



## STAFF REPORT

### City Council

Meeting Date:

8/27/2019

Staff Report Number:

19-181-CC

### Regular Business:

**Introduction of Ordinance No. 1057 adopting updated building codes and local amendments to the 2019 California Energy Code to require higher levels of building electrification and solar production for newly constructed buildings to reduce greenhouse gas emissions effective January 1, 2020**

### Recommendation

Staff recommends that the City Council introduce Ordinance No. 1057 adopting updated building codes and local amendments to the 2019 California Energy Code as written in Attachment A that would require higher levels of building electrification and solar production for newly constructed buildings to reduce greenhouse gas emissions effective January 1, 2020.

### Policy Issues

Adoption of environmentally sustainable local amendments to the California Building Code (known as Reach Codes) is in the City Council 2019 work plan. Adopting local energy codes that reduce fossil fuels, such as natural gas used in buildings, aligns with the City's climate action plan to reduce greenhouse gas emissions (GHG) and the climate and sustainability Resolution (Resolution No. 6493) signed by the mayor on Earth Day that specifies working toward zero carbon (greenhouse gas free) buildings. The adoption of local building code standards or amendments requires City Council and state approval.

### Background

#### California state building code and local Reach Code opportunity

Each local government is required by law to adopt new changes to the California Building Standards Code every three years (known as code cycles) proposed by the State. The next code cycle will take effect January 1, 2020.

This creates an opportunity to simultaneously adopt local building code amendments (known as Reach Codes) that are optional and exceed state code standards. Historically, cities/counties adopt amendments to the Energy (Title 24, Part 6) and California Green Building Standards- CALGreen (Title 24, Part 11) codes to increase environmental building standards that meet community environmental goals or aspirations.

Menlo Park has a climate action plan (Attachment H) with a GHG goal of 27 percent below 2005 levels by 2020. Buildings that use fossil fuels for energy contribute to climate change and increase GHG emissions. In 2013, energy usage from buildings accounted for 55 percent (196,000 tons) of the total community GHG emissions in Menlo Park.

As increased development occurs in the community, it is important to consider feasible and reasonable policies and regulations that will not increase the community's GHG in order to achieve or exceed the City's GHG reduction goals.

The City of Menlo Park has already taken significant steps in reducing GHG emissions by enrolling residents and businesses in Peninsula Clean Energy's (PCE) ECOplus program, which provides a minimum 53 percent of electricity from greenhouse gas free and renewable energy. This creates a significant Reach Code opportunity to reduce future GHG in new buildings by discouraging or eliminating the use of natural gas (fossil fuel that contributes to climate change.) This can be done by incentivizing and/or requiring new buildings to use more electric appliances to utilize clean renewable electricity sources rather than natural gas. All-electric buildings are defined as having electric appliances for space heating, water heating, clothes-drying, fireplaces and cooking appliances.

In addition, the state is requiring that power providers achieve 100 percent greenhouse gas (carbon) free electricity by 2045 (Senate Bill 100.) PCE also has a goal to be 100 percent greenhouse gas free by 2021, which would mean any new all-electric buildings in Menlo Park would be GHG free by 2021. This would maximize the use of clean and renewable energy currently available and in the future, ensuring that the climate action plan goals are met.

#### Environmental Quality Commission recommendations and City Council direction

The City Council included exploring potential Reach Codes in their 2019 work plan. They referred the matter to the Environmental Quality Commission (EQC) to study and provide a recommendation.

The EQC discussed Reach Codes at their February, May and June 2019 meetings. In June, they unanimously recommended the City Council consider requiring all new buildings to be at minimum electrically heated (space area and water,) and in addition, for nonresidential new buildings to produce a minimum amount of on-site solar power. This complements the new state requirement for on-site residential solar, assists with energy grid resilience, and helps to further reduce building operation cost.

On July 16, the City Council considered staff and the EQC's recommendation, and provided further direction to increase the standards to require all new nonresidential buildings to be all-electric. The City Council also directed staff to include an exception to allow gas-cooking appliances for profit restaurants open to the public. The draft ordinance in Attachment A incorporates the additional direction from the City Council. However, staff recommends that the City Council not allow an exception based on the environmental gains, performance evidence, and cost effectiveness of induction cooktops/ranges. Attachment F discusses the increasing trend in the food service industry to use induction stoves. In short, they are safer to operate, two to three times more efficient, and provide higher performance than gas and traditional electric cooktops.

In addition, the City Council directed staff to further analyze all-electric requirements for new life science laboratory buildings. Staff recommends providing an exception for building uses that involve life science laboratory work described in Attachment A and in the analysis below.

In order to meet the timeline to adopt Reach Codes, state building code changes, and receive the required state approvals by the start of the new code cycle January 1, 2020, the City Council needs to formally adopt Reach Codes in August/September 2019. The City has also received a \$10,000 grant from PCE to consider adopting Reach Codes.

## Analysis

### Menlo Park proposed Reach Code

Staff and the EQC explored four different options (Attachment B.) The preferred option was determined using the following criteria:

- Significant greenhouse gas reductions (greatest environmental benefit)
- Ease of implementation and efficiency for the development community and staff
- Community acceptance

The proposed option only applies to newly constructed buildings, and not additions or remodels. Tenant improvements that result from an all-electric core and shell would also be required to comply. Based on the evaluation criteria and City Council direction July 16, the proposed Reach Code for Menlo Park would:

1. Require new residential buildings (three stories or less) to be electrically heated or all-electric. This means at minimum new residential buildings need to use electricity for space heating and water heating in the building. Natural gas can still be used for cooking appliances, fireplaces, clothes dryers or other uses if desired.
2. Require new nonresidential and high-rise residential (greater than three stories) to be all-electric, including, but not limited to cooking appliances, fireplaces, clothes dryers with the following proposed exceptions:
  - Exception No. 1: Life science building uses may use natural gas for space heating if desired (see discussion below.)
  - Exception No. 2: For-profit restaurants open to the public may use natural gas cooking appliances. Based on further research, staff recommends this exception be removed based on evidence in Attachment F. Induction stoves are increasingly popular in the food industry, are more efficient and safer to operate.
  - Exception No. 3: Public agency owned and operated emergency operations centers (see discussion below.)
3. Require new nonresidential buildings and high-rise residential to have a minimum amount of on-site solar production defined in Table 1 below.

Table 1: Solar panel requirements for new nonresidential or high-rise residential buildings	
Square footage of building	Size of panel
Less than 10,000 sq. ft.	Minimum of 3-kilowatt PV systems
Greater than or equal to 10,000 sq. ft.	Minimum of 5-kilowatt PV systems
EXCEPTION: As an alternative to a solar PV system, the building type may provide a solar hot water system (solar thermal) with a minimum collector area of 40 square feet, additional to any other solar thermal equipment otherwise required for compliance with the California Energy Code	

The proposed Reach Code requirements are simple for permit applicants to understand and for the City to implement with current staff resources. It values strong residential preference for cooking with natural gas to continue. It also guarantees significant greenhouse gas reductions by discontinuing natural gas usage for a building's space area and water heating. For example, 80 percent of energy consumed from a residential building is from heating space and water. This is an achievable standard to implement by the start of the code cycle January 1, 2020.

### Exception for life science and emergency operating centers buildings

As a result of the July 16 City Council meeting, some community concerns were raised around the reliability of an all-electric laboratory or life science building where temperatures inside a building must be maintained consistently and without interruption for samples and experiments. Menlo Park has a life science district that provides incubator space for start-up companies and the advancement of medical research. Staff met with life science stakeholders that raised concerns at the July 16 City Council meeting to understand concerns and explore options for electrification of life science buildings.

The outcome of the meetings resulted in an understanding that an all-electric laboratory or life science building is technically feasible. A study performed for the University of California (UC) in 2017 (Attachment I) by Point Energy Innovations found that all-electric laboratories are cost effective. There is a higher upfront cost, but savings would be experienced over the life and operation of the buildings. As a result, the UC will no longer use fossil fuels (Attachment J) for on-site space or water heating in new or renovated buildings, including laboratories. However, Menlo Park's life science stakeholders are concerned that the technology's performance and grid reliability is unproven, and would result in undertaking challenging and expensive designs to manage risks.

It is recognized that a UC campus can utilize economies of a scale to achieve desired results whereas some laboratories and life science buildings in Menlo Park may not have the same circumstances as a UC campus. In addition, the tenants in the life science district change more frequently than in a UC campus system, requiring more flexibility to attract new tenants.

Based on what is known and the concerns raised, staff recommends an exception specifically for life science buildings and laboratories. The proposed code language defines a life science building or laboratory in Attachment A. These buildings would only receive an exception for space heating. Water heating would be required to be sourced from electricity. To grant the exception for space heating, each new building proposed for life science would need to provide evidence on the cost effectiveness and feasibility of an all-electric alternative design. It is anticipated that three new life science buildings will be built in the next code cycle (2020-2023) out of the 21 new buildings throughout the community (if approved by the City.) This exception would only apply to this building code cycle, and would be re-evaluated in 2022.

Emergency operations centers may also need natural gas access in the event of a disaster or emergency where electricity is not available. Emergency operation centers are limited and government run. Fire stations, police, and community centers are identified as emergency operation centers. Since local governments are the developers of emergency centers, there is greater authority and opportunity to explore all-electric alternatives for emergency centers as part of the public approval process. An exception is recommended if a cost effective and feasible all-electric option cannot be achieved with current technology or community needs.

### State code and Reach Code process

The California Health and Safety Code enables local communities to modify the California Building Standards Code and adopt different or more restrictive requirements with the caveat that:

- The local modifications must be substantially equivalent to or more stringent than the building standards published by the California Building Standards Code; and
- The local jurisdiction is required to make specific or express findings that such changes are reasonably necessary because of local geological, climatic or topographic conditions.

These findings are included in Attachment A. If Reach Codes involve energy requirements, cities/counties need to file an application to the California Energy Commission (CEC) to prove that any local amendments

related to the energy code are cost effective and save more energy than those required by the state. This is done through submitting a cost effectiveness study to the CEC.

The County of San Mateo, PCE and TRC Advanced Energy (consultant) have partnered to offer cities in San Mateo County technical assistance in using the statewide Reach Code cost effectiveness study commissioned by PG&E and Southern California Edison Company to assist cities in applying for Reach Code approval from the CEC. The studies are linked in Attachment C and D. The County and PCE have also been engaging with the development community about the proposed Reach Codes by posting information on their websites and through public meetings.

Cost effectiveness study results

The studies in Attachment C and D present the results of research and analysis of the cost-effectiveness of building prototypes designed to be all-electric, produce on-site solar power, or have higher energy efficiency standards than state code.

Several building prototypes were analyzed including one-story and two-story single-family homes, two-story multifamily building, three-story office building, one-story retail building and a four-story hotel. The building prototypes are directly applicable to Menlo Park development. The City has had 100 new single-family homes constructed over the past three years. Additionally, planning permits that are in the queue may result in 21 new buildings that include office, multifamily, hotel and retail uses (if approved.)

The studies in Attachment C and D provide a tool for communities to select different Reach Code options ranging from increased energy efficiency to all-electric requirements. For Menlo Park, the study provides evidence that the proposed electric requirements for new buildings and solar production for nonresidential buildings are cost effective. A large portion of the savings results from not installing natural gas infrastructure in the first place.

Table 2 highlights the cost savings of all-electric over natural gas buildings.

Table 2: Cost savings between all-electric and natural gas building		
Building prototype	Construction savings	Operational savings
Single family home	Up to \$5,349	\$4,416
Multifamily- three stories or less (per dwelling unit)	Up to \$2,337	\$1,864
Office	\$82,330	\$52,738
Retail	\$24,111	\$22,661
Hotel	\$1.3 million	\$1.24 million

A majority of the cost savings is in the construction phase by avoiding the cost to install natural gas infrastructure. Additionally, building operational savings was calculated using time dependent valuation (TDV.) TDV was developed by the CEC to reflect time dependent value of energy including the long-term projected costs of energy, such as the cost of providing energy during peak periods of demand. It also provides a value for GHG produced and the projected costs (or savings.) TDV is expressed as the overall lifecycle savings of the buildings, which is 15 years for residential and 30 years for nonresidential.

If peak demand costs and greenhouse gas costs are removed from TDV, the cost to operate single-family, multifamily, offices and hotels would be increased. However, there are other important local factors to consider that would further reduce operational costs. For example, Menlo Park's electricity provider, PCE, has slightly lower electricity rates than PG&E rates that are used for the cost effectiveness study. Additionally, the study used the lowest energy efficient appliances allowable under federal law for the building prototypes. There are higher energy efficient and cost effective appliances available in the market that would further reduce utility bill costs for customers. In addition, producing on-site solar as required under the proposed reach code for new buildings would further reduce operation costs. Based on the PCE rates, nonresidential/high-rise residential on-site solar requirements, and higher energy efficient appliances available in the market, the expected average annual utility bill would be much lower than projected in the cost effectiveness study.

Overall, all-electric buildings are shown to be cost effective using the CEC methodology, and considering available appliance technology, on-site solar production requirements for nonresidential/high-rise residential, and lower electricity rates in Menlo Park.

In addition, a supplemental memo confirms that using electricity for cooktops/ranges and/or dryers for new nonresidential buildings and high-rise residential are cost effective and saves energy (Attachment E and F.) The memo also provides supplemental information for allowing a relaxed version of all-electric for new residential buildings that allows natural gas for cooking appliances, fireplaces, clothes dryers, or other uses not related to heating space or water. This memo will be submitted in addition to the cost effectiveness study to the CEC for considering approval of Menlo Park's Reach Codes.

#### Reach Code GHG avoided as a result of development

It is important to note that the State tends to increase environmental building standards with each new code cycle. One of the major changes in this upcoming code cycle is new low-rise residential developments (defined as three stories or less and including single family homes) must be solar ready or produce on-site solar in some instances.

It is possible that the next code cycle (effective January 1, 2023) will include all-electric requirements for buildings. The City could wait for the state to make changes rather than adopting a Reach Code. However, local cities have historically played a vital role in advancing state code changes by piloting policies and regulations that showcase advancements toward a carbon free, environmentally sound and energy efficient future.

In Menlo Park, the potential development that can occur in the next code cycle would result in an increase in GHG emissions, making it difficult for the community to meet the City's GHG reduction goals (as stated in the climate action plan.) Menlo Park is in a position to continue taking leadership by adopting the proposed Reach Codes.

Staff has analyzed potential future development projects that could occur in the next three-year code cycle. If all projects are approved, it could result in:

- One hundred new single-family residential buildings
- Twenty-one new buildings that include multifamily, office, research and development, retail and hotel

If these buildings were allowed to use natural gas, an estimated increase of 212,876 tons of GHG would result over the expected life of the buildings (30 years for residential and 50 years for commercial.) This equates to about 5,000 to 6,000 tons of additional GHG a year. While the annual additional GHG seem negligible, it is very difficult at a local level to reduce emissions even by one or two percentage with a new policy or program that addresses climate change. Fortunately, these actions do add up and are

complementary when combined with other climate action plan strategies, technology advancements, and regional and state regulatory changes.

It is also important to note that as the State and region quickly move toward renewable energy, future regulation will likely require electrification of buildings, particularly through retrofit requirements. Addressing electrification now for heating new buildings avoids hardships and costs for building owners in the future.

Other communities' Reach Code proposals

Over 50 communities in California are considering Reach Codes of varying levels that are a mix of mandatory and/or incentive type regulations. They range from increasing energy efficiency requirements, installing on-site solar production, pre-wiring for electric ready buildings, requiring more EV charging stations, to requiring all-electric buildings.

The following Bay Area cities are exploring Reach Codes:

City	City
Atherton	Milpitas
Belmont	Morgan Hill
Berkeley	Mountain View
Brisbane	Burlingame
Burlingame	Pacifica
Campbell	Portola Valley
Colma	Palo Alto
Cupertino	Redwood City
Gilroy	San Jose
Hillsborough	San Mateo
Los Altos	San Mateo County
Los Altos Hills	Sunnyvale
Millbrae	Woodside

Some cities propose to use an incentive type Reach Code approach to motivate applicants to build all-electric buildings. Under this incentive type regulation, the permit applicant can choose to build with higher energy efficiency standards that still allow natural gas, but cost more to build than an all-electric building.

It is important to note that cost savings is not always a motivating factor compared to consumer preferences. Many consumers/building occupants still prefer to use natural gas for cooking, which then leads to using natural gas for other building uses, such as for heating space and water.

For example, Sonoma Clean Power offered significant rebates to electrify the rebuild of homes after the 2017 wildfires. Permit applicants could choose between higher energy efficiency standards for a \$7,500 rebate or all-electric standard for a \$12,500 rebate. In addition to the all-electric rebate, a homeowner would

save on upfront construction costs by not installing natural gas infrastructure. As a result of the rebate program, only one-third of permit applicants or homeowners choose the all-electric home. It showed that incentive type regulations based on cost savings fall short on achieving the desired outcome.

Incentive based regulations also require significant resources to educate market and promote often with less results than requiring cost effective measures that achieve the desired result of reducing GHG. In addition, there can be unintended outcomes if permit applicants are able to find ways to work around the higher efficiency requirements. This has occurred in past attempts of incentivizing all-electric buildings.

Given the amount of development that could occur in the next code cycle for Menlo Park, it would be a high risk to rely on an incentive type regulation as a way to reduce GHG for new buildings.

As a result of City Council's direction July 16 to require electrification for new buildings, several nearby cities have started to explore requiring electrification rather than using an incentive based approach, and are waiting for Menlo Park's outcome to take further action.

On the same night that the City Council provided direction to require electrification of new buildings in Menlo Park July 16, the City of Berkeley adopted an ordinance banning natural gas infrastructure in new buildings that essentially require all-electric new buildings for residential and commercial uses. PG&E representatives spoke in support of the ordinance.

#### Community Engagement

Two articles regarding the proposed Reach Codes were published in The Almanac July 16 (Attachment K) and July 24 (Attachment L.) A project page (Attachment M) was published on the City's website in July. In addition, the planning division has been providing information to current planning permit applicants about the proposed Reach Codes that could impact their project when applying for building permits after January 1, 2020. Staff held three meetings with concerned stakeholders in the life science district to hear their concerns about requiring all-electric life science buildings, and as a result is proposing an exception for life science buildings (Attachment A.)

Written public comments were received after the July 16 City Council meeting and are included in Attachment G. One letter was from a community member in support of the proposed Reach Codes and a letter from Peninsula Builders Exchange was not in support. Peninsula Builders Exchange is concerned about increasing the cost of operating buildings due to the higher cost of electricity over natural gas.

#### Recommendation and next steps

Staff recommends the City Council adopt the proposed Reach Code language and findings as written in Attachment A, and consider removing the exception for restaurants open to the public. If approved, a second reading of the ordinance will be tentatively scheduled for September 24.

After adoption by City Council, staff will submit the proposed Reach Codes to the California Building Standards Commission and the CEC for approval. Approval can take up to 60 days. Staff has been working closely with the CEC to ensure that the proposed Reach Codes and cost effectiveness studies meet the state standards for adopting local energy code amendments. After approval by the CEC, staff will submit the proposed Reach Codes to the Building Standards Commission for final approval.

Staff will also develop an implementation plan over the next few months to prepare the necessary protocols and procedures for development applicants to comply with the Reach Codes. In addition, staff will inform the development community of the changes before the January 1, 2020 effective date.



The building code amendments discussed in this report focus on the Energy Code. Energy code local amendments are more difficult to process as they require a separate cost effectiveness study, and public review and approval by the CEC. Staff anticipates recommending additional local amendments to the Green Building code, Fire Code and possible other uniform State building codes. As these other local amendments do not require CEC approval, staff anticipates bringing forward a second building code ordinance for City Council approval in November 2019. The second ordinance will address the remainder of the uniform codes required by the state to adopt.

Alternative City Council actions include:

- Do not adopt Reach Codes for this code cycle.
- Providing staff and the EQC with a different direction. A different direction is unlikely to meet the timelines to implement Reach Codes by the start of the new state building code cycle. Reach Codes can be adopted at any time, but since the state typically increases requirements with each new code cycle, this may be inefficient in terms of city resources and clarity for permit applicants if new requirements start at a later date or mid-code cycle.

### **Impact on City Resource**

Exploring adoption of Reach Codes is in the City Council 2019 work plan. It involves staff resources from the city attorney's office, sustainability division and community development department. This work plan item has been prioritized over other routine tasks and projects identified in the climate action plan and zero waste plan. As a result, it has delayed some projects and tasks, such as the climate action plan update, greenhouse gas inventory update, and electric vehicle charging infrastructure policy and program analysis.

The proposed Reach Codes will be administered by the building division. The simplicity of the electrically heated and all-electric requirement would not require additional resources and may save time in reviewing plans. On-site inspections would require less inspection time due to less or no natural gas infrastructure. In addition, the solar requirement for nonresidential buildings would not require additional resources to review and inspect.

### **Environmental Review**

Pursuant to Title 14 of the California Administrative Code, Section 15061(b)(3) this ordinance is exempt from the requirements of the California Environmental Quality Act ("CEQA") on the grounds that these standards are more stringent than the State energy standards, there are no reasonably foreseeable adverse impacts and there is no possibility that the activity in question may have a significant effect on the environment.

### **Public Notice**

Public notification was achieved by posting the agenda, with the agenda items being listed, at least 72 hours prior to the meeting.

### **Attachments**

- A. Ordinance No. 1057 amending Title 12 (Buildings and Construction) of the Menlo Park Municipal Code adopting the updated uniform building codes and adopting local amendments to the Energy Code
- B. Hyperlink – EQC staff report, June 19: <https://menlopark.org/DocumentCenter/View/21893/D2->

[20190619-reach-codes-EQC?bidId=](#)

- C. Hyperlink – Statewide Reach Code residential cost effectiveness study: [menlopark.org/DocumentCenter/View/22644/H4--Att-C](http://menlopark.org/DocumentCenter/View/22644/H4--Att-C)
- D. Hyperlink – Statewide Reach Code nonresidential cost effectiveness study: [menlopark.org/DocumentCenter/View/22642/H4---Att-D](http://menlopark.org/DocumentCenter/View/22642/H4---Att-D)
- E. Statewide cost effectiveness study supplemental memo
- F. Supplemental memo on induction ovens/stovetop
- G. Hyperlink – public comment received: [menlopark.org/DocumentCenter/View/22643/H4---Att-G](http://menlopark.org/DocumentCenter/View/22643/H4---Att-G)
- H. Hyperlink – climate action plan: [menlopark.org/ArchiveCenter/ViewFile/Item/8360](http://menlopark.org/ArchiveCenter/ViewFile/Item/8360)
- I. Hyperlink – 2017 UC study: [https://www.ucop.edu/sustainability/\\_files/Carbon%20Neutral%20New%20Building%20Cost%20Study%20FinalReport.pdf](https://www.ucop.edu/sustainability/_files/Carbon%20Neutral%20New%20Building%20Cost%20Study%20FinalReport.pdf)
- J. Hyperlink – UC: <https://www.universityofcalifornia.edu/news/100-percent-clean-electricity>
- K. Hyperlink – July 16 Almanac article: <https://www.almanacnews.com/news/2019/07/16/menlo-park-back-to-back-meetings-for-city-council>
- L. Hyperlink – July 24 Almanac article: <https://www.almanacnews.com/news/2019/07/24/menlo-park-likely-to-ban-gas-heating-stoves-in-some-new-buildings>
- M. Hyperlink – project page: [menlopark.org/reachcodes](http://menlopark.org/reachcodes)

Report prepared by:

Rebecca Lucky, Sustainability Manager

Chuck Andrews, Assistant Community Development Director

Cara Silver, Assistant City Attorney

**ORDINANCE NO. 1057****AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF MENLO PARK AMENDING CHAPTER 12.04 [ADOPTION OF CODES] AND CHAPTER 12.16 [ENERGY CODE] OF TITLE 12 [BUILDINGS AND CONSTRUCTION] OF THE MENLO PARK MUNICIPAL CODE TO ADOPT A LOCAL "REACH" CODE**

WHEREAS, the City of Menlo Park ("City") wishes to adopt a building code in accordance with law and to use the most updated regulations in the processing of development in the City;

WHEREAS, California Health and Safety Code section 17958 requires that cities adopt building regulations that are substantially the same as those adopted by the California Building Standards Commission and contained in the California Building Standards;

WHEREAS, the California Energy Code is a part of the California Building Standards which implements minimum energy efficiency standards in buildings through mandatory requirements, prescriptive standards, and performances standards;

WHEREAS, California Health and Safety Code Sections 17958.5, 17958.7 and 18941.5 provide that the City may make changes or modifications to the building standards contained in the California Building Standards based upon express findings that such changes or modifications are reasonably necessary because of local climatic, geological or topographical conditions;

WHEREAS, the City Council of the City of Menlo Park finds that each of the amendments, additions and deletions to the California Energy Code contained in this ordinance are reasonably necessary because of local climatic, geological or topographical conditions described in Section 1;

WHEREAS, Public Resources Code Section 25402.1(h)2 and Section 10-106. of the Building Energy Efficiency Standards (Standards) establish a process which allows local adoption of energy standards that are more stringent than the statewide Standards, provided that such local standards are cost effective and the California Energy Commission finds that the standards will require buildings to be designed to consume no more energy than permitted by the California Energy Code;

WHEREAS, the California Codes and Standards Reach Code Program, has determined specific modifications to the 2019 State Energy Code for each climate zone that are cost effective;

WHEREAS, that such modifications will result in designs that consume less energy than they would under the 2019 State Energy Code;

WHEREAS, the City of Menlo Park, through TRC Advanced Energy, has performed an additional cost effectiveness analyses as required by the California Energy Commission for the local amendments to the California Energy Code contained in this ordinance which memo is hereby incorporated by reference;

WHEREAS, based upon these analyses, the City Council of the City of Menlo Park finds that the local amendments to the California Energy Code contained in this ordinance are cost effective and will require buildings to be designed to consume no more energy than permitted by the California Energy Code;

WHEREAS, because of the City's unique local climatic, geologic and topographic conditions, the City desires to make amendments and additions to the code.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF MENLO PARK DOES ORDAIN AS FOLLOWS:

SECTION 1: FINDINGS AND DETERMINATIONS. The following local climatic, conditions justify modifications to the California Building Standards Code.

A. Climatic: The City is located in Climate Zone 3 as established in the 2019 California Energy Code. Climate Zone 3 incorporates mostly coastal communities from Marin County to southern Monterey County including San Francisco. The City experiences precipitation ranging from 13 to 20 inches per year with an average of approximately 15 inches per year. Ninety-five percent of precipitation falls during the months of November through April, leaving a dry period of approximately six months each year. Relative humidity remains moderate most of the time. Temperatures in the summer average around 80 degrees Fahrenheit and in the winter in the mid 50 degrees Fahrenheit. Prevailing winds in the area come from the west with velocities generally in the 12 miles per hour range, gusting from 25 to 35 miles per hour. These climatic conditions along with the greenhouse emissions generated from structures in both the residential and nonresidential sectors requires exceeding the energy standards for building construction established in the 2019 California Buildings Standards Code. The City Council also adopted a Climate Action Plan that has a goal of reducing greenhouse gas emissions 27% below 2005 levels by 2020. In order to achieve and maintain this goal, the City needs to adopt policies and regulations that reduce the use of fossil fuels that contribute to climate change, such as natural gas in buildings, in new development. Human activities, such as burning natural gas to heat buildings, releases greenhouse gases into the atmosphere and causes an overall increase in global average temperature. This causes sea levels to rise, affecting the City's shoreline and infrastructure.

Many new buildings in Menlo Park will be built near the coastline in an area known as the Bayfront Area that is situated on marshlands and former salt ponds. San Francisquito Creek also runs through the City, which creates an increasing potential flooding risk with climate change as a result of human generated greenhouse gas emissions. Menlo Park is vulnerable to sea level rise where new development is proposed in this code cycle. New buildings that are directly vulnerable to sea level rise should avoid generating additional greenhouse gas emissions. The proposed Reach Code would ensure that new buildings use cleaner sources of energy that are greenhouse gas free.

B. Geologic: The City of Menlo Park is subject to earthquake hazard caused by its proximity to San Andreas fault. This fault runs from Hollister, through the Santa Cruz Mountains, epicenter of the 1989 Loma Prieta earthquake, then on up the San Francisco Peninsula, then offshore at Daly City near Mussel Rock. This is the approximate location of the epicenter of the 1906 San Francisco earthquake. The other fault is Hayward Fault. This fault is about 74 mi long, situated mainly along the western base of the hills on the east side of San Francisco Bay. Both of these faults are considered major Northern California earthquake faults which may experience rupture at any time. Thus, because the City is within a seismic area

which includes these earthquake faults, the modifications and changes cited herein are designed to better limit property damage as a result of seismic activity and to establish criteria for repair of damaged properties following a local emergency.

C. Topographic: The City of Menlo Park is contiguous with the San Francisco Bay, resulting in a natural receptor for storm and waste water run-off. Also the City is located in an area that is relatively high liquefaction potential given its proximity to the Bay. The surface condition consists mostly of stiff to dense sandy clay, which is highly plastic and expansive in nature. The aforementioned conditions within the City create hazardous conditions for which departure from California Building Standards Code is warranted

SECTION 2: AMENDMENT OF CODE. Section 12.04.010 of Chapter 12.04 [Adoption of Codes] of Title 12 [Buildings and Construction] is hereby repealed and a new Section 12.04.010 is hereby added to read as follows:

**12.04.010 Municipal building code.**

The following codes are hereby adopted and by reference are incorporated herein as if set forth in full:

- (1) The 2019 California Administrative Code, published by the International Code Council, as amended in Part 1 of the California Building Standards Code, California Code of Regulations Title 24;
- (2) The 2019 California Building Code based on the International Building Code, 2018 Edition, published by the International Code Council, together with those omissions, amendments, exceptions and additions thereto as amended in Part 2 of the California Building Standards Code, California Code of Regulations Title 24;
- (3) The 2019 California Residential Code based on the International Residential Code, 2018 Edition, published by the International Code Council, together with those omissions, amendments, exceptions and additions thereto as amended in Part 2.5 of the California Building Standards Code, California Code of Regulations Title 24;
- (4) The 2019 California Electrical Code the National Electrical Code, 2017 Edition, published by the National Fire Protection Association, together with those omissions, amendments, exceptions and additions thereto as amended in Part 3 of the California Building Standards Code, California Code of Regulations Title 24;
- (5) The 2019 California Mechanical Code the Uniform Mechanical Code, 2018 Edition, published by the International Association of Plumbing and Mechanical Officials, together with those omissions, amendments, exceptions and additions thereto as amended in Part 4 of the California Building Standards Code, California Code of Regulations Title 24;
- (6) The 2019 California Plumbing code the Uniform Plumbing Code, 2018 Edition, including the Installation Standards thereto, published by the International Association of Plumbing and Mechanical Officials, together with those omissions, amendments, exceptions and additions thereto as amended in Part 5 of the California Building Standards Code, California Code of Regulations Title 24;

- (7) The 2019 California Energy Code, published by the International Code Council, as amended in Part 6 of the California Building Standards Code, California Code of Regulations Title 24;
- (8) The 2019 California Historical Building Code, published by the International Code Council, as amended in Part 8 of the California Building Standards Code, California Code of Regulations Title 24;
- (9) The 2019 California Existing Building Code based on the 2018 International Existing Building Code Edition, published by the International Code Council, together with those omissions, amendments, exceptions and additions thereto as amended in Part 10 of the California Building Standards Code, California Code of Regulations Title 24 ;
- (10) The 2019 California Green Building Standards Code, published by the International Code Council, as amended in Part 11 of the California Building Standards Code, California Code of Regulations Title 24; and
- (11) The 2019 California Referenced Standards Code, published by the International Code Council, as amended in Part 12 of the California Building Standards Code, California Code of Regulations Title 24.

A copy of each code is on file in the office of the city clerk. The provisions of this title, including said codes and amendments thereto, shall be known as the building code of the city.

SECTION 3: AMENDMENT OF CODE. Chapter 12.16 [Energy Code] of Title 12 [Buildings and Construction] is hereby repealed and a new Chapter 12.16 is hereby added to read as follows:

**SECTION 100.0 – Scope**

(e) Sections applicable to particular buildings. TABLE 100.0-A and this subsection list the provisions of Part 6 that are applicable to different types of buildings covered by Section 100.0(a).

1. All buildings. Sections 100.0 through 110.12 apply to all buildings.  
EXCEPTION to Section 100.0(e) 1: Spaces or requirements not listed in TABLE 100.0-A.
2. Newly constructed buildings.
  - A. All newly constructed buildings. Sections 110.0 through 110.12 apply to all newly constructed buildings within the scope of Section 100.0(a). In addition, newly constructed buildings shall meet the requirements of Subsections B, C, D or E, as applicable; and shall be an All-Electric Building as defined in Section 100.1(b).  
Exception 1: Non-Residential Buildings containing a Scientific Laboratory Building, such area may contain a non-electric Space Conditioning System.  
To take advantage of this exception applicant shall provide third party verification that All-Electric space heating requirement is not cost effective and feasible.  
  
Exception 2: Non-Residential Buildings containing for-profit restaurants open to the public may contain non-electric Cooking Appliances.  
  
Exception 3: All Residential buildings may contain non-electric Cooking

Appliances, Fireplaces and Clothes Dryers.

Exception 4: Exemption for public agency owned and operated emergency centers. To take advantage of this exception applicant shall provide third party verification that All-Electric space heating requirement is not cost effective and feasible.

Note: In such exception situations, The Building Official shall have the authority to approve alternative materials, design and methods of construction or equipment per CBC 104.

Section 100.1(b) is modified by adding the following definitions:

ALL ELECTRIC BUILDING: is a building that has no natural gas or propane plumbing installed within the building, and that uses electricity as the source of energy for its space heating, water heating, cooking appliances, and clothes drying appliances. All Electric Buildings may include thermal solar thermal pool heating.

Scientific Laboratory Building: is a building or area where research, experiments, and measurement in medical, and life sciences are performed and/or stored requiring examination of fine details. The building may include workbenches, countertops, scientific instruments, and supporting offices.

Section 100.1 is modified as follows:

SHADING – is the protection from heat gains because of direct solar radiation by permanently attached exterior devices of building elements, interior shading devices, glazing material, adherent materials, including items located outside the building footprint such as Heritage trees or high rise buildings that may affect shading.

Section 110.2 is modified as follows:

**SECTION 110.2 – MANDATORY REQUIREMENTS FOR SPACE-CONDITIONING EQUIPMENT**

Certification by Manufacturers. Any space-conditioning equipment listed in this section, meeting the requirements of section 100.0 (e)2A, may be installed only if the manufacturer has certified to the Commission that the equipment complies with all the applicable requirements of this section.

Section 110.3 is modified as follows:

**SECTION 110.3 – MANDATORY REQUIREMENTS FOR SERVICE WATER-HEATING SYSTEMS AND EQUIPMENT**

(a) Certification by manufacturers. Any service water-heating system or equipment, meeting the requirements of section 100.0 (e)2A, may be installed only if the manufacturer has certified that the system or equipment complies with all of the requirements of this subsection for that system or equipment.

Section 110.4 is modified as follows:

**SECTION 110.4 – MANDATORY REQUIREMENTS FOR POOL AND SPA SYSTEMS AND EQUIPMENT**

(a) Certification by Manufacturers. Any pool or spa heating system or equipment, meeting the requirements of section 100.0 (e)2A, may be installed only if the manufacturer has certified that

the system or equipment has all of the following:

Section 110.5 is modified as follows:

**SECTION 110.5 – NATURAL GAS CENTRAL FURNACES, COOKING EQUIPMENT, POOL AND SPA HEATERS, AND FIREPLACES: PILOT LIGHTS PROHIBITED**

Any natural gas system or equipment, meeting the requirements of Section 100.0 (e)2A, listed below may be installed only if it does not have a continuously burning pilot light:

Section 110.10 is modified as follows:

**SECTION 110.10 – MANDATORY REQUIREMENTS FOR SOLAR READY BUILDINGS AND SOLAR PANEL SYSTEM REQUIREMENTS FOR NON-RESIDENTIAL NEW BUILDINGS**

(a) Covered Occupancies.

1. Single Family Residences. Single family residences located in subdivisions with ten or more single family residences and where the application for a tentative subdivision map for the residences has been deemed complete approved by the enforcement agency, which do not have a photovoltaic system installed, shall comply with the requirements of Section 110.10(b) through 110.10(e).
2. Low-rise Multifamily Buildings. Low-rise multi-family buildings that do not have a photovoltaic system installed shall comply with the requirements of Section 110.10(b) through 110.10(d).
3. Hotel/Motel Occupancies and High-rise Multifamily Buildings. Hotel/motel occupancies and high-rise multifamily buildings with ten habitable stories or fewer shall comply with the requirements of Section 110.10(b) through 110.10(d)- and Table 2.
4. Nonresidential Buildings. Nonresidential buildings with three habitable stories or fewer, other than healthcare facilities, shall comply with the requirements of Section 110.10(b) through 110.10(d)- and Table 2.

**Table 2: Solar panel requirements for all new nonresidential and high rise residential buildings**

Square footage of building	Size of panel
Less than 10,000 sq. ft.	Minimum of 3-kilowatt PV systems
Greater than or equal to 10,000 sq. ft.	Minimum of 5-kilowatt PV systems

EXCEPTION: As an alternative to a solar PV system, the building type may provide a solar hot water system (solar thermal) with a minimum collector area of 40 square feet, additional to any other solar thermal equipment otherwise required for compliance with Part 6.

(b) Solar Zone.

1. Minimum Solar Zone Area. The solar zone shall have a minimum total area as described below. The solar zone shall comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other Parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area shall be comprised of areas that have no dimension less than five feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet.

A. Single Family Residences. The solar zone shall be located on the roof or



overhang of the building and have a total area no less than 250 square feet.

EXCEPTION 1 to Section 110.10(b)1A: Single family residences with a permanently installed domestic solar water-heating system meeting the installation criteria specified in the Reference Residential Appendix RA4 and with a minimum solar savings fraction of 0.50.

EXCEPTION 2 to Section 110.10(b)1A: Single family residences with three habitable stories or more and with a total floor area less than or equal to 2000 square feet and having a solar zone total area no less than 150 square feet.

EXCEPTION 3 to Section 110.10(b)1A: Single family residences located in the Wildland-Urban Interface Fire Area as defined in Title 24, Part 2 and having a whole house fan and having a solar zone total area no less than 150 square feet.

EXCEPTION 4 to Section 110.10(b)1A: Buildings with a designated solar zone area that is no less than 50 percent of the potential solar zone area. The potential solar zone area is the total area of any low-sloped roofs where the annual solar access is 70 percent or greater and any steep-sloped roofs oriented between 90 degrees and 300 degrees of true north where the annual solar access is 70 percent or greater. Solar access is the ratio of solar insolation including shade to the solar insolation without shade. Shading from obstructions located on the roof or any other part of the building shall not be included in the determination of annual solar access.

EXCEPTION 5 to Section 110.10(b)1A: Single family residences having a solar zone total area no less than 150 square feet and where all thermostats are demand responsive controls and comply with Section 110.12(a), and are capable of receiving and responding to Demand Response Signals prior to granting of an occupancy permit by the enforcing agency.

EXCEPTION 6 to Section 110.10(b)1A: Single family residences meeting the following conditions:

- A. All thermostats are demand responsive controls that comply with Section 110.12(a), and are capable of receiving and responding to Demand Response Signals prior to granting of an occupancy permit by the enforcing agency.
- B. Comply with one of the following measures:
  - i. Install a dishwasher that meets or exceeds the ENERGY STAR Program requirements with a refrigerator that meets or exceeds the ENERGY STAR Program requirements, a whole house fan driven by an electronically commutated motor, or an SAE J1772 Level 2 Electric Vehicle Supply Equipment (EVSE or EV Charger) with a minimum of 40 amperes; or
  - ii. Install a home automation system capable of, at a minimum, controlling the appliances and lighting of the dwelling and responding to demand response signals; or
  - iii. Install alternative plumbing piping to permit the discharge from the clothes washer and all showers and bathtubs to be used for an irrigation system in compliance with the California Plumbing Code

and any applicable local ordinances; or

iv. Install a rainwater catchment system designed to comply with the California Plumbing Code and any applicable local ordinances, and that uses rainwater flowing from at least 65 percent of the available roof area.

B. Low-rise and High-rise Multifamily Buildings, Hotel/Motel Occupancies, and Nonresidential Buildings. The solar zone shall be located on the roof or overhang of the building or on the roof or overhang of another structure located within 250 feet of the building or on covered parking installed with the building project, and shall have a total area no less than 15 percent of the total roof area of the building excluding any skylight area. The solar zone requirement is applicable to the entire building, including mixed occupancy.

EXCEPTION 1 to Section 110.10(b)1B: High-rise Multifamily Buildings, Hotel/Motel Occupancies, and Nonresidential Buildings with a permanently installed solar electric system having a nameplate DC power rating, measured under Standard Test Conditions, of no less than one watt per square foot of roof area.

EXCEPTION 2 to Section 110.10(b)1B: High-rise multifamily buildings, hotel/motel occupancies with a permanently installed domestic solar water-heating system complying with Section 150.1(c)8Biii- and an additional collector area of 40 square feet.

EXCEPTION 3 to Section 110.10(b)1B: Buildings with a designated solar zone area that is no less than 50 percent of the potential solar zone area. The potential solar zone area is the total area of any low-sloped roofs where the annual solar access is 70 percent or greater and any steep-sloped roofs oriented between 90 degrees and 300 degrees of true north where the annual solar access is 70 percent or greater. Solar access is the ratio of solar insolation including shade to the solar insolation without shade. Shading from obstructions located on the roof or any other part of the building shall not be included in the determination of annual solar access.

EXCEPTION 4 to Section 110.10(b)1B: Low-rise and high-rise multifamily buildings with all thermostats in each dwelling unit are demand response controls that comply with Section 110.12(a), and are capable of receiving and responding to Demand Response Signals prior to granting of an occupancy permit by the enforcing agency. In addition, either A or B below:

A. In each dwelling unit, comply with one of the following measures:

- i. Install a dishwasher that meets or exceeds the ENERGY STAR Program requirements with either a refrigerator that meets or exceeds the ENERGY STAR Program requirements or a whole house fan driven by an electronically commutated motor; or
- ii. Install a home automation system that complies with Section 110.12(a) and is capable of, at a minimum, controlling the appliances and lighting of the dwelling and responding to demand response signals; or
- iii. Install alternative plumbing piping to permit the discharge from the

clothes washer and all showers and bathtubs to be used for an irrigation system in compliance with the California Plumbing Code and any applicable local ordinances; or  
iv. Install a rainwater catchment system designed to comply with the California Plumbing Code and any applicable local ordinances, and that uses rainwater flowing from at least 65 percent of the available roof area.

B. Meet the Title 24, Part 11, Section A4.106.8.2 requirements for electric vehicle charging spaces.

EXCEPTION 5 to Section 110.10(b)1B: Buildings where the roof is designed and approved to be used for vehicular traffic or parking or for a heliport.

Exception 6 to section 110.10(b)1B: Performance equivalency approved by the building official.

2. Azimuth. All sections of the solar zone located on steep-sloped roofs shall be oriented between 90 degrees and 300 degrees of true north.

3. Shading.

A. No obstructions, including but not limited to, vents, chimneys, architectural features, and roof mounted equipment, shall be located in the solar zone.

B. Any obstruction, located on the roof or any other part of the building that projects above a solar zone shall be located at least twice the distance, measured in the horizontal plane, of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane.

EXCEPTION to Section 110.10(b)3: Any roof obstruction, located on the roof or any other part of the building, that is oriented north of all points on the solar zone.

C. The solar zone needs to account for shading from obstructions that may impact the area required in 110.10(b)1B. When determined by the Building Official that conditions exist where excessive shading occurs and solar zones cannot be met, a performance equivalency approved by the Building Official may be used as an alternative.

4. Structural Design Loads on Construction Documents. For areas of the roof designated as solar zone, the structural design loads for roof dead load and roof live load shall be clearly indicated on the construction documents.

NOTE: Section 110.10(b)4 does not require the inclusion of any collateral loads for future solar energy systems.

(c) Interconnection Pathways.

1. The construction documents shall indicate a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service.

2. For single family residences and central water-heating systems, the construction documents shall indicate a pathway for routing of plumbing from the solar zone to the water-heating system.

(d) Documentation. A copy of the construction documents or a comparable document indicating the information from Sections 110.10(b) through 110.10(c) shall be provided to the occupant.

(e) Main Electrical Service Panel.

1. The main electrical service panel shall have a minimum busbar rating of 200 amps.
2. The main electrical service panel shall have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space shall be permanently marked as "For Future Solar Electric".

SECTION 5: EXEMPTION FROM CEQA. The City Council finds, pursuant to Title 14 of the California Administrative Code, Section 15061(b)(3) that this Ordinance is exempt from the requirements of the California Environmental Quality Act ("CEQA") on the grounds that these standards are more stringent than the State energy standards, there are no reasonably foreseeable adverse impacts and there is no possibility that the activity in question may have a significant effect on the environment.

SECTION 6: SEVERABILITY. If any part of this Ordinance is held to be invalid or inapplicable to any situation by a court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance or the applicability of this Ordinance to other situations.

SECTION 7: EFFECTIVE DATE. This Ordinance shall become effective following approval by the California Energy Commission, but in no event before January 1, 2020.

SECTION 8: POSTING. Within fifteen (15) days of its adoption, the Ordinance shall be posted in three (3) public places within the City of Menlo Park, and the Ordinance, or a summary of the Ordinance prepared by the City Attorney, shall be published in a local newspaper used to publish official notices for the City of Menlo Park prior to the effective date. INTRODUCED on this twenty-seventh day of August, 2018.

PASSED AND ADOPTED as an ordinance of the City of Menlo Park at a regular meeting of said City Council on this \_\_\_\_\_ day of \_\_\_\_\_, 2019, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

APPROVED:

\_\_\_\_\_  
Ray Mueller, Mayor

ATTEST:

\_\_\_\_\_  
Judi A. Herren, City Clerk



436 14th Street  
Oakland, CA 94612

August 13, 2019

## MEMORANDUM

**To:** Gabriel Taylor, Peter Strait (California Energy Commission)  
**From:** Farhad Farahmand, Abhijeet Pande (TRC), Rafael Reyes (Peninsula Clean Energy)  
**Re:** **Interpretation of Cost Effectiveness Analysis as it Relates to Menlo Park Reach Code Proposal**

As part of an amendment to the California Building Standards Code, the City of Menlo Park is seeking a requirement for all new construction buildings to be all-electric but allows for several exceptions. For residential buildings, the City is proposing to allow natural gas to be used for appliances that don't serve space-heating or water-heating functions, such as cooking and clothes drying. For nonresidential buildings, certain categories of buildings such as public safety buildings, designated emergency centers as well as commercial buildings containing scientific laboratories that require natural gas for operational and process reasons are proposed to be exempted. Buildings containing for-profit restaurants open to public are also proposed to be exempted.

This memo serves to clarify the cost-effectiveness justification of these proposals as required by California Code of Regulations (CCR), Title 24, Part 1, §10-106 and request the Energy Commission's preliminary approval of this justification. If approved, an updated version of this interpretation will be included with Menlo Park's application to the Energy Commission.

The statewide investor owned utility codes and standards program developed a new construction cost effectiveness analysis for all California climate zones which included all-electric measures as part of multiple packages. These analyses have been attached, and:

- ◆ Were performed for both residential and nonresidential buildings
  - ◆ The residential prototypes included 4 end-uses in analysis: space heating, water heating, cooking, and clothes drying. These assumed savings from avoided natural gas infrastructure to and within the residence.
  - ◆ The nonresidential prototypes included 2 end-uses in analysis: space heating and water heating.
- ◆ Found that it is cost-effective to construct all-electric buildings compared to the 2019 Standards ACM baseline, including all end-uses analyzed, partially due to upfront cost savings associated with foregoing a natural gas connection to the building.

Menlo Park's code proposal would allow the construction of all-electric buildings which has been shown to be cost-effective using the TDV cost-effectiveness metric.

The existing cost effectiveness studies completed are sufficient to support Menlo Park's proposal, considering further that:

- ◆ In residential buildings, a proposed building with electric space- or water-heating is already compared to a standard building with these electric end-uses. Thus, no cost effectiveness criteria is explicitly required for the electrification of these end-uses.
- ◆ In nonresidential buildings, the prototypes examined in the cost effectiveness analysis only included space heating and water heating electrification. Other end uses targeted in the Menlo Park ordinance are unregulated appliances such as cooking, clothes drying which are not explicitly modeled in Title 24 compliance calculations. Adding requirements for these end uses to be electric does not impact the TDV budget for the building or compliance with Title 24. These will however impact the overall first cost of the all-electric building as well as operational impacts. These impacts however are not likely to be significant compared with the overall cost savings of around \$25,000 for offices and retail and almost \$1M for hotel occupancies. Electric cooking and clothes drying first cost difference compared to natural gas versions are between \$800-\$2000 per appliance. Operational cost increases are around \$2,000 per appliance over the building's lifetime. Thus the added first and operation costs for electric appliances are unlikely to be greater than the significant cost savings resulting from eliminating natural gas infrastructure. We thus propose that existing cost-effectiveness studies should be sufficient to justify Menlo Park requirements.

Thank you for considering our findings and analysis. Please contact me if you have any questions or concerns.



**MEMORANDUM**

**Date:** 8/27/2019  
**To:** Mayor and Members of the City Council  
**From:** Joanna Chen, Sustainability Specialist  
**Re:** All-electric commercial kitchen

On July 16, City Council directed staff to pursue an all-electric reach code option for nonresidential buildings with the exception of life science buildings. An all-electric building is defined as a building that has no natural gas or propane plumbing installed within the building. This means cooking appliances cannot have gas burners. Induction cooking is two to three times more efficient than gas cooktops, making it the most energy efficient cooking appliance as proven in the Range Top Technology Assessment Report. Induction cooktops cook food faster, lose less heat in the process, and enhance the indoor air quality. According to Lawrence Berkeley National Lab, induction technology produces 30 times less indoor air pollutants than natural gas cooktops.

Induction cooking technology was introduced in 1933 and is popular in Asia and Europe. Thus, this technology is more than 80 years and will continue to advance. Despite most assumptions, the recent demand of induction cooking appliances have driven prices down and the selection up. For instance, a Frigidaire 30 inch gas cooktop costs \$854.10 compared to a Frigidaire 30 inch induction cooktop for \$899.10. A GE 30 inch gas cooktop costs \$1,169.10 compared to a GE 30 inch induction cooktop for \$1,439.10.

David Kaneda from Integral Group, which is a deep green engineering and consulting firm, is working with several projects involving all-electric commercial kitchens. A handful of professional head chefs at Michelin Star rated restaurants, including French Laundry, have switched to induction. Curtis Stone, a Michelin star chef, advocates for induction cooktops due to their heat efficiency, cooking flexibility, and easy cleaning. According to the 2018 Consumer Reports, the top ten rated cooktops are all induction stoves. The 10<sup>th</sup> rated induction cooktop earned 97 out of 100 score, whereas the top rated gas cooktop earned an 89 rating.



**Figure 1.** Maison Troisgros, a three-star Michelin restaurant

David noted three high-tech companies are committed to build all electric induction kitchens. LinkedIn's Sunnyvale office is net zero energy (produces enough renewable energy offset its own energy consumption to reduce the use of nonrenewable energy, such as natural gas) and has induction wok burners in the kitchens. Sonoma Academy, a nonprofit, private high school in Santa Rosa, CA, also has an all-electric commercial kitchen.



**Figure 2.** Induction wok burner.

In conclusion, an all-electric nonresidential building reach code option is achievable. Induction cooking is the future and is safer to operate. Not only does an induction cooktop improve the indoor air quality, but it also automatically turns off when a pot is removed. The glass surface does not get hot and an induction cooktop cannot turn on without a pan. Induction technology have advances progressively since the 1900s, so much that the cooktop has Wi-Fi and Bluetooth capabilities.



## References

Range Top Technology Assessment

Report: [https://fishnick.com/equipment/techassessment/5\\_range\\_tops.pdf](https://fishnick.com/equipment/techassessment/5_range_tops.pdf)

Lawrence Berkeley National

Lab: <https://pdfs.semanticscholar.org/1570/efb2619c61da28cd547899059795d164605c.pdf>

Most about Curtis Stone's perspective on induction cooktops: <https://www.bosch-home.com/us/experience-bosch/heart-of-the-home/recipes/curtis-stone-recipes/why-i-love-the-bosch-induction-cooktops>

Consumer Reports: <https://www.consumerreports.org/cro/cooktops.htm>

LinkedIn's Net Zero Energy

remodel: <https://www.mercurynews.com/2016/11/29/linkedin-opens-building-company-says-is-net-zero-energy/>

Sonoma Academy: <https://www.wrnsstudio.com/sonoma-academy-janet-durgin-guild-commons-a-story-of-community-sustainability-and-place/>