing an independent city utility. There are several Bay Area models for this approach. Menlo Park's neighbor, Palo Alto, runs its own utilities department and has committed to using one hundred percent renewable electricity sources at an estimated added cost to residents' utility

bills of under three dollars per year. Indeed, Palo Alto already purchases completely carbon neutral electricity; during its transition to completely renewable sources as well, the city will purchase non-renewable power only with renewable energy certificates (RECs).[40] Residents of Boulder, Colorado also passed a referendum in 2011 to establish a municipal utility in order to decrease greenhouse gas emissions.[41]

Marin and Sonoma have also created joint power agencies that offer community choice aggregation (CCA), a method of pooling local governments' electricity load to purchase clean energy on behalf of residents, businesses, and municipal accounts. The utility retains ownership and management of the distribution infrastructure and customer services, and CCAs preserve individual choice by allowing customers to opt out and switch back to traditional utility service.[42] Moreover, the redirection of revenue from the utility to the community can be leveraged for reinvestment in additional clean energy and sustainability projects. In 2010, Marin Clean Energy launched as the first CCA in the U.S. committed to reducing greenhouse gas emissions and increasing the use of renewable power, supporting distributed generation and net-energy metering (solutions that will be discussed later in this report). Sonoma and San Francisco are following suit, and over 15 communities across California are moving to form their own CCAs as well.

If Menlo Park finds an unwilling partner in PG&E, it could investigate the independent utility and CCA options. However, either option would require substantial effort and investment to break away from PG&E, and could create a negative public distraction from the benefits of climate neutrality, so the city should be cautious in pursuing these approaches. Menlo Park should begin its efforts in the power sector by working to create a partnership in which the city and PG&E learn and thrive together.

Support distributed generation of renewable energy

Distributed generation, or on-site generation that produces electricity from small energy sources such as solar panels, allows private individuals to tackle clean power projects by themselves in the near term. As a result, distributed generation offers residents and businesses flexibility to choose their own power sources and lower or eliminate their utility bills paid to the central utility. However, distributed generation faces some challenges to ensuring a reliable supply of renewable power sufficient to cover all energy needs.

Residents and businesses in Menlo Park have already begun to take action on distributed generation by installing technology for renewable power generation on new and existing buildings. PG&E permits net energy metering, which allows customers with their own renewable power generators to offset their electric bills with energy they export to the grid.[43] In addition to well-established renewable technologies such as wind and solar, emerging technologies like commercial fuel cells and micro-windmills are improving and becoming viable distributed generation options. For example, Google powers a portion of its Mountain View campus with a Bloom Box, a fuel cell that emits less CO2 than traditional coal, oil, or natural gas fuels.[44]

Creating a program that aggregates demand for renewable installations and then allows providers to bid competitively on the bundle of customers could help reduce the up-front cost to individuals of shifting to long-term profitable means of distributed generation. Community-owned solar providers such as Clean Energy Collective have developed streamlined systems to integrate renewable credits into utilities' existing billing systems, simplifying net metering and allowing individuals to participate without purchasing their own generators.[45] The creation of microgrids within the community to localize energy generation for a portion of the city, such as a business complex or neighborhood, could also help decrease costs to individuals through greater scale and increase the reliability of power generation if users combine different types of renewables in a single grid. However, the latter opportunity, like community choice aggregation and an independent utility, could complicate relations with PG&E by creating fears of a substantial loss of customers.

A number of organizations and cities have already begun to take distributed generation to scale, and Menlo Park can follow suit. Solar photovoltaic (PV) arrays are particularly popular and promising in California: companies such as SolarCity, Sungevity, and Sunrun offer residential solar installations with low or even no up-front costs for customers, and the California Solar Initiative aims to install 1,940 MW of new solar generation capacity by 2016 through a variety of rebate programs.[46]

One potential means of revolutionizing Menlo Park's power generation would be leveraging new forms of financing available for the installation of solar PV citywide or covering an entire net zero energy district

One potential means of revolutionizing Menlo Park's power generation would be leveraging new forms of financing available for the installation of solar PV citywide or covering an entire net zero energy district. For example, the Partnership for Sustainable Communities, a collaboration between the U.S. Department of Housing and Urban Development, U.S. Department of Transportation, and U.S. Environmental Protection Agency, provided $240 million in federal investments between 2009 and 2012 and leveraged over $250 million in private investments and commitments from local partners.[47] Mosaic, an online platform that allows crowd funding for commercial and residential solar investments, has raised over $7 million in investments with a 100% payback rate. In fewer than 24 hours after Mosaic launched crowd funding campaigns in January 2013 in which investors could contribute as little as $25, four clean energy projects for affordable housing projects in California were funded. Mosaic's largest project to date supported the installation of solar panels on 1,500 homes in New Jersey.[48] Because solar power generation quickly becomes profitable, a loan or bond could be designed to easily repay investors with interest well within a decade. This type of financing structure could serve as an example for future investors in other communities.

Finally, SRI International merits additional consideration for renewable distributed generation efforts. Its cogeneration facility is the single largest point source of emissions in the city, exceeding 26,000 megatons of CO2e in 2010.[49] Although cogeneration can be an efficient way of using less energy to produce both heat and electricity, the power plant currently uses a steam injected gas turbine which generates substantial emissions. Cogeneration can integrate renewable alternative fuels such as concentrating solar power, so working with SRI to make their power generation

compatible with renewables could have a large impact on the city's power sector emissions.[50]

Plug into clean power

As Menlo Park's power grid transitions to clean, renewable energy sources, residents and businesses should shift their appliances and other technologies to use the clean power grid. In many cases, this transition will be automatic: for example, if PG&E provided electricity sourced entirely from renewables, all electric-powered home appliances would draw from clean power. However, in some cases, old appliances and technologies that directly use greenhouse gas-emitting power sources, such as gas ranges, should be replaced over time.

Step two: Use it wisely

Residential and commercial energy accounts for over half of greenhouse gas emissions in Menlo Park's inventory. A key step towards climate neutrality is increasing the efficiency of buildings and ultimately reaching zero net energy. According to the New Buildings Institute, the number of zero net energy-verified and emerging projects in the U.S. more than doubled from 2012 to 2014 from 60 to 160 projects, and an additional 53 ultra-low energy buildings reached efficiency on par with zero net energy buildings. These buildings span retrofits and new construction, the public and private sectors, and residential and commercial uses.[51] Though small, this rapidly growing number indicates that the building technologies required to dramatically increase building energy performance, and renewable generation sources to complement energy needs, have advanced to the point of making zero net energy buildings feasible and cost-effective. Menlo Park's movement towards zero net energy buildings should include efforts to (Figure 8):

Figure 8

Use it wisely

Upgrade to efficient equipment, materials, and technology in buildings

Efficient building upgrades often do not require dramatic renovations. Rather, conventional efficient technologies, including solutions such as efficient lighting and insulation, can go a long way towards addressing many types of energy usage in residential and commercial buildings.[52] The first step for many building owners and residents is to conduct an energy audit to measure the energy their buildings consume and identify measures that can increase efficiency. Go Solar California and SF

Environment provide lists of recommended energy efficiency auditors, PG&E offers energy audits to select customers, and the U.S. Department of Energy even furnishes guidance to individuals for "do-it-yourself home energy audits."[53] Menlo Park could look to the neighboring county of Santa Clara, which partners with a local NGO to provide free energy audits, as an example starting point for establishing a home energy audit program tailored to Menlo Park residents' needs.[54]

Distributing information about energy audits more widely, and encouraging groups of residential and commercial buildings to request audits together to negotiate for a discounted rate, could substantially increase awareness of efficient measures and identify low-hanging fruit that can be upgraded quickly and inexpensively. Small efficiency improvements with low up-front costs can help galvanize community support at the beginning of the city's path towards net zero. The city could promote energy audits directly by helping to connect residents and businesses with auditors. However, it must be cautious to structure such a program carefully: previous attempts to offer audits combined with rebates for implementing recommended improvements have suffered from a lack of competition driving up costs due to requirements to use approved contractors for upgrades.

Campaigns for greater energy efficiency have met with great success in the past. For example, since its inception in 1993, the U.S. Environmental Protection Agency's Energy Star program has reduced greenhouse gas emissions by over 1.9 billion metric tons and saved over $239 billion on utility bills, all in voluntary partnership with consumers and businesses.[55] Menlo Park has also successfully retrofitted street lamps with LED bulbs that have created substantial cost savings and CO2 reductions (see sidebar).[56]

Case study: LED streetlight retrofits in Menlo Park

From 2011 to 2013, the City of Menlo Park completed 1,135 LED streetlight retrofits. The total cost for these retrofits was $651,450, but the city successfully secured grant funds from the California Energy Commission, so only $160,000 of the cost was taken from city funds. The retrofits save the city $66,200 per year in energy and maintenance costs, while reducing over 117.2 million pounds of CO2 emissions per year. The payback period for these retrofits is under a decade considering the entire cost including grant funds. However, the payback period for the city's portion of the investment is less than two and a half years.

Construct efficient buildings and retrofit existing buildings

In 2008, the California Energy Commission adopted ambitious zero net energy building goals, including that all new residential buildings must be zero net energy by 2020, 50% of existing commercial buildings must be zero net energy by 2030, and all new commercial buildings must be zero net energy by 2030.[57] To lead the way, Governor Jerry Brown also signed an executive order requiring half of state buildings to be zero net energy by 2020 and all new state buildings to be zero net energy by 2025.

Figure 9 summarizes California's building energy efficiency standards, which guide new construction and retrofits and were recently updated to advance towards the state's zero net energy targets.[58] When constructing new buildings, explicitly setting

Figure 9

California's building energy efficiency standards

Selected updates to the 2013 California Building Energy Efficiency Standards (Title 24) effective January 1, 2014

Residential

Required	Recommended
• Solar-ready roof • Hot water pipe insulation • Verify air conditioner installation	• Whole house fan • Improved windows • Insulated walls

Commercial

Required	Recommended
• Solar-ready roof • Lighting controls • Efficient process equipment	• Cool roof • Improved windows • High efficiency heating and cooling equipment

Source: Natural Resources Defense Council, 2012

When constructing new buildings, explicitly setting the goal of zero net energy is crucial to ensure that the complete building design is as efficient as possible

the goal of zero net energy is crucial to ensure that the complete building design is as efficient as possible. Zero net energy buildings also capture the imagination of architects, business leaders, government officials, and everyday citizens and set a clear aspirational standard for building projects. Moreover, a quarter of existing zero net energy buildings were renovation projects, demonstrating that with careful planning, zero net energy technologies can be integrated into existing structures.[59]

Menlo Park and the Bay Area have already begun to move in the direction of California's targets. For example, the David and Lucile Packard Foundation in Los Altos recently designed its headquarters to be zero net energy and LEED Platinum, and its 49,000 square feet make it the largest zero net energy certified building in the world.[60] In Menlo Park, the Bohannon Development Company's Menlo Gateway project plans to reach LEED Gold certification for its office buildings and LEED Silver for its hotel, making them the greenest buildings in Menlo Park.[61] Tarlton Properties also won the 2012 Environmental Project Award from Acterra for sustainable retrofits to the 25-year-old Menlo Business Park, which will save $400,000 annually and reduce greenhouse gas emissions by over a million pounds per year. Menlo Business Park's completely modernized features include upgrades to lighting fixtures, thermostats, power lines, computer servers, and more, resulting in a drop in the complex's vacancy rate from 30% to under 5%.[62] These projects are tangible evidence that Menlo Park's business community can be strong allies in the construction and retrofits of efficient buildings.

Residential developers have also taken strides towards high efficiency buildings. A passive home in Menlo Park built by Clarum Homes won a Menlo Park Environmental Quality Commission award in 2012. Its energy consumption is at least 90% lower than conventional homes and sets the stage for even greater progress towards zero net energy residences.[63] In Palo Alto, Project Green Home has gone a step further and completed a fully zero net energy house.[64]

Convert outdated heating systems

Although Menlo Park enjoys a temperate climate year-round, heating is often a major source of wasted energy for homeowners and businesses. Improvements to heating systems are a crucial part of efficiency upgrades and sustainable new construction. Innovative new technologies in heating have also made these renovations attractive to consumers seeking sleek upgrades for their homes. For example, Nest thermostats, which learn to adjust temperature settings based on residents' schedules, are successfully marketed not only as energy-saving, but also as eye-catching, easy to use, and innovative.

Other technologies such as efficient heat pumps can substantially diminish energy usage and appeal to customers seeking cost savings and greater comfort. For example, electric air-source heat pumps use the difference between outdoor and indoor air temperatures to cool and heat homes, reducing both utility bills and greenhouse gas emissions by consuming less energy.[65] Additionally, because they are powered by electricity, when plugged into an electric grid powered by renewables, these heat pumps can reach zero emissions.

Save energy through efficient behavior

The most direct way to achieve greater energy efficiency is through encouraging users to adopt more efficient behaviors, yet this simple solution can be quite challenging to achieve at scale. However, Menlo Park has many opportunities to educate residents about efficient energy usage, particularly because nearly a fifth of the population consists of school-aged children who can be easily reached through environmental education at schools.[v] [66] Children are also a promising conduit for spreading information, as they are likely to share their knowledge about sustainability with family members. For older residents, the City of Menlo Park could expand classes to teach residents about energy efficiency, or sponsor community events that get residents excited about sustainability, such as a "green festival" for Earth Day.

Subtle cues based on social science research can also play a surprisingly large role in changing behaviors. Utilities across the U.S., which spend $8 billion annually to help customers lower their energy use, have begun to turn to behavioral energy efficiency programs that could save up to 20% of total residential energy use.[67] For example, Opower, a community engagement platform for utilities, elicits people's emotional responses to encourage energy saving behaviors. They employ simple methods such as alerting people of money they could potentially lose when changing their thermostat settings and displaying energy reports with smiley faces for using less energy than one's neighbors.[68]

Merely providing more information to building users can be effective as well: the International Brotherhood of Electrical Workers Local 595 Training Center, a zero net energy building, prominently features an "energy dashboard" in its lobby that displays the building's energy usage for passersby, keeping efficiency at the top of

[v] 17% children ages 5 to 18.

users' minds. Another example is energy audits in Santa Clara County, which have helped homeowners save up to 20% of their electricity use simply by educating them about easy ways to decrease phantom plug loads, appliances that consume energy all day even when turned off.[69]

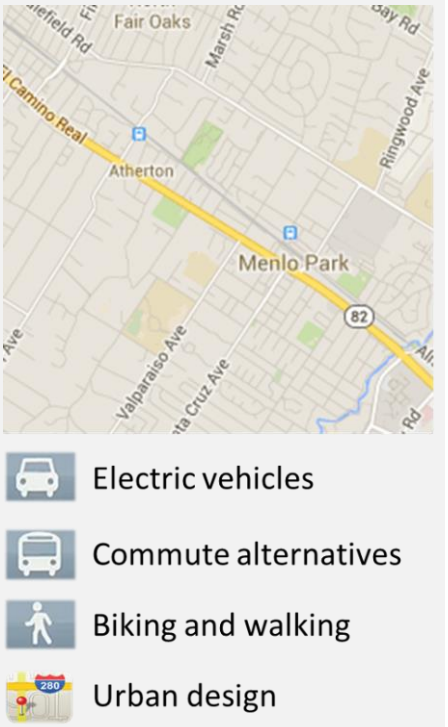
Efficient behavior can achieve substantial reductions at minimal costs for the city through volunteer-led sustainability classes, subtle cues embedded in consumers' daily lives, and increasing word of mouth. At the same time, efficient behaviors will decrease costs for residents and eventually become a communitywide norm.

Step three: Travel light

Transportation is responsible for nearly 40% of Menlo Park's emissions in its latest emissions inventory. However, this figure is based only on fuel sales within Menlo Park. Despite the fact that some nonresidents purchase fuel in Menlo Park, this is likely to be an underestimate of Menlo Park residents' transportation emissions, as residents also purchase fuel in other cities and travel by additional means such as trains and airplanes. Accounting more broadly for vehicles miles traveled by Menlo Park residents, on Menlo Park's highways and local roads, and via air travel would substantially increase transportation's share of the city's emissions (and the city's total emissions).

Figure 10

Travel light



Although transportation is a sizable and challenging sector, Menlo Park can make significant inroads towards cleaner transportation for residents and commuters. In the long run, the city could aim to develop a comprehensive measure of transportation emissions, but it should focus in the short term on residents' and employees' transportation habits and purchases, which play a definitive role in driving the city's emissions. Efficient transport could reduce the city's emissions through the following efforts (Figure 10):

Increase use of electric and high fuel-efficiency vehicles

With the expansion of charging station networks and improved electric vehicle (EV) designs, EV sales in the U.S. have skyrocketed in recent months. National EV sales grew nearly 450% in the first three quarters of 2013 compared to the same period in 2012, putting the U.S. on the path to doubling the number of EVs on the road by the end of 2014.[70] Tesla, which previously had a showroom in Menlo Park, sold

approximately 18,000 cars in 2013, making it the bestselling full-size luxury sedan in the U.S. By the end of 2014, Tesla aims to sell 800 EVs per week, a 50% increase over 2013.[71] As EVs continue to grow in popularity, Menlo Park could launch a community campaign to promote EVs as trendy, cost-effective, and sustainable choices.

Menlo Park could also explore opportunities to help scale electric and highly fuel-efficient vehicles. Tesla could be a promising partner in supporting the development of EV infrastructure within Menlo Park to encourage more residents to purchase electric cars. Palo Alto has also taken several exemplary initial steps to support the scaling of EVs. In 2013, the city council approved a new ordinance requiring all new single-family homes to be wired for electric vehicle chargers. Although the ordinance adds up to $500 to the cost of a new home, the measure won unanimous approval from the council and widespread public approval.[72] Additionally, the city has installed free EV chargers at several downtown garages, as well as an inexpensive fast charger at the Stanford Shopping Center.[73]

Lower-income areas in particular stand to benefit from upgrades to newer efficient vehicles

Lower-income areas in particular stand to benefit from upgrades to newer efficient vehicles. A household that switches from a 15 mile- per-gallon vehicle to a 30 miles-per-gallon vehicle could save over $1,200 per year, while abandoning older vehicles that significantly underperform on safety. Retiring or replacing a few old and highly polluting vehicles could have a disproportionately beneficial impact on emissions: a small 10-15% subset of old vehicles is responsible for over half of light duty vehicle smog in California.[74]

While lower-income families may not be able to purchase electric vehicles, simply moving to hybrids or efficient gas-powered cars can bring substantial and immediate economic, safety, and climate benefits. Recently, less expensive EVs and hybrids have increased in popularity and made efficient vehicles accessible to more of the population. Among EVs, the Chevrolet Volt, Honda Fit, Nissan Leaf, Smart Electric Drive, Chevrolet Spark, Fiat 500e, and Mitsubishi i-MiEV are priced comparable to non-electric sedans.[75] For example, with federal and state EV incentives, the price of the i-MiEV dips below $14,000.[76] Hybrid cars are also increasingly economical, with models like the Honda Insight and Toyota Prius C available for under $20,000.[77]

Moreover, government incentives support the widespread adoption of electric and high fuel efficiency vehicles among low-income drivers. California offers the Consumer Assistance Program (CAP) and Enhanced Fleet Modernization Program (EFMP), which aim to repair, retire, or replace high-emitting vehicles. EFMP offers a $1,000 incentive for the retirement of light- or medium-duty vehicles, with an additional $500 incentive for low-income owners. In three years, the program has retired over 70,000 vehicles, over half of which were owned by low-income drivers.[78] The South Coast and San Joaquin Valley air districts also provide $2,000 to $2,500 vouchers to replace high-polluting vehicles with lower-emissions vehicles. Menlo Park could educate residents about existing incentives, and support the adoption of local incentives like those offered by the South Coast and San Joaquin Valley.

Finally, banks like Citigroup are pioneering "green bonds," which offer financing for green industry as banks and government reduce lending.[79] A partnership with major banks to finance the purchase of efficient vehicles at low interest rates could help catalyze the retirement of old vehicles for consumers who could otherwise not find financing to purchase a new car.

Improve urban design to minimize transportation needs

SB 375, the Sustainable Communities and Climate Protection Act of 2008, aims to help California meet its AB 32 emissions reduction goals through coordinated transportation and land use planning.[80] SB 375 requires all metropolitan planning organizations to develop Sustainable Communities Strategies as part of their Regional Transportation Plans. For the San Francisco Bay Area, SB 375 sets a target of 7% per capita greenhouse gas reduction from 2005 levels by 2020 and 15% per capita reduction by 2035.[81] These targets highlight the importance of coordinating transit, housing, and overall development plans in order to ensure that cities like Menlo Park can reach their long term emissions reduction goals.

As Menlo Park updates its General Plan, and begins to implement its new Downtown Specific Plan, it should align development goals with the principles of transit-oriented development (TOD).[82] TOD seeks to maximize the benefits of public transit while emphasizing the needs of users and additional modes of transport like walking and biking, as opposed to transit-adjacent development, which simply locates buildings next to transit corridors. The Institute for Transportation and Development Policy outlines eight principles for TOD:[83]

1. Walk: Develop neighborhoods that promote walking
2. Cycle: Prioritize non-motorized transport networks
3. Connect: Create dense networks of streets and paths
4. Transit: Locate development near high-quality public transport
5. Mix: Plan for mixed use
6. Densify: Optimize density and transit capacity
7. Compact: Create regions with short commutes
8. Shift: Increase mobility by regulating parking and road use

Cities have successfully implemented many of these TOD principles, resulting in communities that emphasize not only public transit, but also walking and biking. While big cities like New York are better able to develop massive public transit networks, they also illustrate successful strategies that are replicable at a smaller scale. For instance, the center of Palo Alto consists of short blocks and streets to provide more direct routes for pedestrians and cyclists. Newport Beach has broad cycling and pedestrian streets with highly visible paint to make vehicular crossings safer. Washington, D.C. has vibrant and attractive pedestrian spaces near transit stations. Menlo Park already has some raised crosswalks that force cars to give priority to

pedestrians and cyclists. New York City combines residential, commercial, and work spaces in the same or adjacent blocks.

Relatively small changes in urban design, like painted bike lanes, trees to shade pedestrian routes, or the inclusion of a housing unit atop a new retail development, contribute substantially to environmentally-friendly transit choices.[84] Moreover, they provide the additional benefits of convenience for residents and a greater sense of community connectivity that can improve overall quality of life in Menlo Park.

Promote alternative commuting via public transit and employer-provided transit

To complement Menlo Park's transit-oriented development efforts, the city could encourage alternative commuting among Menlo Park residents and employees of businesses in Menlo Park. Among Menlo Park residents, the mean commute time to work is approximately 20 minutes, suggesting that many residents work outside of Menlo Park and likely commute by driving.[85]

Although the availability of public transit is a substantial problem in Menlo Park, with the Caltrain, buses, and shuttles running limited times and routes, the public transit issue spans the entire San Francisco Bay Area.[86] Menlo Park could be part of a regional effort to better integrate transit services, through efforts such as the San Francisco Bay Area's Transportation Improvement Program, coordinated by the Metropolitan Transportation Commission, and Plan Bay Area, approved by the Association of Bay Area Governments and the Metropolitan Transportation Commission.[87]

One promising opportunity is the Dumbarton Rail Corridor Project, for which Menlo Park is represented by the San Mateo County Transportation Authority. The project envisions the reconstruction of an existing rail corridor to extend commuter rail service between the Peninsula and East Bay.[88] The rail line would run through the M2 industrial area in Menlo Park and could serve as a key transit option for employees of companies like Facebook and residents of Belle Haven. However, the project has struggled to secure sufficient funding and political support ($91 million of its designated funding was transferred to a BART extension project in 2009[89]), so Menlo Park could substantially advance the rail line by securing the backing of businesses in the M2 who would stand to benefit.

Within Menlo Park, the city could benefit from the establishment of a dedicated Transportation Management Agency, to supplement the work of the existing Transportation Management program under the Public Works Department. A Transportation Management Agency could focus on implementing a full spectrum of transportation demand management initiatives on a communitywide basis. Palo Alto has begun to explore the creation of a Transportation Management Agency and transportation demand management program: the City Council voted in February 2014 to investigate proposals including providing Caltrain Go Passes to all downtown employees, soliciting private sector bids to expand the city's shuttle program, distributing residential parking permits, and creating car-share and ride-share programs.[90]

Menlo Park could also adopt the driving-alternative incentives that Facebook and Stanford have implemented with immense success. Facebook's employee shuttles have steadily increased ridership to the point that nearly half of Facebook employees use alternative transportation instead of commuting by car alone.[91] As Menlo Park's largest employer, Facebook's efforts can significantly decrease emissions from commuting and set an example for the rest of the community. Other large Menlo Park employers have followed suit, such as SRI International, which provides subsidies for transit, preferred parking for carpools, shuttles, and other incentives.[92]

Stanford has likewise dramatically decreased single-car commuting through a comprehensive alternative transportation program: between 2002 and 2013, the percent of Stanford faculty and staff (many of whom live in Menlo Park) who drive alone to work dropped from 72% to 47%.[93] The university's Commute Club numbers over 9,000 members, offering commute planning services and a buddy program that matches experienced commuters with new commuters. Its shuttle bus fleet has expanded from 15 on-campus buses to over 60 shuttles with over 200 stop locations. Stanford also provides Caltrain GoPasses and financial incentives for commuting by bike, transit, or shared rides.[94] The key to Stanford's success is the comprehensive nature of its program, integrating transit resources like the Caltrain with shuttle bus connections, and although the program may seem expensive, it has actually saved the university $100 million in the construction of parking structures over the last decade.[95]

Although smaller employers in Menlo Park may be unable to replicate the efforts of Facebook, SRI International, or Stanford at scale, the city could support the pooling of resources by smaller employers to create a citywide alternative commuting program. Bundling smaller companies together could allow greater participation in programs like the Caltrain GoPass and the expansion of shuttle routes.[96]

Increase ease of biking and walking as primary transportation means

As Menlo Park's transit-oriented development efforts decrease the number of vehicles on the road, complementary efforts to increase biking and walking could become more attractive as primary means of transportation due to increased safety and a shift in community attitudes towards transportation. Many cities have successfully implemented bike- and walk-friendly measures, such as:

- **Smart, visible bike lanes to guide cyclists and drivers.** The Silicon Valley Bicycle Coalition and local residents successfully organized the installation of colorful and buffered bike lanes at the interchange of Alpine Road and Highway 280 between Menlo Park and Portola Valley. The movement followed the death of a cyclist at the intersection where merging was extremely dangerous.[97] Other innovative bike lane ideas include two-way bike lanes that use parked cars to create a buffer zone from road traffic (New York City's parking-separated cycle tracks), low-speed bicycle boulevards that bypass congested high-speed thoroughfares (Berkeley), independent networks of bike paths and multi-use sidewalks with underpasses for road crossings

(Boulder), and bike boxes at intersections to prevent collisions between cyclists and right-turning vehicles (Portland).[98]

- **Bike share programs.** The Bay Area Bike Share program, which has 1,000 bikes between San Francisco and San Jose, expanded to neighboring Palo Alto in 2013.[99] As the bike share continues to grow, Menlo Park could join the program and increase connectivity across town as well as between neighboring cities like Palo Alto and Redwood City. Cities such as Washington, DC, Minneapolis, and New York City have seen increasing ridership as their bike share programs became community-wide initiatives.[100]
- **Bicycle education programs.** Sacramento has experimented with bicycle education in schools in order to teach young riders proper safety measures as well as build a new, young base of cycling advocates.[101] The Palo Alto Recreation Department offers urban cycling classes for both children and adults.[102] Boulder's walk-and-bike month provides free bike clinics and workshops, and Thursday cruiser bike rides feature theme-decorated bikes that turn cycling into a recurring communitywide tradition.[103] Menlo Park's Bicycle Commission conducts similar education programs and could be a key partner for Menlo Spark. The Bicycle Commission should continue to distribute information about bike-friendly improvements in the city that could attract new cyclists previously deterred by safety concerns and sponsor fun events to engage residents, drawing on the network of contacts and advocates Menlo Spark will help organize.[104]
- **Short city blocks and dense urban neighborhoods.** Areas with short blocks, such as Cambridge, Massachusetts or even downtown Menlo Park and Palo Alto, promote walking by increasing the number of direct routes for pedestrians.[105] High-density development and public interest zoning districts that promote mixed-used development with minimal parking, such as in Atlanta, Seattle, Portland, and Denver, also encourage walking.[106]

Step four: Waste not

Menlo Park has already implemented strong recycling and composting programs, which it can build on to ensure that responsible waste practices continue to reduce methane emissions and preserve environmental resources. The community should focus on both decreasing the production of waste and managing existing waste. Although waste is a relatively small portion (7%) of communitywide emissions, minimizing waste is an extremely visible and salient issue that can generate support for broader sustainability measures and

Figure 11

Waste not

cultivate positive behavior change. In order to address waste challenges, Menlo Park could (Figure 11):

Decrease the production of non-recyclable and non-compostable waste

San Mateo County Recology offers recycling and composting services to both residential and commercial buildings in Menlo Park. Recology provides free residential recycling and composting services, which has dramatically decreased unsustainable waste. Only 27% of Menlo Park's residential waste goes to the landfill, and residents treat recycling and composting as standard behavior.

Commercial recycling, on the other hand, poses a greater challenge. California's AB 341 requires all businesses and multi-family complexes that generate four or more cubic yards of garbage to recycle.[107] Recology's commercial recycling services are free, and composting is half the cost of an equivalent sized garbage container. Despite these incentives, however, 60% of Menlo Park's commercial waste is still deposited in the landfill, and the commercial recycling rate has remained flat in recent years.[108] The 2013 update to Menlo Park's climate action plan recommends the adoption of a mandatory commercial recycling ordinance to increase recycling by up to 20%.

The city's climate action plan also suggests the adoption of a zero waste policy. California requires the city to divert 50% of community solid waste from the landfill, and although the city exceeds that rate at 54%, a more ambitious goal is feasible given the already high support and participation of residents. A zero waste policy based on Menlo Park's climate action plan would aim for 75% diversion by 2020 and 90% by 2030.[109] However, other cities have set even more ambitious targets. For instance, San Francisco's Zero Waste program aims to achieve zero waste by 2020 (the city's waste diversion rate is already 80%, the national record)[110] through a suite of measures ranging from a Mandatory Recycling and Composting Ordinance to multilingual door-to-door resident outreach.[111] In 2005, the Palo Alto City Council adopted a similar goal of achieving Zero Waste by 2021.[112]

Capture methane emissions from landfills

According to the city's emissions inventory, the closed Marsh Road Landfill at Bedwell Bayfront Park is Menlo Park's second-largest point source of emissions (after SRI International's cogeneration project), accounting for 6% of communitywide emissions. Additionally, the park is a highly visible symbol of waste within the community and is often cited by residents and city staff as a significant environmental issue.

In 1982, the City contracted with Fortistar to capture methane emissions from the landfill for a gas-to-energy plant. However, due to decreasing gas production over time, Fortistar terminated the contract as the profitability of methane capture fell. The methane is now discharged via the landfill's gas flare, which is highly inefficient and fails to meet current air quality standards since it was constructed in 1982.[113] Despite the city's Landfill Gas Flare Replacement project, which is intended to

replace the existing flare with a Bay Area Air Quality-compliant flare, flaring continues to contribute to Menlo Park's greenhouse gas emissions.

Given the difficulty of capturing methane at Bedwell Bayfront Park and the negative environmental impact of flaring practices, this area is ripe for innovation. The city could partner with business and philanthropy to sponsor a prize for the development of a solution for Bedwell. For instance, the city could explore SRI International's interest in supporting the prize because the captured landfill methane could potentially be used by SRI's cogeneration plant. A prize could elevate public awareness of the issue, signal the city's commitment to tackle serious and persistent problems, and inspire a wider pool of ideas from non-traditional contributors. Unlike the Acterra Business Environmental Awards, which highlight outstanding achievements after they have been completed in order to educate and motivate companies to adopt sustainable business practices, this prize could aim to proactively spur the development of new ideas and accelerate progress towards a solution.[114] The prize contest could also help forge partnerships between different community members, perhaps through mixed teams including students, philanthropists, business leaders, and academic researchers.

Prizes have often been successful in accelerating innovation in energy and technology. For example, the U.S. Department of Energy sponsors a variety of national competitions, including the National Clean Energy Business Plan Competition, Solar Decathlon, National Collegiate Wind Competition, and EcoCAR2, which offer students and professors opportunities to win prestigious monetary prizes for energy and technology innovations.[115] A proposal to use funds from California's cap-and-trade program for an annual Green Prize is also supported by a number of state and local officials, including Menlo Park Assemblyman Rich Gordon.[116]

Step five: Clean up the leftovers

The pathway to climate neutrality will be gradual and long-term. In the short-run, however, Menlo Park can quickly become carbon neutral by using offsets to mitigate carbon emissions (Figure 12). As time passes, the city should aspire to decrease its reliance on market trading schemes as offsets to achieve climate neutrality, focusing instead on increasing energy efficiency and clean power and transportation within the community.

Figure 12

Clean up the leftovers

Trees and watersheds

Carbon offsets

Increase ecological offsets by planting trees and conserving watersheds

Ecological offsets may only mitigate a small

amount of Menlo Park's emissions, but they serve as an important publically visible symbol of the city's commitment to sustainability. Additionally, the conservation of trees and watersheds intersects with numerous other community interests, ranging from beautifying streets to preserving a stable water supply, and has the potential to garner widespread support for the environmental movement.

Menlo Park proudly wears its tradition of green public spaces: the city's website proclaims the city a Tree City USA community, the nonprofit group Trees for Menlo was supported by SRI International and a broad coalition of community members, and the city's Arrillaga Family Recreation Center grounds offer a picturesque space for residents to enjoy.[117]

Moreover, the California Air Resources Board has authorized forest projects and urban forest projects as eligible for carbon offset credits under AB 32.[118] This means that investments in planting new trees as ecological offsets can help Menlo Park meet regulatory requirements in the short term. Menlo Park could use trees as offsets to legally meet up to 8% of its emissions cap under AB 32, which suggests that investing heavily in trees and other ecological offsets can play a meaningful role in supporting the city's progress towards meeting and ultimately exceeding state carbon reduction goals.

Purchase carbon offsets and renewable energy certificates

Market-based mechanisms to encourage carbon reduction may take many forms, so Menlo Park has substantial choice in how to design its temporary offset system, including choosing whether the city or residential and commercial energy users purchase offsets and credits. First, Menlo Park could design a local carbon offset market based on either a cap-and-trade compliance market or a voluntary market. In this market scheme, residential and commercial energy users would purchase carbon credits and offsets.[119] Second, the city could purchase carbon offsets on behalf of the community to compensate for Menlo Park's emissions by reducing emissions outside of the city (for instance, offsets that support an external reforestation project). Third, Menlo Park could purchase renewable energy certificates, which represent the property rights for renewable energy. By purchasing RECs and applying them to nonrenewable sources of energy in Menlo Park, the city could claim the environmentally friendly attributes of the RECs, such as the creation of renewable fuel and lowering of emissions.[120]

Market-based regulatory and incentive programs to reduce greenhouse gas emissions have been well received in many areas. For example, the Regional Greenhouse Gas Initiative, a cooperative effort between Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont, has implemented a carbon cap of 91 million short tons for 2014, with a 2.5% decline in the cap each year through 2020.[121] The auction of these emissions allowances incentivizes businesses to minimize their emissions to save on the costs of purchasing emissions allowances.

The biggest challenges to achieve climate neutrality are not technical; rather, they are a matter of community will and community action

Through it all: Come together

The biggest challenges to achieve climate neutrality are not technical; rather, they are a matter of community will and community action. With thoughtful, conscientious, and deliberate community engagement backed by a powerful set of resources, Menlo Park can accomplish an audacious goal that will drive movements toward sustainability in similar communities around the world. Despite its relatively small size, Menlo Park can catalyze the scaling of climate efforts among a set of small cities that together produce a massive amount of greenhouse gas emissions and therefore hold tremendous promise for climate action. Furthermore, within California, impending mandates from the state are driving communities like Menlo Park to seek the best possible climate solutions. The next section of this report describes how Menlo Park's community can unite behind the vision of a sustainable city in order to execute the technical pathway to climate neutrality.

Achieving benefits across the community

Menlo Park's climate leadership will support a vibrant and prosperous city

Sustainability and adaptation play an indispensable role in ensuring Menlo Park's vitality in a variety of areas

Sustainability is not a stand-alone goal separate from the community's other interests. Rather, sustainability and adaptation play an indispensable role in ensuring Menlo Park's vitality in a variety of areas. The technical solutions to climate change are important components of a climate neutral plan, but only community interest and action can help the city make tangible progress towards its goals in sustainability, prosperity, safety, and equity. Therefore, sustainability projects should span three key constituencies:

1. Residents
2. Businesses
3. Government

Reaching climate neutrality is not only technically possible, but also tremendously beneficial for the city and each of these constituencies. Climate efforts can further a broad spectrum of goals, not just environmental goals, and create a space for all constituencies and interests to play important roles in local leadership. Indeed, citizens and businesses must be involved in climate action, because climate neutrality cannot be achieved through city action alone. The City of Menlo Park accounts for less than one percent of Menlo Park's emissions, and it cannot mandate broad-based change. Rather, sustainability efforts present an affirmative opportunity for community members to step up and turn their vision for the city into a reality.

Menlo Park will be unique not because it will discover many entirely new solutions, but because it will be the first community of its size to combine the many components of a comprehensive climate solution together in one city. Menlo Park's creativity has the potential to be a beacon for similar communities around the world if it embraces its potential as a test bed for innovative approaches and comprehensive solutions. Few communities have the vision and resources to lead the way towards climate neutrality like Menlo Park: Menlo Park is situated in the heart of Silicon Valley, where entrepreneurs are eagerly seeking partners to pilot new solutions and are willing to invest in their local community. Menlo Park has the potential to declare the M2 industrial area a zero net energy district, which could revitalize the area's businesses, pave the way for citywide progress, and serve as an incubator for green start-ups and new technologies. Yet most importantly, Menlo Park has a savvy and engaged citizenry willing to embrace new solutions to achieve longstanding goals. Climate neutrality is a key pathway to success for the following goals:

- Safe, smart, and healthy kids

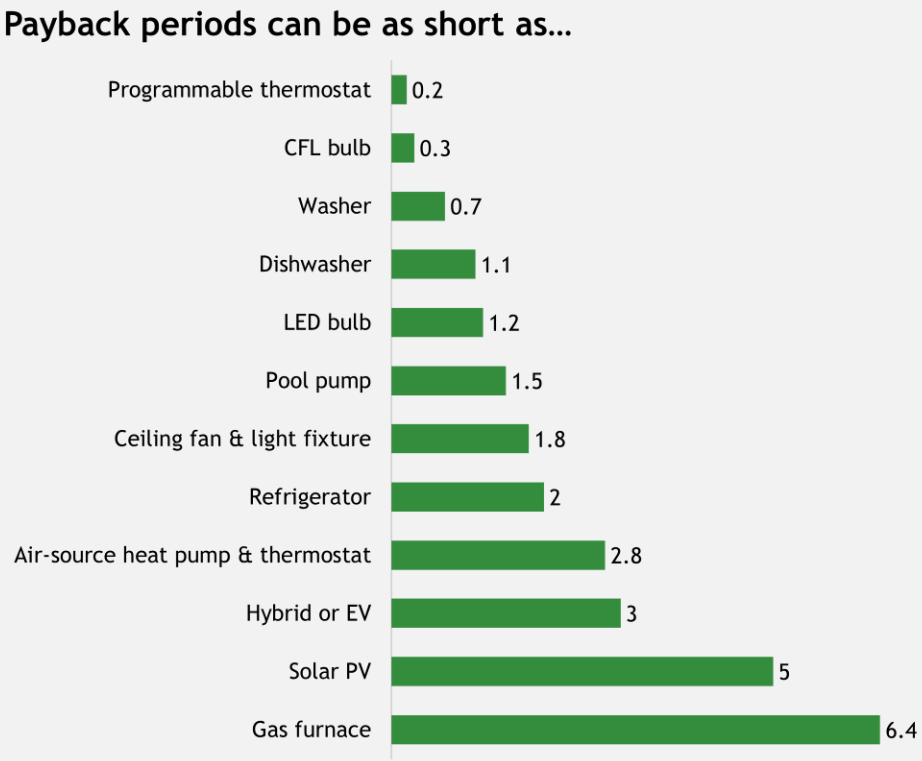
- Economic vitality and innovation
- Strong neighborhoods, peaceful streets, and historic preservation
- Equitable and inclusive prosperity
- Responsible governance and robust city services

Investments in sustainability and green technologies can not only further myriad community goals, but are also much more cost-effective than some may expect. Figure 13 shows payback periods for common green investments. The cost of simple upgrades to home and business appliances, such as light bulbs and washing machines, can often be repaid in less than two years. Even larger investments like solar panel purchases can be recouped in five years.

Figure 13

Green investments

Years to break even on initial additional cost compared to less efficient alternative



Sources: Energy Star, Forbes, CleanTechnica, SolarCity[122]

Given the cost-effective benefits of green solutions, the remainder of this section will examine how sustainability is a crucial part of achieving Menlo Park's community goals and provide actionable next steps for various constituencies to pursue.

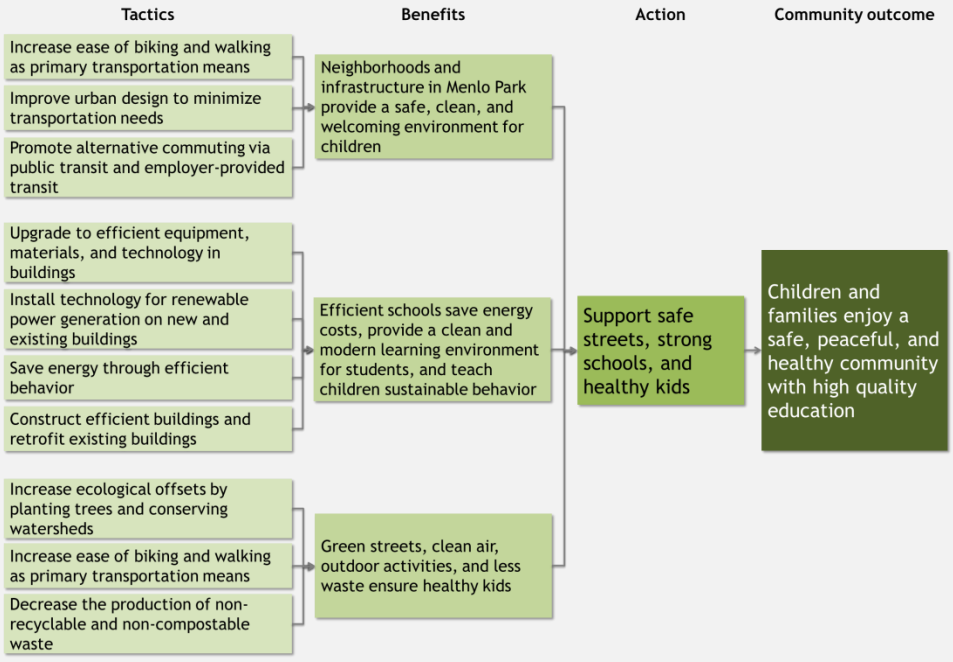
Safe, smart, and healthy kids

About a quarter of Menlo Park's population consists of children under the age of 18, slightly above the national average.[vi] [123] Because many families and children call Menlo Park home, children's safety, education, and health rank among the community's top priorities. As Menlo Park faces new growth and development, residents seek to preserve the peaceful neighborhood environment that draws families to the city.

Sustainability efforts can play a significant role in ensuring the safety and comfort of children in Menlo Park. Figure 14 outlines how movement towards climate neutrality can improve neighborhood safety, increase the efficiency and productivity of schools, and ensure a healthy environment for children.

Figure 14

Green initiatives support safe, smart, and healthy kids



Neighborhoods and infrastructure in Menlo Park provide a safe, clean, and welcoming environment for children

Although neighborhoods in Menlo Park are family-oriented, it can often be difficult and dangerous for children to venture from their residential streets to schools and extracurricular activities. As a result, children and parents are often dependent on driving to safely reach their daily activities. This exacerbates the problem of cars and traffic on the road, making biking and walking more dangerous for kids.

Measures to increase the safety and convenience of biking and walking, including safe bike lanes, appropriately-timed crosswalk lights at major intersections, and cyclist and

[vi] The national average is 23.5%, compared to 24.4% in Menlo Park.

pedestrian safety education, help children seeking safe routes to schools and other key locations. Additionally, urban design that minimizes transportation needs can be especially beneficial to children who are unable to drive and parents who benefit from less time spent shuttling their children between activities. Finally, greater adoption of alternative commuting can help decrease traffic congestion, making streets safer for children to bike and walk. All of these efforts not only provide climate benefits, but also increase convenience for parents and children by expanding safe transportation options.

Menlo Park has already moved towards improving the safety of transportation infrastructure for children. For example, the Menlo Park City School District received grants from San Mateo County to map car-free "safe routes to school" for Encinal, Hillview, Laurel, and Oak Knoll Schools.[124] Other efforts under consideration to promote the safety of car alternatives and decrease traffic density include improved bike paths, addition of sharrows on key roads, and grade separation projects to facilitate railroad crossings at major intersections like Ravenswood.[125]

Efficient schools save energy costs, provide a clean and modern learning environment for students, and teach children sustainable behavior

The Menlo Park City School District is a community-funded district that derives most of its revenue from local, rather than state or federal, sources. As a result, fundraising organizations such as the Menlo Park-Atherton Education Foundation and school Parent-Teacher Organizations (PTOs), which draw on the contributions of parents, businesses, teachers, and local residents, are responsible for funding a substantial portion of the district's budget.

Energy efficiency plays a key role in keeping non-student related operational expenditures low, which results in direct savings for parents and the community. Upgrades to efficient equipment, materials, and technology as schools undergo renovation can save significant utility and maintenance costs, and installations for renewable power generation can provide schools with clean, reliable power while increasing comfort in classrooms. For instance, Hillview Middle School underwent a green renovation that will save at least $85,000 per year in utility costs through solar installations, conserve up to 700,000 gallons of water, reduce uncomfortable classroom temperatures, and ensure that children are not exposed to hazardous building materials (Figure 15).[126]

Figure 15

Solar panels on Hillview Middle School

Schools are also an important venue for educating children about sustainable behavior. By reaching children at an early age, schools can help children think about sustainability as routine, rather than as behavior change after unsustainable habits are already formed. Moreover,

environmental education can engage students in science, technology, engineering, and math (STEM) education by demonstrating the applicability of STEM to everyday life. As the U.S. aims to increase the number of students interested in STEM careers to fill a gap in workforce needs, schools are seeking every opportunity to promote STEM education experiences that get kids excited about STEM fields.[127] Sustainability is an ideal subject for hands-on learning, especially as it offers children the opportunity to get out of their classrooms and enjoy the outdoors as they learn.

Finally, educating children about sustainability provides spillover benefits among parents and the broader community. Children may pass on lessons to their parents, grandparents, and friends at home. And as children age and become the next generation of community leaders, they will be responsible for sustaining the green movement as the impending dangers of climate change loom large.

Green streets, clean air, outdoor activities, and less waste ensure healthy kids

Green efforts provide perfect opportunities for children to enjoy the outdoors and stay healthy

Green efforts provide perfect opportunities for children to enjoy the outdoors and stay healthy. As childhood obesity has more than doubled in the last thirty years, children will benefit from easy ways to incorporate exercise into their daily routines and maintain an active lifestyle.[128] Particularly in Menlo Park's temperate climate, children can enjoy outdoor activities year-round.

Sustainability measures can play a role in mitigating the harms of air pollution in the Bay Area. With droughts and major fires (both wildfires and industrial fires like the Redwood City fire in 2013) bringing the Bay Area's air pollution levels to the worst levels in recent years, climate action can help prevent the further deterioration of air quality over time.[129]

Ecological offsets, such as planting trees and conserving watersheds, and decreased waste can help improve air quality and make outdoor spaces more pleasant and attractive for children and families to enjoy. Tree planting also gives youth an opportunity to participate directly in ecological restoration. Menlo Park is particularly supportive of greening efforts that involve trees: the Heritage Tree Ordinance restricts the removal and pruning of large trees and the Street Tree Reforestation Program aimed to replace declining trees with healthy new trees.[130] SRI International also supports Trees for Menlo, a community nonprofit organization dedicated to planting street trees in Menlo Park.[131]

Finally, biking and walking support air quality management and are key components of the Bay Area Air Quality Management District's "Spare the Air Every Day" recommendations.[132] These transportation alternatives can also be a fun form of exercise for children when incorporated into their schedules as time to spend outdoors with friends and family.

Priority initiatives and next steps

- **Expand Safe Routes to School in Menlo Park and centralize resources for parents.** Although the city has done some planning for safe routes to school, additional work on troublesome areas such as the Ravenswood

crossing near Menlo-Atherton High School can further improve safety. The city could benefit from better distribution of information about the program as well: community-based information to help parents learn how their children can begin biking and walking to school safely can encourage a shift in parents' beliefs about the safety of driving alternatives. For example, Palo Alto has a comprehensive website with maps for suggested bike and pedestrian routes to schools, information about crossing guards, and resources for carpools, buses, and shuttles.[133]

- **Designate Parent Teacher Organization and other school advocates for environmental education and sustainability in schools.** Sustainability education is a natural fit as part of STEM education in schools, which already has widespread support. Finding internal champions who understand each school's funding, political, and other factors can help identify opportunities to introduce a greater emphasis on sustainability and environmental education.
- **Establish a youth green corps community service program.** As part of extracurricular enrichment and graduation requirements (such as the Menlo School's required community service), Menlo Park students could learn about and promote sustainability.[134] Such a program could be modeled on Acterra's Green@Home program and adapted to fit Menlo Park's needs. It could send students out to the community to offer energy and waste audits and simple energy upgrade installations, such as efficient light bulbs, low-flow showerheads, and optimized water heater and refrigerator temperatures.[135] To ensure the credibility of volunteers to homeowners, the program should conduct background checks and develop a mechanism to verify qualifications. The program would have the dual benefit of educating students and furthering efficient building upgrades at a low cost. Additionally, students could engage in tree planting and creek restoration projects. Similar youth service-learning opportunities include the National Park Service's Youth Conservation Corp, local Recycling Volunteer programs, and 4-H club community education campaigns.[136]
- **Sponsor creative opportunities for student innovation and participation in sustainable initiatives.** School science fairs could easily incorporate sustainability themes by creating an award for sustainability-related projects. Additionally, an innovation prize or design charrette for solutions to Bedwell Bayfront Park could encourage high school student teams to partner with other community resources like business and Stanford to think creatively about a tangible problem. This type of idea has been previously successful: in 2011, a team of Menlo-Atherton High School students won the statewide Climate Generation award for their project about efficient behavior changes, mentored by Stanford University researcher June Flora.[137]

Contests and events for kids can help increase awareness while providing a fun incentive to participate in sustainable initiatives

Finally, contests and events for kids can help increase awareness while providing a fun incentive to participate in sustainable initiatives. For example, the school district could launch a contest for sustainable transportation to schools, rewarding children who bike or walk to school the most. Palo Alto's

Walk to School Day and Walk & Roll events include bicycle education, art projects, and contests.[138]

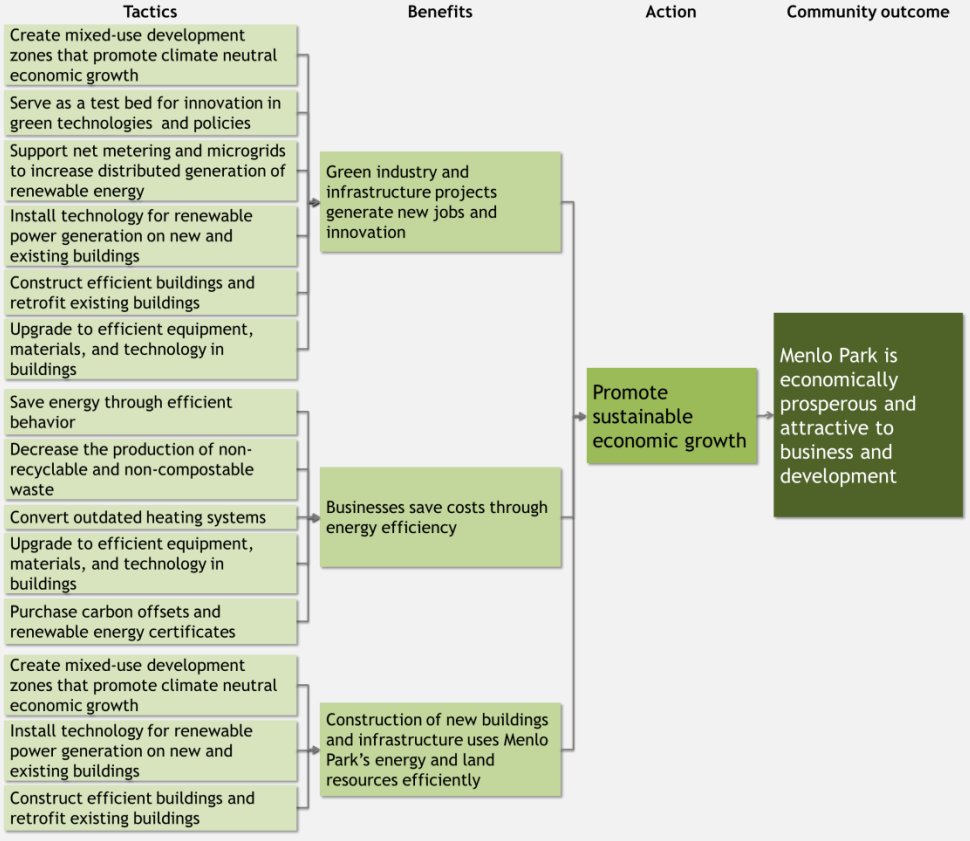
- **Secure funding for grade separation and over/underpass projects, particularly the Ravenswood crossing.** The city has conducted several studies of grade development projects to make crossing the Caltrain tracks and El Camino safer for cyclists and pedestrians. Although the city's request to the San Mateo County Transportation Authority for funding for grade separation design at the Ravenswood Avenue crossing was deferred, the city could attempt to fundraise from unconventional sources like Stanford University, local businesses, or resident crowd funding.[139]

Economic vitality and innovation

As the home of many successful businesses ranging from Facebook and SRI International to venture capital firms to small businesses, Menlo Park enjoys tremendous economic prosperity. Situated in the heart of Silicon Valley, the city is a highly attractive location for development, which creates promising opportunities for private sector investment to lead and support city sustainability efforts. Climate action and green investments can reap substantial benefits for businesses, developers, and residents while ensuring financial stability (Figure 16). Green development projects

Figure 16

Sustainability promotes long-term economic prosperity



will generate new jobs, innovation, and construction, while businesses can save costs through energy efficiency measures.

Green industry and infrastructure projects generate new jobs and innovation

Green industry and infrastructure projects are responsible for a growing number of jobs in the U.S. In 2012, the green building industry accounted for 44% of all U.S. commercial and institutional construction jobs in 2012. Green building could account for over 55% of commercial and institutional construction in the U.S. by 2016, topping $248 billion in revenue.[140] Additionally, residential projects could exceed $114 billion by 2016.[141] In 2011, the Bureau of Labor Statistics released a report suggesting that there are over 3.4 million "green jobs" in the U.S., and the growth rate of green jobs is four times as fast as all other industries combined.[142]

The M2 industrial area presents a perfect opportunity for the city to encourage businesses to look ahead to zero net energy requirements and achieve that target from the outset

Menlo Park can capitalize on the growth potential of green industry by developing old existing building stock and vacant lots into vibrant, sustainable mixed-use development zones. The M2 industrial area presents a perfect opportunity for the city to encourage businesses to look ahead to zero net energy requirements and achieve that target from the outset, rather than building a less efficient building now and incurring additional costs later for retrofits. Bohannon Developments' plan for Menlo Gateway to be LEED Gold for its office buildings and LEED Silver for its hotel should be just the beginning of a movement towards all new buildings being highly efficient.[143]

Tarlton Properties has also demonstrated through the renovation of Menlo Business Park the potential for existing buildings to substantially improve their efficiency. Menlo Business Park's vacancy rate dropped from 30% to below 5% after the renovation, and the complex houses a variety of businesses ranging from biotech startups to light manufacturing companies.[144]

Menlo Park can support the growth of green start-ups by serving as an incubator for new technologies and volunteering to test early products. Menlo Business Park, for instance, served as a test bed for Enlighted's smart lighting control system, a project projected to generate $400,000 in annual energy savings and a million pounds of annual emission reductions while helping to prove an innovative new technology.[145] Not only will serving as an incubator and test bed help create green jobs as these companies grow, but it will also attract environmentally conscious employees who are eager to live and work in a sustainable building and community. A recent survey of employees in developed economies found that over half of employees under the age of 40 considered a company's approach to sustainable business practices in deciding whether to accept a job offer, and over 30% said they would accept a pay cut of 5% or more to work for a global sustainability leader.[146] For example, Facebook has successfully cultivated a reputation for sustainability by renovating its Menlo Park campus to achieve LEED Gold certification for commercial interiors and completing LEED Gold projects like the Prineville Data Center in Oregon.[147]

Finally, the installation of technology for distributed generation, construction of new efficient buildings and retrofits for existing buildings, and installation of efficient

equipment, materials, and technology will create green construction jobs. For example, within the Bay Area, GRID Alternatives partners with job training organizations to prepare adult and youth students for jobs in the solar industry, training hundreds of volunteers and creating $25 million in energy savings for Bay Area low-income families.[148] Expanding programs that work with local organizations and schools to teach students specific, desirable skills for green jobs could have a substantial impact on employment opportunities for Menlo Park residents, who live in an area with rapidly growing demand for efficient installations.

Businesses save costs through energy efficiency

The U.S. Environmental Protection Agency estimates that existing commercial buildings can save approximately 30% of energy consumption

Energy efficient upgrades can yield significant cost savings for businesses through decreased utility bills. Although many businesses realize that energy efficiency investments have some cost-saving potential, they often dramatically underestimate the returns. For example, among a thousand energy projects supported by the Carbon Trust, companies received a stunning average internal rate of return of 48% and payback within three years.[149] The U.S. Environmental Protection Agency estimates that existing commercial buildings can save approximately 30% of energy consumption, beginning with lighting and temperature systems.[150]

Businesses can take a number of simple steps to increase efficiency, many of which are largely cost-free. For example, companies can encourage behavior change among employees by designating employee sustainability champions responsible for reducing stores' and offices' footprints, listing energy efficiency tips applicable to daily tasks, or setting energy saving targets and tracking efficiency in a public dashboard.[151] Although behavior change may seem daunting, there are many examples of successful changes in community culture. For example, Menlo Park's residential recycling program has increased the residential waste diversion rate to 73%. In comparison, 60% of commercial waste still goes to landfill, suggesting substantial opportunities to change behavior.[152]

Businesses can also take measures to decrease waste by purchasing recyclable and compostable supplies and voluntarily purchasing carbon offsets and renewable energy certificates to balance remaining emissions. Finally, businesses that own their buildings can take steps to convert outdated heating to more efficient systems and upgrade other equipment, materials, and technology. Businesses that rent space should reach out to their buildings' owners to push for improvements, encouraging property owners to consider the benefits of differentiating their buildings through sustainable upgrades.

Businesses in Menlo Park can take advantage of resources like PG&E's energy audits to identify opportunities for improvements. For example, Menlo Business Park conducted a comprehensive energy audit that discovered opportunities such as lighting and HVAC improvements through on-bill zero interest financing, rebates, and other incentives provided by PG&E.[153] Other resources like the U.S. Small Business Administration provide information and recommendations for energy efficiency.[154]

Construction of new buildings and infrastructure uses Menlo Park's energy and land efficiently

As the city, developers, and businesses consider new developments and upgrades to existing buildings and infrastructure, efficient planning can maximize the city's economic potential. Sustainable properties will attract more prospective tenants who value sustainability and are seeking lower utility costs. Therefore, the installation of technology for renewable power generation, construction of efficient buildings, and retrofits of existing buildings can maintain Menlo Park's attractiveness to investors and companies.

Mixed-use development can help the city ensure that its growth is both environmentally and economically sustainable

Mixed-use development can help the city ensure that its growth is both environmentally and economically sustainable. Balancing the construction of new office space with corresponding residential units and essential retail space is central to maintaining long-term prosperity as employees are able to live near their workplaces.

Priority initiatives and next steps

- **Develop the M2 industrial area into a net zero energy district.** As the city updates its General Plan, it should designate the M2 as an ambitious test bed for rapid progress towards climate neutrality. Including the recommendation that the M2 become a mixed-use development zone in the request for proposal for development projects in the M2 could begin to attract businesses and other green supporters to the city.

  The first step towards climate neutrality in the M2 would be the construction of Menlo Gateway. The city and Bohannon Developments should work together to secure a hotel partner so the new development can begin.

- **Publicize an open request for proposal for green innovators seeking test beds for new products, and announce the launch of a city green incubator program.** In order to encourage the adoption of green technologies in Menlo Park and elsewhere, the city could announce a partnership with developers and property owners to support technology start-ups. This could occur through test deployments of new technologies that lead to business park-wide adoption contingent on pilot success, or facilities aimed at meeting green startups' needs, such as Tarlton Properties' Menlo Labs at Menlo Business Park.[155] For example, Enlighted, a smart lighting technology start-up, counted 15 buildings for Tarlton Properties and Menlo Park among its biggest early projects.[156]

- **Signal the city's support for private green projects by streamlining the permit and construction process, and demonstrate leadership and economic benefits by installing solar panels on city buildings.** Tangible demonstrations of the city's commitment to supporting green industry and businesses that want to become more sustainable can galvanize private sector action. Although the installation of solar panels on city buildings would have a small direct effect on Menlo Park's emissions, it would signal to businesses that the city wishes to support sustainability. It would also be an opportunity

for the city to demonstrate firsthand the economic benefits and cost savings of green projects. Finally, incentives for private green projects, such as expedited permits, could encourage businesses to make initial investments in sustainability that will pay off in the long run.

- **Explore the willingness of businesses in the M2 to support the Dumbarton Rail project.** Businesses around the M2 industrial area east of Highway 101 would benefit from the revitalization of the Dumbarton Rail line because employees would have a convenient rail option for commuting. For example, Facebook has already demonstrated willingness to invest in the surrounding community by funding a police officer for Belle Haven, so it may be willing to lead a coalition of businesses in a private-public partnership to support the Dumbarton Rail.[157]
- **Investigate funding opportunities for green construction and installations.** The city could facilitate participation in government programs such as commercial PACE by proactively and comprehensively reaching out to businesses to distribute information and answer questions (particularly medium-sized businesses that have sufficient resources and needs but lack dedicated sustainability officers). Additionally, business owners could consider crowd funding for green installations in their business parks through platforms like Mosaic.[158]

Strong neighborhoods, peaceful streets, and historic preservation

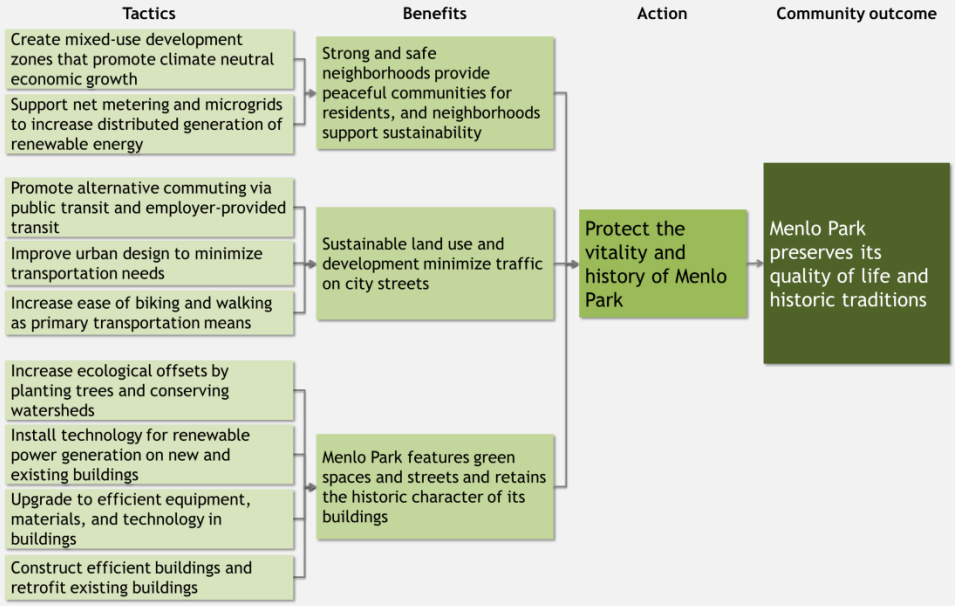
As a tightly-knit community home to many longtime residents, the preservation of Menlo Park's high quality of life is key. Although the city enjoys a vibrant downtown area and growing population, it retains a welcoming and peaceful small town feel and continues to celebrate its history. Sustainability can help protect the city's vitality and residents' quality of life by strengthening neighborhoods, minimizing traffic, and enhancing green spaces and buildings (Figure 17).

Strong and safe neighborhoods provide peaceful communities for residents, and neighborhoods support sustainability

Strengthening existing neighborhoods and building new neighborhoods in areas of new development are important for the preservation of Menlo Park's tightly-knit community culture. Therefore, mixed-use development can not only promote sustainability by decreasing transportation needs, but also support the growth of residential areas. For example, the city's 2012 Environmental Impact Report for the Downtown Specific Plan encouraged development to balance office buildings with residential and retail buildings.[159]

Figure 17

Sustainability enhances quality of life in Menlo Park



Neighborhoods can also be a powerful unit for promoting sustainable changes that benefit residents. For example, in Massachusetts, "neighborhood net metering" allows groups of residential customers living in a single neighborhood to collectively own renewable generators and share the credits from the energy generated.[160] The Colorado Community Solar Gardens Act helps residents without sufficient roof exposure for their own solar generators to purchase shares of Xcel Energy-owned community solar gardens for as little as $1,000.[161] These types of community initiatives encourage neighborhood cooperation and create a shared culture of sustainability among residents.

Sustainable land use and development minimize traffic on city streets

Sustainability efforts can help ensure that all development enhances the quality of life for residents

Sustainability efforts can help ensure that all development enhances the quality of life for residents. Climate action aimed at reducing car trips and promoting alternative transportation methods align with residents' desire to minimize traffic congestion on Menlo Park's streets. Particularly in the downtown area, transit-oriented design can help minimize transportation needs as new development increases business density. Indeed, the city's Downtown Specific Plan includes features such as extensions of sidewalks on Santa Cruz Avenue to make downtown more accessible and bike lane improvements to compensate for expected increases in traffic density that could make biking more difficult.[162]

Planning for mixed use zoning and providing single-car commute alternatives can help mitigate the effects of development on traffic while achieving emissions reductions. For example, alternative commute incentives and services have helped Stanford increase its employee and student population 25% over the last decade while

meeting the Santa Clara County trip cap requiring Stanford to keep vehicle trips constant.[163] Indeed, the university's comprehensive transportation program matched with sustainable development considerations has not only helped decrease traffic to Stanford but also decreased the amount of emissions and parking used.[164]

Menlo Park features green spaces and streets and retains the historic character of its buildings

Residents of Menlo Park enjoy the city's beautiful parks and greenery, as well as the village character of the downtown area.[165] The city already supports environmental offsets that both compensate for emissions and bring joy to the community. For example, in 2013, kindergarten students at Laurel School and city officials planted a strawberry tree in front of the school to celebrate Arbor Day.[166] Events like Arbor Day, Earth Day, or periodic community service weekends can bring the community together around green spaces and give children and families opportunities to enjoy the outdoors. Furthermore, the city's Heritage Tree Ordinance helps protect greenery year-round, and an organization similar to Trees for Menlo could advocate for additional trees throughout the city.

Energy efficiency measures can also help Menlo Park's beloved existing buildings comply with future California zero net energy requirements to prolong their lifespans. Instead of being forced to replace historic buildings with new construction, property owners can install technology for distributed generation, upgrade equipment, materials, and technology, and investigate other options for retrofitting their buildings. While retrofits may be challenging, they bring substantial long-term cost savings benefits. Tarlton Properties' Menlo Business Park, a 25-year-old complex, demonstrates the power of green renovations to revitalize aging structures.[167]

Priority initiatives and next steps

- **Reduce traffic by exploring a comprehensive transportation demand management program.** The city could draw on lessons from Palo Alto's newly launched downtown transportation program, which seeks to balance rapid development and growth with a comprehensive vision for transportation. The city could begin by establishing an official transportation management agency to coordinate efforts including biking, walking, public transit, and traffic mitigation.
- **Work with neighborhood associations to establish sustainability teams that will educate and support peers in their neighborhoods.** Residents are more likely to adopt sustainability measures tested by and advocated for by their peers. Neighborhood associations have substantial influence over regulations for renovations, landscaping, and other climate-related actions and can ensure that sustainable solutions are part of the community dialogue and tailored to residents' needs.
- **Support the expansion of the Bay Area Bike Share to Menlo Park.** The bike share program already serves the nearby cities of Palo Alto and Redwood

City, so Menlo Park could request the addition of stations to help bridge existing stations to the north and south.[168]

- **Plant trees.** Simple community service days for families and children or businesses can encourage community members to support sustainability at a low cost, while building public awareness of green efforts. The beautification of parks and streets can also be paired with regular celebrations like Earth Day.

Equitable and inclusive prosperity

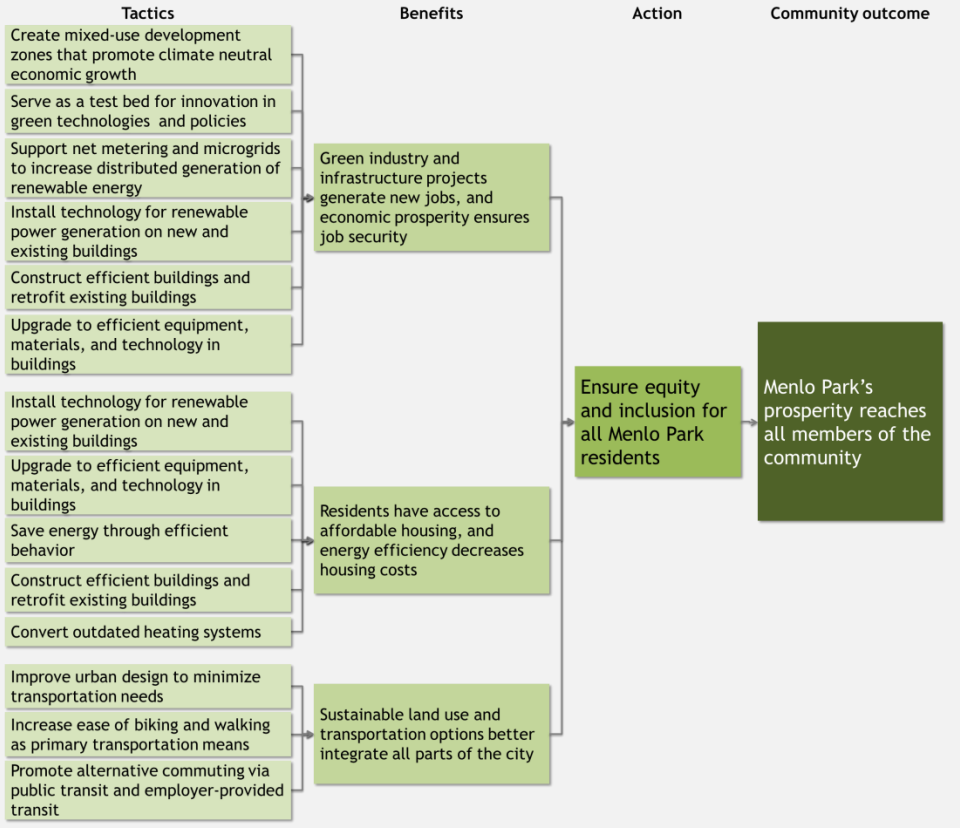
Although Menlo Park is a prosperous and relatively affluent city, not all residents share equally in its wealth. 5.4% of its residents were below the poverty line in 2011, including 7.5% of black residents, 7.2% of Hispanic or Latino residents, and 8.6% of residents who are two or more races.[169] East of Highway 101, Belle Haven's median household income is $77,000 in comparison to $110,000 across the entirety of the city.[170] A greater share of Belle Haven residents are underrepresented minorities and are English language learners, and average educational attainment is lower.

As the city adopts green reforms, it must ensure that all Menlo Park residents share in the city's economic prosperity, especially because less affluent areas may face greater

As the city adopts green reforms, it must ensure that all Menlo Park residents share in the city's economic prosperity

Figure 18

The benefits of sustainability promote equity across the city



implementation challenges even as they stand to benefit the most from greater efficiency. A community movement towards climate neutrality can help families save costs, generate new jobs for blue-collar workers, and create a greater sense of inclusion across the city (Figure 18).

Green industry and infrastructure projects generate new jobs, and economic prosperity ensures job security

Green construction supported more than 3.3 million workers in the construction industry between 2009 and 2013, along with many additional workers employed by suppliers of green building materials and products

The economic benefits of green industry and infrastructure projects discussed previously can particularly advantage underserved populations and blue collar workers. As Menlo Park improves its built environment, more green construction jobs will become available. The U.S. Green Building Council estimates that green construction supported more than 3.3 million workers in the construction industry between 2009 and 2013, along with many additional workers employed by suppliers of green building materials and products.[171] Green construction and efficiency improvement projects tend to create local jobs because they require transformations to existing infrastructure and the production of manufactured parts that are difficult to offshore. For example, a weatherization project must employ local workers because buildings cannot be moved for weatherization and then returned to their original site. And in the manufacturing sector, component parts for green technologies like wind turbines are too large and expensive to transport, so they are most cost-effectively produced near their ultimate destination, thereby generating manufacturing as well as construction jobs.[172]

Therefore, many climate action tactics will naturally generate economic prosperity and job security for low-income and middle class workers. Creating mixed-use development zones and serving as a test bed for innovative green technologies will make Menlo Park an attractive location for businesses that create construction and service industry jobs. The installation of technologies for renewable power generation, construction of efficient new buildings, retrofits of existing buildings, and building efficiency upgrades all create a steady stream of job opportunities for workers with a variety of skill sets in industries including construction, mechanical, heating, plumbing, landscaping, and other industries.

For example, Facebook's new West Campus, a 433,500 square foot project that includes green features such as a rooftop forest, will employ hundreds of workers from Level 10 Construction (a Silicon Valley company whose president worked on the Sun Microsystems Campus purchased by Facebook) during its construction phase.[173] Additionally, the Menlo Gateway Project is estimated to create 1,800 construction jobs and a net total of over 1,800 new permanent jobs, with priority for Menlo Park residents seeking both construction and permanent jobs.[174]

Residents have access to affordable housing, and energy efficiency decreases housing costs

Housing prices in Silicon Valley have spiraled upward in recent years, due in large part to the region's technology boom. The median rent in Menlo Park exceeds $1,700 per month, ranking in the upper half among cities on the Peninsula.[175]

New green construction can benefit low income residents by increasing the supply of affordable housing. As new residential buildings are constructed to increase the housing supply, low-income residents may have greater access to housing. For example, Facebook plans to construct a 394-unit apartment complex called Anton Menlo near its Menlo Park campus to address the city's housing shortage. Most of the buildings will be open to non-Facebook employees, and some will be rented at below market rates for low-income residents.[176]

Energy efficiency improvements can also provide substantial cost-savings benefits for low-income households. Indeed, the average low-income households spends 16% of its income on energy costs, more than four times the level of average households, so reductions in energy bills can free up valuable income for other households needs.[177]

Installations for renewable power generation, efficient upgrades for equipment, materials, and technology, building retrofits, and upgraded heating systems can create large savings on low-income residents' utility bills. Additionally, educating residents about efficient behavior changes could provide cost-free opportunities to save.

Many programs are available to help low-income residents cover the initial costs of efficiency investments. The Federal Department of Health and Human Services offers the Low Income Home Energy Assistance Program, which provides low-income households with funding via local government and nonprofits to weatherize their homes for greater energy efficiency. California and PG&E's Energy Savings Assistance Programs offer free improvements like CFL lights, caulking, showerheads, and appliance replacements.[178] Additionally, programs like Opower's Home Energy Reports deliver efficiency savings to more than 85% of homes, including those ineligible for or unaware of free upgrade programs.[179]

Sustainable land use and transportation options better integrate all parts of the city

Menlo Park's unique geography currently poses challenges to the integration of residents across the city. Highway 101 separates Belle Haven and the M2 industrial area from the rest of Menlo Park, and El Camino and the Caltrain railroad tracks divide the remainder of the city.

Transit-oriented development, focusing on transportation options and compact development, can improve east-west connectivity within the city. This could help residents in geographically isolated neighborhoods access the downtown area more easily and feel more integrated into the community. Green initiatives such as improved biking and pedestrian routes increase safe transportation options for families without cars or who seek to minimize fuel costs by driving less. Improved public transit systems double as sustainable commute options as well as means of accessing everyday needs for residents. Increasing the prevalence of employer-provided transit also allows residents who cannot afford to live in expensive areas but also cannot afford to pay for long commutes by car greater flexibility to choose workplaces throughout the city.

Menlo Park has taken some steps to improve both sustainability and integration of the city's geographically scattered neighborhoods. For example, city shuttles run to some destinations east of Highway 101, such as the Belle Haven library. The expansion of public shuttle routes can help take cars off the road and increase ease of access to the downtown area for residents who live in Belle Haven.

Priority initiatives and next steps

- **Explore private-public partnerships in the M2 and Belle Haven to further equity through sustainability.** For example, the city could inquire about businesses' interest in funding a sustainability and equity staffer in Belle Haven, similar to the police officer position Facebook funds. Sustainability could also be an opportunity for Facebook and other businesses in the M2 to meaningfully expand their community service initiatives by organizing employees to conduct energy audits or provide environmental education to less privileged residents who would benefit most from energy efficiency upgrades.
- **Develop and distribute a city guide to energy efficient behavior for residents, and teach sustainability classes at community centers, emphasizing cost-savings benefits.** In order to increase residents' comfort level and exposure to information about sustainability, the city should sponsor and promote environmental education materials. By distributing the information through trusted venues, such as the Onetta Harris Community Center, the city can reach a wide audience that might otherwise not learn about the personal economic benefits of costless efficient behavior changes. Though the city has worked to distribute information like this in the past, it could successfully reach a broader audience through a concerted effort to leverage not only city distribution channels, but also local newspapers, community groups, schools, and businesses to promote awareness of the materials.
- **Research possible high efficiency vehicle donation or trade-in programs to accelerate vehicle turnover among low-income drivers.** Although California offers the Consumer Assistance Program and Enhanced Fleet Modernization Program, which include higher incentives for high-emitting vehicle retirement and replacement, the structure of the programs' incentives could be

Savings from switching to more efficient vehicles

Even for residents who cannot afford a hybrid or electric vehicle, switching from a highly inefficient car to a moderately more efficient car can create substantial cost-savings.

Residents who trade their 15 miles-per-gallon car for a 30 miles-per gallon car can save over $1,235 annually. Across Belle Haven, this would translate to over $3 million per year in savings for residents.[vii] 180

[vii] Based on 1,294 households in Belle Haven (4,658 residents in Belle Haven with an average household size of 3.6 people) and two cars per household (the average for San Mateo County).

improved to increase emissions benefits.[181] Additionally, a local program could draw on the resources of wealthier vehicle owners in Menlo Park and surrounding areas who want to replace their cars with new cars. A vehicle trade-in or donation incentive could help create a pool of higher efficiency used vehicles for low-income drivers, making the transition to cleaner vehicles more affordable in combination with California's rebate programs.

- **Request GRID Alternatives' assistance for solar installations in Belle Haven.** GRID Alternatives has installed solar power for over 4,000 families, providing over $110 million in energy cost savings.[182] Each home outfitted with solar panels saves an average of 80% off its electricity bill, dramatically increasing disposable income for other needs like food and education. The organization also trains volunteers on solar installation, providing valuable experience to catalyze entry-level job opportunities in the solar industry.[183] Stanford's chapter of GRID Alternatives has a special focus on low-income families near the university, which could make Belle Haven an attractive partner.[184]

- **Explore program-related investments from foundations, green bonds, and crowd funding to lower the cost of financing for solar, energy efficiency, and vehicle upgrades.** A variety of creative financing methods could help alleviate the up-front cost burden of efficient upgrades for low-income residents (see example box below). Low-interest loans in the form of philanthropic program-related investments or green bonds could be repaid over time, and crowd funding platforms like Mosaic or Kickstarter could help large projects pool together many small donors who would otherwise be unable to gather enough resources to reach scale. Investors interested in both

Costs and savings for solar installations

The adoption of green solutions can both be inexpensive up-front and generate massive long-term cost-savings.

For example, 30% of Menlo Park might adopt residential solar through rooftop or community solar projects.[viii] [185] Over three-quarters of residents choose third-party solar installations (such as solar leases) instead of purchasing their own panels, which yield no up-front costs and create immediate savings from current utility bills.[ix] [186] For the remaining residential installations, the average cost of purchasing a solar PV system is about $10,000.[187]

In total, residents would pay approximately $3.7 million to achieve 30% residential solar penetration in the city. The total financing cost (including costs borne by third-party installers for leases) for all of this solar would be about $24.9 million.[188] Yet the average 20-year savings for a residential solar installation is over $34,000. Therefore, the total net savings for residents in 20 years would be $80 million. Even accounting for the total financing for installations, the 20-year savings would be $59 million.

[viii] 22-27% of homes are eligible for rooftop solar installations. Community solar is an additional option for some rooftop-ineligible homes. Estimate based on 13,180 housing units within 8,901 buildings (calculated from Census data about the distribution of housing units among buildings of varying sizes). 30% of residential buildings to adopt solar totals 2,670 buildings, minus approximately 230 buildings that already have solar based on California Solar Initiative applications.

[ix] Estimate based on 85% of residents choosing third-party solar because the rate of third-party solar as a share of total solar installations is rapidly increasing in California.

sustainability and equity could be particularly motivated to fund these projects because of their dual climate and economic benefits.

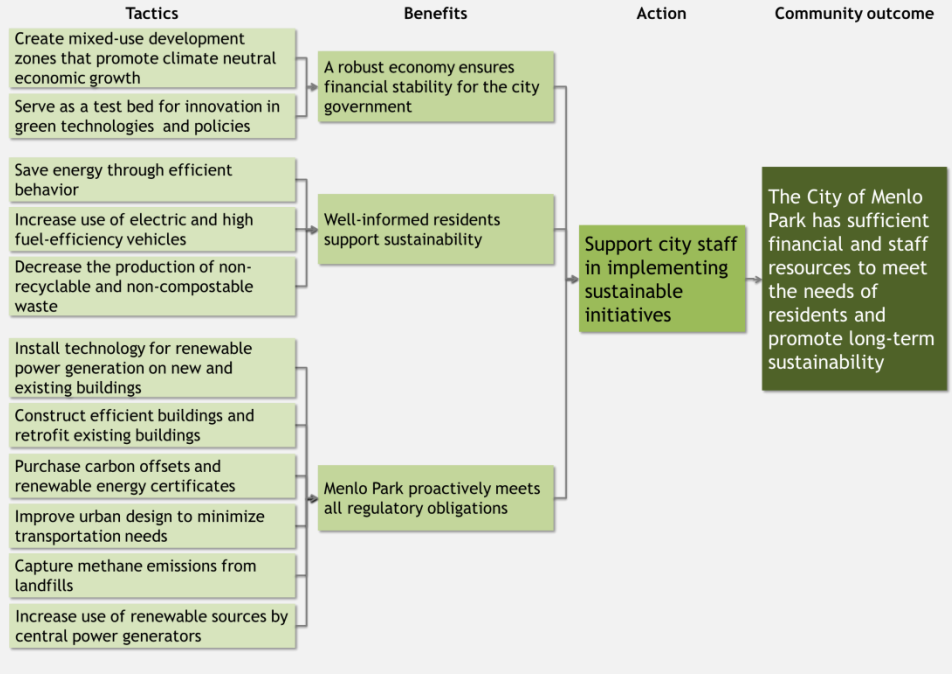
- **Investigate opportunities to encourage landlord-led energy efficiency upgrades.** Because many residents in Belle Haven rent their homes, they often cannot retrofit and upgrade their buildings themselves due to lease terms or uncertainty about the permanence of their residence. Moreover, landlords who can easily find tenants in a competitive housing market may not wish to pay for upgrades. Therefore, the city could consider proactively reaching out to landlords to explain the long-term return on investment for building upgrades, as well as tailoring any efficiency retrofit programs to include incentives for landlords to participate.

Responsible governance and robust city services

The City of Menlo Park aims to govern responsibly and provide a wide range of city services. As the community engages with sustainability issues, the city council and staff seek to ensure that the city government has sufficient financial and staff resources to meet residents' needs and promote sustainability. Sustainability can support the City of Menlo Park by promoting economic prosperity that leads to financial stability, encouraging residents to be a well-informed and active citizenry, and helping the city proactively meet all regulatory obligations (Figure 19).

Figure 19

Sustainability supports responsible governance



Climate leadership in Menlo Park will strengthen the city's economy and ensure financial stability for the city government

A robust economy ensures financial stability for the city government

Climate leadership in Menlo Park will strengthen the city's economy and ensure financial stability for the city government. New development can generate substantial revenue for the city, as mixed-use development leads to more construction of office and residential properties.

For example, the Menlo Gateway project requires that Bohannon Developments begin with the construction of its LEED Silver hotel, which is expected to generate over $1.2 million in sales and hotel taxes in the first three years after the hotel opens, in addition to 2% in subsequent years and $1 million in public benefit fees for capital improvements. The city has also collected substantial development and permitting fees.[189] Additionally, the city will benefit from Menlo Park serving as a test bed for innovation in green technologies. By supporting the growth of green businesses in the city, the local government will ultimately be repaid in sales and income taxes, as well as a more vibrant community overall.

The city government can also directly benefit from increasing municipal energy efficiency. Although municipal operations account for a very small fraction of communitywide emissions in Menlo Park, greater efficiency could help the city free up some of its budget for additional programs for the community.

Well-informed residents support sustainability

Greater community awareness of climate issues and support for climate action would likely help the city reach its emissions reduction goals more easily. Efficient behavior changes, greater resident uptake of electric and high efficiency vehicles, and decreased residential and commercial waste production could all signal growing willingness in the community to back local government action. Although new efficiency regulations might not be well-known now, once residents have reached a critical mass of adoption, the city could have the political legitimacy to mandate changes across the board.

For example, Menlo Park and many other cities in California levy a utility user tax, which taxes the consumption of utility services and must be approved by voters through a ballot measure. If Menlo Park residents were willing to support a temporary increase in the utility user tax, the tax revenue could help fund the city's efforts to increase energy efficiency and transportation resources. Alternately, the revenue from an increased utility user tax could be put into a revolving loan fund or loan guarantee program to support renewable installations and then be returned to residents after efficiency improvements are complete. Demonstrated resident interest in sustainability could also help the city win grant funds for its desired sustainable projects, such as the installation of additional electric vehicle charging stations.

There are promising signs that Menlo Park residents can become an increasingly engaged, green citizenry. For example, the Green Ribbon Citizens' Commission gathered a large and diverse group of over 120 volunteers who were able to elevate the salience of climate and sustainability issues in the public dialogue.[190]

Menlo Park proactively meets all regulatory obligations

Menlo Park's Climate Action Plan sets the city's emissions reduction targets just above the level of current California regulations (27% below 2005 levels by 2020 to barely exceed AB 32's goal of 1990 levels). However, California's target is likely to become even more aggressive after 2020. Although not legally binding, Governor Arnold Schwarzenegger's 2005 executive order that initially declared the 2020 goal was accompanied by an even more ambitious goal for 2050: reduce emissions to 80% below 1990 levels.[191]

By supporting community action toward climate neutrality early, the city can ensure that it keeps pace with the state's increasingly strict climate regulations

By supporting community action toward climate neutrality early, the city can ensure that it keeps pace with the state's increasingly strict climate regulations and avoids penalties for noncompliance. Menlo Park can only reach neutrality through a comprehensive vision and plan, and the city is positioned in the middle of all the community's issues to act as a central coordinator. The city has direct control over some opportunities, such as urban planning and zoning, methane capture from Bedwell Bayfront Park, and city participation in market-based carbon offset schemes. The city can also advocate for, educate residents about, and provide support for the installation of renewable power generators, efficient construction and retrofits, and renewable central power. However, the 27% reduction is quite challenging for city staff and the city council to achieve through their influence alone. Menlo Spark will help the city reach this goal by promoting community action that can alleviate the leadership burden on the city by itself and allow the city to exceed its target.

Priority initiatives and next steps

- **Support the inclusion of an additional environmental programs staff position in the city budget, and seek funders willing to match that staff member with another position paid by donors.** The majority of existing environmental programs city staff's time is occupied by regulatory compliance, leaving little time to advance progress on the Climate Action Plan. Additional staff positions would allow staff to devote more time to moving the community ahead of current mandates, and the city could potentially find funders willing to fund additional staff, match new staff positions, or pay for full-time consultants.
- **Contact green technology companies to discuss the possibility of city adoption of their technologies.** For example, before Menlo Park replaces its police car fleet, it could reach out to Tesla to discuss the possibility of electrifying the city's fleet. The city could present the opportunity for businesses to test the market for their products among city governments, which could grow into a major source of revenue if expanded statewide or nationwide.
- **Reach out to cities like Fort Collins and Sacramento to discuss the creation of a zero energy district and other best practices.** By connecting with other leading innovative cities, Menlo Park can learn from best practices in technical solutions, community engagement, and city governance. Menlo Park could also explore partnerships with nonprofit organizations like the

Rocky Mountain Institute, whose deep technical knowledge could supplement city staff's local expertise.

- **Pass stricter green building ordinances for residential and commercial buildings in advance of California's zero net energy building mandate deadlines.** Because the city has control over zoning and construction issues, unlike transportation, it can pass ordinances that substantially accelerate progress. As the city council and staff reexamine the General Plan and Downtown Specific Plan, it could consider strengthening green development regulations to help the city reach California's rapidly approaching zero net energy targets.
- **Explore financing opportunities from federal, state, and other grant sources.** Although the city and its residents and businesses may be eligible for a variety of funding supports and incentives, the lack of clear, consolidated, and trustworthy information deters individual action. City staff should continue to investigate financing opportunities like PACE, Energy Upgrade California, and the OneBayArea Grant Program to identify potential matches with community goals and distribute information about programs widely.[192]
- **Connect Menlo Park city staff with city staff from Palo Alto and other Bay Area cities, and open a dialogue about possible multi-city initiatives.** Menlo Spark can facilitate introductions between environmental programs and related staff in Menlo Park and other cities around the Bay Area. As cities across California face tightening state regulations on climate issues, interest in collaborative regional partnerships will continue to grow. Working across city lines offers opportunities to tackle larger problems, such as public transit or waste treatment facilities, which require regional coordination.

Menlo Park can launch a broadly inclusive community movement that furthers not only sustainability goals, but also the community's vision for prosperity, safety, health, quality of life, and responsible governance

To reach climate neutrality, Menlo Park can launch a broadly inclusive community movement that furthers not only sustainability goals, but also the community's vision for prosperity, safety, health, quality of life, and responsible governance. This must begin with the city, businesses, and residents coming together to demonstrate their leadership (Figure 20). The success of this movement can ensure that Menlo Park continues to thrive for many years to come. The next chapter explains how Menlo Spark can launch this movement and set incremental goals to scale from part of Menlo Park to the entire city and beyond.

Figure 20

Community action checklist

What you can do if you are a...

Resident

- ☑ Tell City Council you support transit-oriented development and a zero net energy district in the General Plan
- ☑ Walk, bike, or carpool to work
- ☑ Sign up for a home energy audit
- ☑ Apply to participate in PACE, vehicle rebates, or other efficiency programs
- ☑ Talk to your neighbors about going green together by installing solar panels and planting trees
- ☑ Help your child plan a safe biking or walking route to school, or talk to your PTO about safe route improvements
- ☑ Find likeminded members of your community organizations (e.g. Menlo Park Presbyterian, Rotary Club of Menlo Park, Little House) to support sustainability in the organization and community

Business

- ☑ Offer your employees resources and rewards for walking, biking, or carpooling to work
- ☑ Offer to pilot a new green technology
- ☑ Designate an office sustainability manager to support green employee behavior
- ☑ Sign up for a commercial energy audit or ask your landlord to get an audit for your building
- ☑ Talk to other businesses in your area (e.g. downtown, the M2) about pooling funds to support green investments
- ☑ Create a fun workplace recycling and compost competition to match Menlo Park's residential landfill diversion rate
- ☑ Mobilize your employees for a green volunteer day in Belle Haven

Menlo Spark will serve as a facilitator, connector, and catalyst for change

Making change happen

Menlo Park can become a national leader in climate action by investing in solutions that strengthen the community. However, achieving the city's vision for prosperity and sustainability will require a successful community movement like Menlo Spark. By engaging residents, businesses, government, and philanthropy, Menlo Spark will serve as a facilitator, connector, and catalyst for change. Menlo Spark's success can create change not just in Menlo Park, but throughout the country as a demonstration of the power of small cities to achieve transformative change.

This chapter first explains the role of Menlo Spark in galvanizing change within Menlo Park, setting incremental goals to guide local success. It then describes how Menlo Park's local movement can grow into regional and statewide transformation by setting examples of best practices and pushing for policy reforms. Finally, it outlines a path to scale Menlo Park's local movement into national action by leading a coalition of likeminded small cities across the United States.

Building a movement within Menlo Park

Menlo Spark's first priority is success within the local Menlo Park community. In order to achieve citywide change, residents, businesses, and government will come together to launch Menlo Spark as the backbone of a powerful and inclusive community-wide movement for sustainability.

Menlo Spark will be designed to support community needs

Menlo Spark will be a nonprofit initiative that collaborates with the city government, businesses, and residents to ensure the success of the community's efforts on climate and sustainability-related issues. By helping to weave together the network of projects and initiatives in the city that may contribute to sustainability, Menlo Spark will support a more unified strategy for progress towards climate neutrality.

Menlo Spark will be modeled after other highly successful community initiatives. For example, the Menlo Park-Atherton Education Foundation funds over 10% of the school district's operating budget, serves as a forum for parents and others to contribute meaningfully to the city's vision, and garners tremendous respect within the community.[193] As climate change and the benefits of sustainability affect all residents of Menlo Park just as education does, Menlo Spark can grow into a similarly prominent and successful organization.

While the community will be the primary driver of initiatives, Menlo Spark will engage in a number of supportive activities and could run some of its own projects as well. Its activities may include (Figure 21):

- **Engaging the community and conducting media outreach.** Because Menlo Spark will be devoted to climate action and sustainability, it can help ensure that climate issues remain prominent in the community dialogue as current issues shift over time. Menlo Spark could organize a community visioning exercise early in its timeline to gather the views of residents and other stakeholders in order to ensure that its goals and strategy align with the community's needs.

Figure 21

Potential roles for Menlo Spark

- **Educating businesses and residents about opportunities.** Although there are many opportunities for businesses and residents to get assistance for efficiency upgrades and other sustainability measures, it can be hard to distribute information about these opportunities. While the city is an important resource for information, Menlo Spark can supplement its community education activities by serving as a trustworthy, comprehensive, and available resource that translates information into easily understandable and actionable next steps.
- **Identifying and organizing volunteers.** There is substantial community interest in green projects such as planting trees or recycling. However, individual projects often need to seek volunteers on their own, which can be difficult for time-constrained organizers. Menlo Spark can help identify and organize a team of dedicated long-term volunteers, such as local experts or neighborhood leaders, who can serve as a base for launching projects over the long term. Menlo Spark can also help bridge the gaps between different parts of the community that might not otherwise realize their interests overlap.
- **Supporting the city's (and county's) efforts by connecting it with experts, other cities, and resources.** City staff are deeply knowledgeable about local issues and are often interested in collaborating with others, but have limited time to devote to researching additional outside opportunities. Menlo Spark can facilitate connections between Menlo Park's city (and county) officials and experts, government officials, and resources from other areas. By identifying useful external partnerships and resources with an understanding of Menlo Park's needs, Menlo Spark can help city staff find opportunities to maximize the productivity of their engagements beyond the local community, as well as bring in the best possible assistance for areas of need.

- **Fundraising for projects and securing outside funding sources.** As a visible symbol of Menlo Park's devotion to climate action and sustainability, Menlo Spark can draw the attention of funders for community projects. It can secure grants and other outside funding sources, as well as engage the community to fundraise locally for projects.
- **Conducting a detailed technical assessment of what is feasible in Menlo Park, and monitoring progress.** City staff conducts annual emissions inventories for municipal and communitywide emissions. However, they have limited time to explore additional technical research beyond the currently used model. Menlo Spark could work with technical experts to conduct a more detailed assessment of Menlo Park's emissions and draw actionable conclusions about what measures are feasible in the city. This could help city staff learn about any additional opportunities, or provide a more detailed understanding of the potential for and sequence of known opportunities, without having to invest a substantial amount of time in conducting the analysis on their own. Menlo Spark could also help the city monitor progress on climate action across government and community efforts.
- **Running a handful of projects of its own.** Menlo Spark could launch a few ambitious signature projects to help raise its public profile and generate community buy-in for future grassroots community action. Such projects could include a sponsored prize for solutions to Bedwell Bayfront Park's methane emissions, an initiative to put solar panels on a large swath of rooftops in part of the city, and a green startup incubator or accelerator program supported by Sand Hill Road venture capitalists. Once established, the projects could be taken over by community members, other organizations, or the city.

In order to effectively support the community, Menlo Spark will begin with a full-time executive director, who will be responsible for launching the organization and running its day-to-day operations. As project needs grow over time, the organization may add additional staff positions as resources allow. Menlo Spark will also help identify funding for an additional environmental staff position in the city government. This will allow Menlo Spark to connect directly with city staff's needs and free up additional city staff time to devote to progress on climate action beyond current regulatory burdens.

Menlo Spark will gather volunteers to help run programs and draw on the tremendous expertise of the community to support its strategy. The advisory board will include leaders from across the community, spanning key constituencies such as developers and businesses, neighborhood leaders, and environmental advocates. Menlo Spark will intentionally liaise with the city and county to support government climate action initiatives and ensure that its community-driven efforts are consistent with government needs.

Overcoming barriers to action

Although many Menlo Park community members support sustainability and climate action, a few barriers prevent rapid and substantial progress in emissions reduction. Menlo Spark aims to directly address these barriers, including:

- **Capacity of city staff.** Menlo Spark's staff will supplement the city's busy environmental programs staff, providing assistance with projects, research, and outreach as needed. In addition, Menlo Spark will seek funding opportunities for additional city staff and run independent projects city staff do not have the capacity to manage themselves.
- **Financing and costs.** Even though investments in energy efficiency and sustainability are profitable over time, the city, businesses, and residents are often deterred by up-front costs. Menlo Spark will work to secure funding sources, such as government and philanthropic grants, for green projects. It will also promote awareness of alternative funding opportunities such as crowd funding. Because Menlo Spark is a uniquely ambitious and promising movement, it will help raise Menlo Park's profile among potential funders and investors.
- **Sustained community attention.** Residents of Menlo Park have many interests, which often shift in priority within the public dialogue. As a dedicated green organization, Menlo Spark will be a consistent voice for sustainability interests and also seek opportunities within other community projects to indirectly incorporate and further sustainability.
- **Access to information.** Although a great deal of research supports the many possible green solutions in the pathway to climate neutrality, the research is often time-consuming to find and understand and poorly distributed amongst the general public. Menlo Spark will work to synthesize this information and communicate digestible, actionable next steps to residents, businesses, and the city.
- **Select technical solutions.** Many new green innovations are still being tested or have yet to reach their scale potential. Therefore, they remain too costly and are perceived as too risky for mainstream adopters. Menlo Spark will encourage Menlo Park as a whole, and businesses and individuals within Menlo Park, to seize opportunities to act as a green incubator and serve as a test bed for innovation, helping refine and scale new technical solutions for widespread adoption.

Local businesses and institutions can also join Menlo Spark as partners. For example, prominent businesses such as Facebook, Kepler's Books, and Kleiner Perkins Caufield & Byers can lend credibility, resources, and community insights to the initiative. Other institutions such as Menlo Park Presbyterian Church and neighborhood associations can create a network of interests unified in support of sustainability and reach a broad set of residents.

Finally, Menlo Spark will likely be housed at an existing local organization that supports sustainability and climate action. This will connect Menlo Spark's staff with others in the Bay Area interested in sustainability, allowing Menlo Spark to both share its ideas and learn from others pursuing similar goals.

Establishing initial goals

Menlo Spark will evolve and set incremental goals to reach climate neutrality

After launching the Menlo Spark initiative, the community should set goals and track progress in the short, medium, and long-term to ensure that it maintains its focus on the ultimate goal of climate neutrality and is able to adjust its strategy as necessary. Figure 22 summarizes how Menlo Spark will evolve and set incremental goals to reach climate neutrality.

Figure 22

Growth of the Menlo Spark local movement

Initial progress in Menlo Park within the initiative's first 12 months should focus on community engagement victories. Its goals could include:

- **Align a core set of key constituencies, institutions, and local leaders behind the initiative.** Menlo Spark will start by finding partners that will help integrate it into diverse parts of the community. For example, identifying leaders within Menlo Park Presbyterian Church, the Belle Haven community, and key neighborhood associations willing to spread the word about and advocate for Menlo Spark's efforts could help the initiative reach many residents through a few well-placed contacts.

  Menlo Spark should also approach the city's major institutions, which could not only provide resources for programs but also lend the initiative local and external credibility. Institutions that could be promising matches include Facebook, SRI International, a leading venture capital fund, and the Hewlett Foundation.

  Finally, the endorsement of local leaders is necessary to achieve policy changes in the long term, as well as encourage community participation in the short term. Menlo Spark should aim for public support from a majority of the City Council, Planning Commission, and Environmental Quality Commission.

- **Launch several high profile projects that receive substantial local media coverage.** These programs should focus on building momentum and convincing the community that climate neutrality is possible, while laying the groundwork for deep emissions reductions in the longer term.

- **Secure easy wins for emissions reductions.** The city can support several programs that are relatively low-hanging fruit and will lead to early emissions reductions. These programs might include Energy Upgrade California, residential PACE, commercial PACE, the stricter California green building code, and regional grants from OneBayArea. Although the emissions reductions from these efforts may not be very deep, they will help build allies within the community who can then serve as advocates to and resources for their peers and neighbors.

- **Start a few small projects that provide low-cost opportunities for people to join the initiative and publically identify as green.** Menlo Park can build its public reputation as a grassroots campaign by encouraging individuals to self-identify and publically represent as members of the movement. The effort could be similar to a political campaign, employing strategies like yard

Menlo Spark should highlight early projects and victories, small or large, to increase community optimism and excitement about green solutions

signs, t-shirts, bumper stickers, Facebook likes, and mailing list sign-ups. Menlo Spark could also solicit small active commitments to the environmental cause, such as through a five dollar donation program. Social psychology research suggests that small initial active commitments to environmental causes make individuals more likely to make larger commitments to the cause in the future.[194]

- **Draw attention to public engagement projects and early wins.** Menlo Spark should highlight early projects and victories, small or large, to increase community optimism and excitement about green solutions. It could host community visioning forums, run an energy-related event at a church fair or other major existing event, reach out to reporters at The Almanac and InMenlo for consistent news coverage, and use neighborhood social networks such as Nextdoor to generate informal buzz.
- **Establish baselines and targets for the adoption of green solutions.** A deep technical analysis of Menlo Park's progress towards the adoption of green solutions would provide crucial guidance for the initiative and city to refine its priorities. Menlo Spark should support research to estimate the current penetration of solar installations, modes of transportation, and electric and high-efficiency vehicle ownership. It should also work with PG&E to get more detailed information about power usage and utility power generation specifically within Menlo Park.

Following the early public launch of Menlo Spark, the initiative should aim to make substantial progress in emissions reductions within three years. These interim goals could include:

- **Secure the switch to 100% renewable power.** Renewables constituted only 19% of PG&E's electric power mix in 2012, and its goal is 33% renewables by 2020 to comply with California's renewable portfolio standard.[195] Therefore, reaching 100% renewable power may initially seem like a daunting task to achieve within three years. However, neighboring Palo Alto has already achieved completely carbon neutral electricity through its municipal utility (its portfolio is up to 85% long-term dedicated renewable resources, combined with purchased short-term renewables or renewable energy certificates), and community choice aggregation (CCA) provides 100% renewable options to customers of Marin Clean Energy.[196]

  Menlo Park therefore has several options to reach completely renewable power in a short timeframe. Sonoma County, for example, is setting up its own CCA similar to Marin's, a process which launched in mid-2011 and will begin serving customers in mid-2014.[197] The increasing popularity of CCA in the Bay Area (San Francisco and parts of the East and South Bay are also moving towards establishing CCAs) could accelerate Menlo Park's progress if it chose to pursue that option. However, if Menlo Park were to maintain its PG&E service, it is likely that growing competition from CCAs and municipal

utilities will encourage PG&E to be open to testing a completely renewable power mix in Menlo Park.

- **Commit to making the M2 industrial area zero net energy, and start to examine strategies to expand that model across the city.** Although updating the Menlo Park General Plan will take several years, the City Council, city staff, Planning Commission, and Environmental Quality Commission could collaborate to issue a less formal public statement declaring the intent to make the M2 a zero net energy district. The City Council could also take more incremental steps to translate that vision into implementation, such as through strict green building codes and permit discussions with developers. Joint Venture Silicon Valley's Smart Energy Enterprise Development Zone (SEEDZ) initiative, which aims to build a sustainable "smart energy" zone in Sunnyvale and Mountain View through business, government, and community collaboration, could be a promising local example.[198]

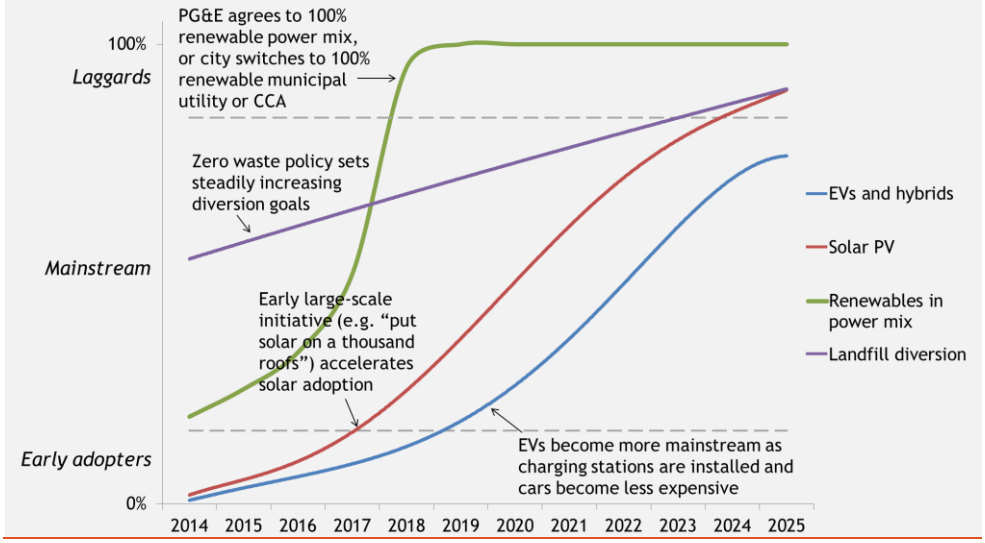
- **Move from early adoption of key technologies by consumers and businesses toward mainstreaming** (Figure 23). Currently, the adoption of green solutions in Menlo Park may be above average, but the absolute number is still small. For example, Menlo Park ranks in the top three cities in San Mateo County for the number of applications for the California Solar Initiative with only 230 applications.[199] And despite the growing visibility of hybrid and electric vehicles, Menlo Park residents have received only 293 vehicle rebates from the California Clean Vehicle Rebate Project. While these programs are conservative estimates because not all residents with solar installations and clean vehicles participate, they are still an extremely small

Menlo Park ranks in the top three cities in San Mateo County for the number of applications for the California Solar Initiative with only 230 applications. These figures point to an opportunity to increase adoption by educating large populations of residents unaware of these programs and their benefits.

Figure 23

Potential adoption curves for green solutions

Percent penetration



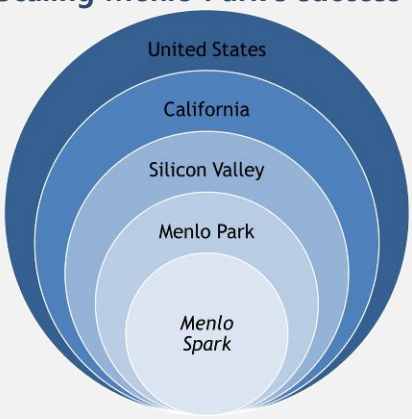
share of total homes, businesses, and vehicles (likely only about one percent, and not greater than five percent).[x] [200] These figures point to an opportunity to increase adoption by educating large populations of residents unaware of these programs and their benefits. Through broader participation in new energy upgrade and PACE programs, as well as efforts to achieve transportation behavior changes, Menlo Park can begin to move up the adoption curve from early adopters to the majority.

These steps can put Menlo Spark on track to reach its ultimate goal of climate neutrality. Once a technical assessment of Menlo Park's current status and possible opportunities is complete, Menlo Spark will develop a more detailed timeline and metrics and targets for assessing progress.

Scaling success to magnify Menlo Spark's impact

Achieving meaningful impact at scale will require a network of leading cities and government officials to pursue a shared vision for sustainability

Figure 24
Scaling Menlo Park's success



Although Menlo Park alone accounts for a tiny share of total emissions in the U.S., Menlo Spark could spur changes that have an enormous impact on emissions through partnerships, regulatory changes, and the establishment of best practices. Achieving meaningful impact at scale will require a network of leading cities and government officials to pursue a shared vision for sustainability. However, this process will be gradual (Figure 24): Menlo Spark will begin by finding opportunities within Menlo Park to demonstrate best practices before working to extend these practices across the city. It will then aim to replicate its success in other cities in Silicon Valley, followed by California and then the rest of the U.S. However, progress in each of these venues will not be linear. Rather, Menlo Spark will focus locally but seize opportunities that arise to form partnerships that will support the city's own efforts and ultimately build its broader network.

Transforming Silicon Valley and California

Menlo Spark can first aim to reach scale within Silicon Valley and California. Menlo Park can begin by connecting with other likeminded communities in Silicon Valley and then deliberately engage with state regulators to spur changes across California.

[x] The initial percent penetration for the adoption curves is based on estimates of current levels. The city's current landfill diversion rate is 54 percent, and PG&E's current power mix is 19 percent renewables. Based on the low number of solar and clean vehicle rebates in Menlo Park, even if some residents did not apply for rebates, the current penetration of solar PV and electric vehicles is likely to be only about one to two percent (based on an estimate of 13,180 housing units and two cars per household, the county average, across 12,550 households).

As part of Silicon Valley, Menlo Park is situated in one of the most innovative and resource-rich regions of the world. Moreover, Menlo Park and its neighbors encompass residents of diverse socioeconomic status, so a partnership with nearby cities could support savings and quality of life improvements for many underserved populations.

Menlo Park could reach out to explore partnership options with Palo Alto, East Palo Alto, Redwood City, Portola Valley, and Atherton. These cities are each pursuing climate action independently and could offer fresh ideas and mutual opportunities for greater efficiency through larger scale. For example, East Palo Alto's free community shuttles travel to Redwood City and Palo Alto, and are operated by Palo Alto.[201] An integrated transportation program including Palo Alto, East Palo Alto, Redwood City, and Menlo Park could support many commuters, expand service in areas with limited resources, and make the program more appealing for residents' short daily trips.

The city could also discuss the possibility of joining Palo Alto's carbon neutral electric utility.[202] Although City of Palo Alto Utilities currently only serves Palo Alto, Palo Alto has experience providing service to neighboring cities. For example, the City of Palo Alto owns and operates the Regional Water Quality Control Plan for Palo Alto, Stanford, East Palo Alto, Los Altos, Los Altos Hills, and Mountain View.[203] Even if Menlo Park did not ultimately join Palo Alto Utilities, it could learn from Palo Alto's experience transitioning to carbon neutral power and apply those lessons to a partnership with PG&E or the formation of its own utility or CCA.

Towns like Portola Valley are also promising partners for encouraging green behavior change among residents and developers. Portola Valley is a strong supporter of sustainability, with a network of bike and pedestrian paths for residents to enjoy and major green building projects like its LEED Platinum Portola Valley Town Center.[204] Connecting the two towns with better bike paths and encouraging Menlo Park residents to take advantage of the paths in Portola Valley for recreation could spur greater walking and biking in residents' daily lives in Menlo Park. Visits to green buildings like the Portola Valley Town Center could inspire developers, businesses, and residents to pursue green building projects and retrofits.

The idea of designating the M2 in Menlo Park a zero net energy district could benefit from parallel efforts in nearby communities. A network of zero net energy districts in Silicon Valley would provide more opportunities for green start-ups to test new innovations, bring benefits to more residents, and demonstrate feasibility among a diverse set of cities with different challenges and resources. This could prove the viability of climate neutrality for many types of communities and substantially accelerate more widespread adoption of zero net energy goals outside of designated districts.

Finally, Menlo Spark could investigate larger regional opportunities in San Mateo County and the rest of Silicon Valley and the San Francisco Bay Area. For example, cities in San Mateo County, Santa Clara County, and the East Bay, as well as San Francisco, have formed working groups to study the formation of regional CCAs that could operate highly cost-efficiently at scale. A number of cities in San Mateo County

are also considering banding together to arrange for the bulk purchase of residential solar installations and storage batteries. Other efforts are virtually impossible without broad regional collaboration—particularly transportation. For example, the Caltrain from San Francisco to the South Bay requires voluntary funding from San Mateo, Santa Clara, and San Francisco Counties, so improvements in Caltrain frequency and availability must include all three counties.[205] Additionally, public transit improvements that make first and last mile connections to transit easier must occur at the beginning and end of routes to be effective, meaning that a single city or small cluster of cities is unlikely to be able to make sufficient improvements alone.

As Menlo Spark builds momentum within Silicon Valley, it can seek opportunities to influence statewide action as well. California is a national leader in climate change, with some of the most aggressive climate action targets and innovative environmental policies in the country. Menlo Park's efforts will serve as an example for the myriad cities throughout California that must meet California mandates in upcoming years, and its success could translate into green regulatory reforms.

Particularly in the power sector, Menlo Spark could lead to meaningful statewide changes. For example, the city's potential collaboration with PG&E to increase the share of renewables in its power mix could encourage PG&E to seek and invest in more renewable sources as demand for clean energy in California increases. Menlo Spark could also approach regulators like the California Public Utilities Commission and the California Transportation Commission to advocate for resources and supportive regulations it believes can be helpful to other cities based on its own experience.

Changing the nation

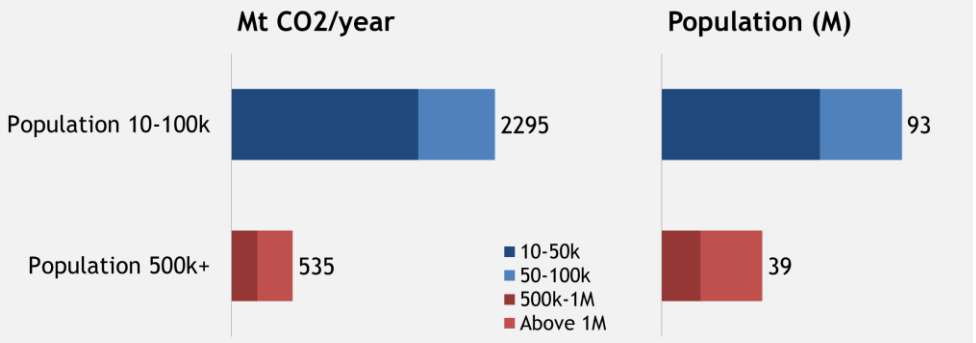
A coalition of small cities across the United States could present an even greater emissions mitigation opportunity than working with big cities

Climate leadership depends on small cities like Menlo Park, not just big cities that often receive the most attention for climate action efforts. In fact, a coalition of small cities across the United States could present an even greater emissions mitigation opportunity than working with big cities. Cities like Menlo Park, with populations between ten and fifty thousand people, are responsible for more emissions and are

Figure 25

Small cities account for more emissions and represent a larger share of the U.S. population than big cities

Cities and towns in urban metropolitan areas[206]



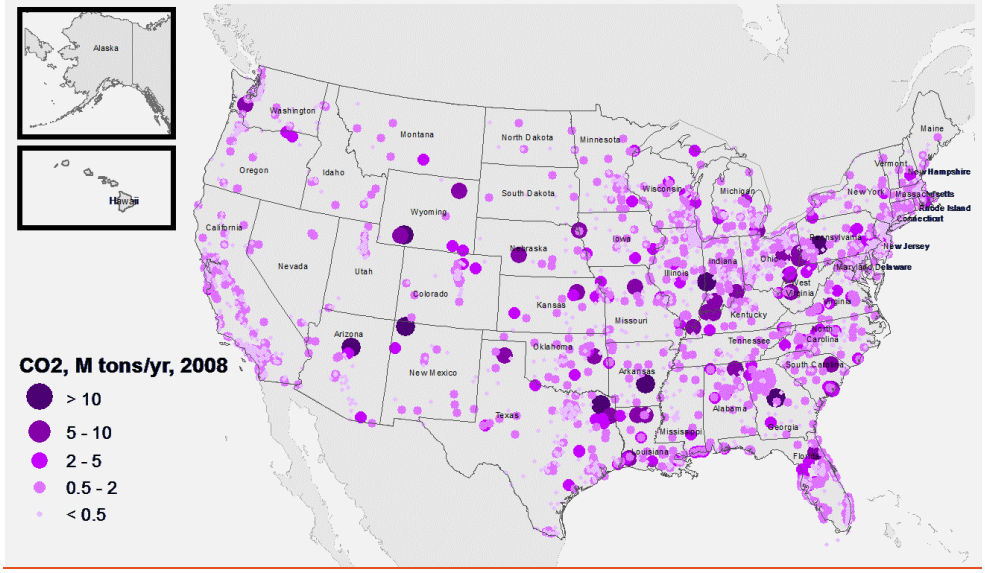
home to a greater share of the U.S. population than cities with 500,000 people or more (Figure 25).

Suburban areas laid out like Menlo Park account for half of total U.S. household carbon footprints, in large part due to transportation emissions.[207] For example, the carbon footprint for an average household in Menlo Park is 52.6 tons of CO2 per year, compared to 39.5 tons of CO2 per year for San Francisco, accounting for emissions from travel, home, food, goods, and services.[208] Many smaller cities face similar challenges to Menlo Park, such as bigger homes, longer commutes, and less public transit. As a result, Menlo Park is perfectly suited to lead a movement for climate action where the greatest opportunities for impact lie: in small cities with the most people and the most emissions. Coupled with slightly larger cities, such as those with populations between 10,000 and 100,000 people, such a movement could encompass a vast and diverse portion of Americans scattered around the U.S. (Figure 26).

Figure 26

Emissions of U.S. cities with populations of 10,000-100,000 people

Cities and towns in urban metropolitan areas[209]



The Menlo Spark initiative can help identify key components of success for replication across the country. A few criteria could serve as initial guidelines for selecting cities to reach out to form a coalition:

- **Supportive community institutions.** Major research universities like Stanford can play a large role in bringing credibility, resources, and volunteers to local climate action efforts. In particular, cities with universities interested in climate, sustainability, and natural resources, such as Colorado State University or the University of Colorado Boulder, could be major assets to their local communities. Technical organizations, such as the Rocky Mountain

Institute in Boulder or the Regulatory Assistance Project in Montpelier (VT), can also lend crucial expertise to community and local government action.

Cities that are home to large employers could also be promising. In Silicon Valley, for example, major employers like Facebook, Stanford, and Google have substantially decreased transportation emissions from employee commutes through large investments in comprehensive transportation programs. Big businesses are likely to have the resources necessary for large up-front investments in energy efficiency that will be repaid in savings over time. They could also be potential partners for investments in renewables that could benefit the community at large.

- **Local resources.** Funding from a variety of sources will be necessary to implement the many changes over time that will lead to climate neutrality. Menlo Park is fortunately located near a number of major philanthropies, such as the Hewlett and Packard Foundations. Other cities located near large philanthropies like Kresge or Rockefeller, or cities served by community foundations, could work with these funders to support climate action in their backyards.

  City funding available for climate and sustainability efforts is also key. Utility users taxes, for example, could be channeled back into green efforts to mitigate nonrenewable power consumption.[210] Cities could also issue green municipal bonds to support sustainability projects.

  Finally, cities located in states like California that provide state-level funding and incentives for climate action could be promising partners. Washington, for example, offers a Homeowner Incentives for Renewables and Efficiency program.[211]

- **Political will.** Menlo Spark should aim to create a coalition that is likely to succeed from the outset in order to build momentum for more borderline cities to join the movement. The partnership could include cities whose political leadership (e.g., the mayor, city council, and city manager) have expressed interest in substantial climate action, early adopters that already have some electric vehicle and solar penetration, and energized young people who are educated about and supportive of sustainability.

  Broader support from state policies and the utility provider can also help quell political opposition. Although community culture and voluntary behavior and purchasing changes will make the greatest headway in emissions reductions, cooperation from the utility and policymakers can spur regulations and mandates that dramatically accelerate the process.

- **Diversity of states and demographics within the coalition.** In order to build a movement that is nationally representative and inspiring to small cities of all shapes and sizes, Menlo Spark should reach out to partner with states that face different types of challenges and tend to be pivotal in national politics. For example, Virginia is a swing state in presidential elections and has

coastal communities threatened by sea level rise induced by climate change. Norfolk, Virginia is already working to raise neighborhood streets and houses to mitigate frequent flooding due to sea level rise, and has begun to investigate creative strategies such as inflatable dams that could be a model for other coastal cities.[212] Florida has similar characteristics and is known for its rapidly increasing diversity. Ohio is a battleground state that presents an opportunity to address industrial and economic challenges. Colorado is a swing state with pockets of communities that are quite advanced on climate action, such as Boulder and Fort Collins. Kansas, known as an oil and natural gas producing state, has seen the town of Greensburg pursue LEED construction to attract businesses and young people after a tornado destroyed the town, and residents of many other small towns like Salina and Lindsborg embrace energy efficiency for economic and conservation benefits.[213]

Existing networks of cities and leaders interested in climate action can help Menlo Spark scale across the country. For example, the Urban Sustainability Directors Network is a peer-to-peer networking organization that connects municipal sustainability directors and other local government officials across the U.S. It also provides funding for innovative projects and gives matching grants to scale best practices.[214] Other opportunities might include national organizations of city leadership, such as the National League of Cities, the United States Conference of Mayors, and ICLEI-Local Governments for Sustainability USA.

Finally, Menlo Spark should work to build on the C40 Cities Climate Leadership Group, which counts among its high-profile advocates former New York City mayor Michael Bloomberg.[215] C40 is a global network of large cities working to address climate change through the leadership of major cities. A parallel "C4000" movement could complement the C40 initiative, encompassing even more of the world's people and emissions through smaller cities.

Menlo Spark will support the community's vision and catalyze a bold new movement

This report is only the beginning of a communitywide dialogue about how Menlo Spark can best advance Menlo Park's goals

Menlo Park must act now to address the urgent dangers of climate change and reap the benefits of early adaptation and innovation. Menlo Spark's next steps will begin to engage the community in sustainability issues and raise the necessary resources to launch the initiative at an ambitious scale and sustain momentum. The initiative's strategy will be continuously refined to incorporate broad community input and respond to shifting challenges. As a result, this report is only the beginning of a communitywide dialogue about how Menlo Spark can best advance Menlo Park's goals.

Menlo Park can be a pioneer for climate neutrality within the U.S. and across the world. By setting an ambitious goal and gathering the community to support the Menlo Spark initiative, Menlo Park can not only achieve climate neutrality, but also increase local economic prosperity, equity, and quality of life. This innovative demonstration of how comprehensive climate action can support a broad community

vision can help catalyze a national movement of other likeminded cities, who have the potential to reduce emissions by nearly 2,300 megatons of CO2 per year and improve the lives of their citizens.[xi] [216]

[xi] Total CO2 emissions from cities and towns in urban metropolitan areas with populations 10,000 to 100,000. Approximately half of total U.S. emissions from cities and towns in urban metropolitan areas.

Interviewees

Many interviewees contributed invaluable insights for this report. They include:

- Adam Browning, Vote Solar[xii]
- Adina Levin, Peninsula Transportation Alternatives
- Ahmad Sheikholeslami, Hillview Middle School
- Alex McIntyre, City of Menlo Park
- Cat Carlton, Menlo Park City Council
- Chris Andrews, Northwestern Mutual
- Chris DeCardy, David and Lucile Packard Foundation
- Christine Salembier, Regulatory Assistance Project
- Cristina Kinney, William and Flora Hewlett Foundation
- Danny Kennedy, Sungevity
- David Bohannon, David D. Bohannon Organization
- Emily Kirsch, SfunCube
- Gail Slocum, Pacific Gas and Electric Company
- Gil Friend, City of Palo Alto
- James Newcomb, Rocky Mountain Institute
- John Kadvany, Menlo Park Planning Commission
- John Reis, DataSafe
- Katie Ferrick, LinkedIn
- Kirsten Keith, Menlo Park City Council
- Kristin Kuntz-Duriseti, Stanford University
- Lauren Swezey, Facebook
- Mary Anne Rogers, David and Lucile Packard Foundation
- Matt James, Next Generation
- Matt Lewis, Next Generation
- Matt O'Keefe, Opower

[xii] Interviewees' current or previous institutional affiliations are provided for identification only and do not imply institutional endorsement.

- Michael Closson, Acterra
- Mitch Slomiak, Menlo Park Environmental Quality Commission
- Patti Fry, City of Menlo Park
- Ray Mueller, Menlo Park City Council
- Rebecca Fotu, City of Menlo Park
- Rich Cowart, Regulatory Assistance Project
- Rich Sedano, Regulatory Assistance Project
- Riley Allen, Regulatory Assistance Project
- Shawn Marshall, LEAN Energy U.S.
- Sophie Martin, Dyett & Bhatia Urban and Regional Planners
- Steve Toben, Flora Family Foundation
- Susan Bell, Stanford Woods Institute for the Environment
- Susan McCue, City of South San Francisco

Outside of formal interviews, we consulted dozens of Menlo Park residents whose names are not captured in the list above.

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