DATE: January 13, 2020

SUBJECT

Study session regarding the adoption of Reach Codes

RECOMMENDATION

Receive public comment and Council input on the proposed and revised ordinance amendments to the Energy and Green Building Standards Codes towards the adoption of Reach Codes.

STRATEGIC INITIATIVE

Community Building and Communication

BACKGROUND

Reach Codes are amendments to the Energy and Green Buildings Standards Codes. Reach Codes aim to reduce greenhouse gas emissions (GHGs) by reducing reliance on natural gas and gasoline through refocusing energy consumption towards electrification. Beginning in July 2019, City staff, Peninsula Clean Energy (PCE), and the San Mateo County Office of Sustainability have worked together to develop Reach Code recommendations for City Council to consider for adoption. PCE is a community choice energy program that provides San Mateo County residents an energy alternative and also implements programs and supports efforts to reduce GHGs. Also, as of January 1, 2020, the 2019 California Energy Code requires solar photovoltaic systems for all new single-family homes as well as multi-family residences up to three stories.

On September 23, 2019, City Council hosted a presentation by PCE. PCE shared information on the Reach Codes and provided an update on City staff’s efforts towards developing Reach Code recommendations. Reach Codes only apply to new construction, and will include single-family, multi-family, office, and other non-residential buildings. Additionally, the staff recommendation was to adopt a Mixed-Fuel Reach Code to achieve reduced GHGs while providing property owners the ability to choose between all-electric construction and more energy-efficient mixed-fuel construction. The City Council provided general
feedback, such as increasing the availability of electric vehicle (EV) charging outlets, and sought to understand how the proposed Reach Code may impact residents and businesses.

After receiving feedback from City Council, staff increased the number of electric vehicle (EV) ready outlets required for new construction and presented the revised Reach Code to City Council on October 28, 2019. City Council directed staff to also prepare an All-Electric Reach Code, with certain exceptions, for their consideration. The following analysis explores the different All-Electric Ordinance exceptions for City Council consideration developed after receiving Council’s previous input and additional comments from developers, industry professionals and the Board of Building Review.

The Board of Building Review held a meeting on December 9, 2019 where the Board discussed both an All-Electric Reach Code, with certain exceptions, and a Mixed-Fuel Reach Code. At the meeting, some members of the public, including city residents and local developers, expressed concerns about the feasibility and costs involved with implementing both All-Electric and Mixed-Fuel Reach Codes. The Board members echoed many of these concerns, asking whether a cost effectiveness study has been performed in Redwood City, and discussing the additional costs potentially passed onto residents and developers. Board members expressed a desire for additional research to be performed before bringing the Reach Codes to City Council. PCE representatives noted that a statewide cost effectiveness study has been performed which shows the overall feasibility of Reach Code implementation. PCE also expressed that other jurisdictions have cited this study as the justification for incorporating Reach Codes into their municipal codes. The Board also asked for more clarity on the exceptions included in the proposed All-Electric ordinance. The Board subsequently recommended some minor changes and the addition of a few exceptions further described in the analysis.

Redwood City staff has performed community outreach through the aforementioned City Council meetings, study session, and social media, while also responding to numerous questions from the public via email, and by inviting PCE to hold local events. So far this year, PCE has held eight outreach events in the region, including workshops and stakeholder meetings in Redwood City, and plans to host additional workshops to assist and educate the public and local developers, after the adoption of Reach Codes in Redwood City. PCE workshops are open to the general public, including residents, contractors, developers, and local government staff. In addition, PCE has participated in numerous municipal roundtables and direct dialogue with developers including detailed discussions with MidPen Housing and Summer Hill Homes. PCE supports Redwood City’s efforts, and indicated they will be available to support workshops going forward.

ANALYSIS

GENERAL QUESTIONS AND CONCERNS ABOUT REACH CODES

Staff has received questions about the implications of Reach Codes and has worked with PCE to address concerns. The section below addresses questions received regarding Reach Codes.
**Affordable Housing:** How will Reach Codes impact affordable housing developers? Have we spoken with any of those developers?

There are two costs to consider regarding Reach Codes and affordable housing projects - construction/capital costs and operational costs.

**Construction Costs**

- Affordable housing projects are subject to a maximum allowable cost per unit depending on the applicable fund or tax credit. Due to the current cost of construction in the Bay Area, many affordable housing projects are close to those thresholds. Certain Reach Code requirements could make projects infeasible. For example, there can be additional costs associated with upsizing electrical transformers as would be required by Pacific Gas & Electric (PG&E) due to the additional electrical load. In another example, the number of units could be affected if space is needed for an upsized transformer or for water storage related to centralized water heating systems.

- There are some examples of recently constructed all-electric affordable multifamily buildings in California. These buildings are typically less than 70 units, since there can be constructability issues for larger residential buildings as will be discussed below under Exception 7. For example, MidPen Housing recently constructed a 66-unit all-electric building in Sunnyvale. MidPen was awarded a grant for this project which eliminated many of the added design and construction costs for going all-electric. Nonetheless depending on project type, PCE has indicated that they will provide technical assistance for optimal design and cost-effectiveness in constructing all-electric buildings.

- For EV Charging, PCE will provide incentives for EV infrastructure for affordable housing new construction and, in addition, the model code includes an exception for affordable housing that reduces the amount of Level 2 EV Ready required and associated electrical infrastructure costs. A Level 2 outlet is a 240V outlet similar to that used for a clothes dryer or oven. The Menlo Park model allows for exceptions on a case by case basis if technically infeasible due to site constraints, or if a project consists of 100% Below Market Rate housing. PCE’s EV infrastructure incentive program is set to launch in 2020.

**Operating Costs**

- Operationally, property managers for affordable and market-rate multi-family buildings have noted they anticipate increased costs for maintenance of all-electric water and space conditioning systems, and increased electric utility costs due to PG&E’s pricing model. It should be noted, that cost effectiveness studies supporting the adoption of Reach Codes only consider construction and capital costs, not ongoing operational costs. How these costs are distributed to tenants is not yet certain. PCE has indicated that operational costs could be reduced with increasing the photovoltaic panel square footage requirement. However, this could potentially affect the design of buildings should there be interest in active rooftop spaces for tenants.

**Accessory Dwelling Units:** How would Accessory Dwelling Units (ADU) be affected by the implementation of the Reach Codes?

- Under some circumstances panel or service upgrades may be required for all-electric ADUs, increasing costs and inhibiting housing development. Staff and the Board of Building Review recommend that homeowners and developers choose whether to install all-electric or non-
electric fireplaces and cooking appliances. If the requirements established in the Reach Codes are truly less expensive, a home owner will likely choose them. Furthermore, ADUs will be installed on properties with existing homes that are mixed-fuel buildings. Requiring All-Electric ADUs may require the existing electrical service to be upgraded to accommodate both the ADU and the existing home.

**Building Materials:** Were building materials recommendations made as a part of Reach Codes? For example, while researching building materials, concrete appears to be a significant contributor to GHG emissions. Do our Building Codes disincentivize its use? Does CEQA factor in GHG emissions from materials?

- The production of all building materials, whether wood or concrete are a significant source of GHGs. However, there is scarce availability of low-carbon cement. CEQA does not consider embedded carbon and local climate action plans also do not count it (known as “Scope 3 emissions”). The Reach Codes address direct emissions sources from combustion of fossil fuels.

**EV Adoption Rates:** For electric vehicles, could we develop a requirement that sets the amount of spaces required as a proportion of total spaces, and include a formula to increase the number of spaces depending on different variables?

- Yes, but the current staff recommendation is to set a fixed amount of required EV spaces. The Redwood City EV reach code, proposed by PCE, was developed as a response to feedback from City Council during the September 23rd meeting. PCE developed the model to ensure buildings built today will be ready for EV adoption to occur within the ~40-year life of the building and incorporate that readiness at construction to avoid the substantially greater costs of retrofits. For our region, EV sales will likely continue to grow for many years so EV expansion will be well within the life of the buildings. PCE anticipates that EV sales will continue to grow and suggest that any building that does not accommodate residents with EVs would not meet future residential market needs.

**Board of Building Review:** What would be the role of the Board of Building Review on Reach Codes? Have they reviewed and weighed in on them?

- Staff met with the Board on December 9, 2019 to receive input on the Reach Code and have taken their feedback into consideration where applicable.

**Safety Impacts:** Have the safety impacts of natural gas been overstated? What scientific research has been done on the subject?

- The most common pollutant associated with gas for household use is carbon monoxide. Currently, the Consumer Product Safety Commission estimates that carbon monoxide related deaths account for 170 accidental deaths each year or one out of every 20 million Americans. The National Institutes of Health have found no apparent impact of gas stove use on pulmonary functions or respiratory symptoms, but have found a relationship between respiratory illnesses and symptoms and gas heating. The takeaway is that respiratory illnesses can be attributed to the energy source and length of exposure to the energy source. With cooking, there is relatively low exposure, whereas heating typically takes place over many hours.
Utility Infrastructure: Will PG&E provide a Service Level Agreement for electric? Has PCE or have other Community Choice Aggregation organizations broached this while advocating for Reach Codes? The concern is that PG&E is slow on electric installations and developers often absorb the costs to get them installed. Does this make the cost of development higher and slow progress?

- PCE reports that requests for upgrades to the distribution grid due to EV charging installations (more load than electric buildings) are rare. However, they anticipate the need to upgrade the distribution grid may rise with the increased focus on electrification, and that PG&E’s responses to requests for upgrades are taking longer than they did in the past. PG&E has committed to support electrification and is openly supporting all-electric reach codes due to concern about stranded natural gas assets and rising costs of maintaining the natural gas system. PCE plans to engage the California Public Utilities Commission to both reduce costs and improve response timeframes.

Goals: What are the overall goals in the adoption of the Reach Codes?

The overall goals are to a) eliminate fossil fuels from buildings, and b) ensure buildings allow individuals to easily choose EVs. There are multiple models for implementation of Reach Codes. For building electrification, 3 models have emerged:

a. Natural gas “ban”: As adopted by Berkeley, San Jose and Morgan Hill, this does not permit any natural gas hook-up for specific building types.

b. All-electric “required”: As adopted by Menlo Park, Mountain View and Pacifica, this requires certain uses to be all-electric. There is some variance in approaches but the key concept is that space and water heating is all-electric because these are the most significant GHG sources. Exclusions vary between jurisdictions but include exceptions for cooking, commercial kitchens, science and research labs, ADUs and others.

c. Electric “preferred”: As adopted by San Mateo, this provides two tracks – electric or mixed-fuel. It provides the most flexibility but is more complex to implement and past codes in this approach have yielded only very modest outcomes (Palo Alto).

For electric vehicles, approaches vary but the major distinctions are outlined in the following list. The proposed Redwood City EV model is based on 100% of dwellings having an EV Ready space:

a. EV-Capable spaces: Generally, this provides for sufficient panel capacity and conduit. The property owner may then complete the circuit at some point in the future. EV drivers are not able to charge until the circuit is complete. Even assuming a resident has an EV-Capable spot, in practice this means that someone who wishes to get a vehicle cannot do so unless they or the property owner to prepare the spot. Since many rental property owners do not wish to provide the service, this is frequently insurmountable.

b. EV-Ready spaces: EV spaces are ready to plug-in. No action required by the property owner and/or resident.
c. Charging levels: The charging level is less important than having some access to power. For this reason the model code makes significant use of Level 1 EV outlet which is the standard outlet, especially for residential settings.

d. Number of spaces: Purchasing an electrical vehicle can be unattractive if charging options are limited. In instances where parking is assigned such as with many older multi-family buildings availability of EV charging is only possible if the assigned space is EV Ready. Where EV charging is limited to a percentage of spaces and parking is available on a first-come first-park basis, residents may experience difficulty in charging their car. This is especially true for lower-income residents who are disproportionately in rental apartments. Increasing charging availability through residential parking can therefore result in an increase in EV usage.

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As previously noted, the goal of the Reach Codes is to reduce fossil fuel usage. The proposed Reach Codes in Attachment A and B only apply to newly constructed buildings. Reach Codes will not apply to additions or remodels that may fall under the requirement for fire sprinklers or to tenant improvements in existing buildings.

Reach Code Approaches and Exceptions

Reach codes are local amendments that exceed the State Energy Code and/or Green Building Standards Code. In order to adopt the local amendments, the additional requirements must be cost effective as it relates to the incremental cost of the additional requirement compared to the energy cost savings over the life of 15 years. PCE recommended a cost-effectiveness study prepared for the Southern California Edison Company for utility users throughout the state. Staff worked with PCE to interpret the results of the study and infer what options may or may not be cost-effective for the building types that are prevalent in Redwood City. Additionally, staff worked with PCE to evaluate options for central water-heating systems in high-rise residential buildings which were not analyzed in the cost-effectiveness study. Staff is only recommending local amendments that were analyzed in the cost-effectiveness study. PCE and their consultants have also provided support to assist other cities in understanding the cost-effectiveness study results when adopting Reach Codes, and they will continue to assist City staff in this analysis.

Difference between Mixed-Fuel and All-Electric Approaches

There is one Reach Code ordinance approach drafted by PCE intended to allow for mixed-fuel buildings. The Mixed-Fuel ordinance approach provided property owners with two options for constructing buildings with a reduced GHG footprint: Performance and Prescriptive. The Performance option allows an applicant to design a building as long as it is energy efficient based on accepted computer modelling. The Prescriptive option requires one or more specific energy efficient improvements. Additionally, under the Prescriptive option most buildings would be required to be electric capable for major energy uses such as drying, space conditioning (heating and cooling), and cooking.

After the October 28th meeting where City Council asked staff to prepare an All-Electric ordinance, staff examined what other cities prepared and worked with PCE to develop an All-Electric Reach Code. Many communities have adopted All-Electric Reach Codes with certain exceptions included. The All-Electric approach developed by staff is primarily based on the City of Menlo Park and City of Mountain View’s all-electric reach codes, in addition to some other cities’ exceptions.

Below are nine potential exceptions to an all-electric Reach Code option for City Council consideration based on exceptions adopted in other communities:

**Exception 1** – Non-Residential Buildings containing a Health Facility as defined in Chapter 7, Article 2 of the 2019 California Administrative Code may contain a non-electric space-conditioning and water-heating systems.

- The largest use of energy for most homes and businesses relates to space conditioning. One of the alternatives to gas-powered space conditioning is the use of electric heat pumps, which typically reduce energy usage since they are more efficient. Heat pumps can be the primary space conditioning system or be complementary to other space
conditioning equipment. The concern for using all-electric space conditioning equipment relates to fluctuating temperatures, as electric appliances are more inconsistent than non-electric appliances in maintaining temperature. Maintaining constant temperatures is essential to ensuring consistency and safety in experiments, lab results, and health care. This can be achieved with an all-electric system; however, staff have received feedback regarding the upfront costs and affects to other designed elements of these changes, that the designs for all-electric systems is very new and is still developing, and that requiring it now could be high in cost relative to potential benefits should these be improved in the future.

- Staff received feedback from the development community and residents regarding concerns about Health Facilities containing all-electric space conditioning systems and/or all-electric water heating systems. In addition, the design and potential structural changes to facilitate heat pump systems can impose significant costs to a project. These concerns were echoed by health care representatives at the BOBR meeting.
- Exception 1 would be unique to Redwood City for cities considering an all-electric reach code.

**Exception 2** – Buildings containing a Scientific Laboratory Area may contain non-electric space-conditioning and water-heating systems.

- Staff received feedback from the development community and residents regarding concerns that Scientific Laboratory Areas contain all-electric space conditioning systems and/or all-electric water heating systems and the design and potential structural changes to a building to facilitate heat pump system can impose significant costs to a project.
- Other cities that have adopted a similar exception regarding scientific laboratories are Brisbane, Menlo Park, and Mountain View.

**Exception 3** – New residential buildings may contain non-electric cooking appliances and fireplaces.

- As discussed in the City Council meeting on October 28, 2019, this exception notes that if natural gas is allowed for cooking appliances and fireplaces in new residential buildings, it should be equally applicable to all types of new residential building. This exception would apply to new single-family homes, duplexes, and all multi-family units. However, low-rise residential buildings (single family homes and structures under four stories) will be required to be pre-wired to be electric capable.
- Other cities that have adopted this exception are Brisbane, Menlo Park, Pacifica, and Saratoga.

**Exception 4** – Emergency Centers.

- Gas may serve as a back-up energy source to power certain appliances in the event of emergencies. This is beneficial to emergency centers in the event of power failure during an emergency. Additionally, as the number of emergency centers is limited, the GHGs contributed from these facilities are relatively minimal.
• Other cities that have adopted this exception are Menlo Park, Pacifica, and Saratoga.

**Exception 5** – Non-Residential Buildings containing a kitchen may contain non-electric cooking appliances.

• This exception includes buildings containing a restaurant or catering kitchen open to the public or employees. Similar to cooking appliances for residential buildings, previous City Council discussion reflected considering gas usage for commercial kitchens and restaurants, which are dependent on gas-fueled cooking appliances due to the consistency of product, lower cost, and equipment availability. Staff have received feedback from restaurant industry professionals indicating while some equipment does exist, the availability of National Sanitation Foundation (NSF) certified products or equipment that can produce the same heat as gas-powered equipment is limited. The NSF is an industry public health and safety organization. Additionally, restaurateurs and chefs have expressed concern that potential increased electricity costs are significant in an industry with very small profit margins.

• Some examples of all-electric restaurants exist; PCE has advised that they may be able to reach out to experts on commercial kitchens if further information is needed.

• Other cities that have this exception for commercial cooking include Brisbane, Menlo Park, Pacifica, Mountain View and Saratoga.

**Exception 6** – Non-residential buildings containing F and H occupancies, as defined in the California Building Code, or Scientific Laboratory Areas may have gas piping installed for use of natural gas in manufacturing, research, development, or for scientific purposes.

• Certain manufacturing processes require natural gas as a feedstock for products such as fertilizers. Research and medical labs may have highly specialized applications such as high volume sterilization and other needs. Recent Redwood City projects with F or H occupancies include Bristol Myers Squib, Impossible Foods (the imitation meat place), Kaiser and Stanford.

• The Reach Code presents no impediments on ‘process’ or industrial loads. The focus of this Reach Code is on space heating and water heating, and to a lesser extent cooking and clothes drying. There is no intent to modify processes that specifically require natural gas.

• Mountain View has exceptions for F and H occupancies. Cupertino is proposing exceptions for F, H and L occupancies, but has not yet adopted them.

**Exception 7** – High-rise residential buildings may contain non-electric water-heating systems.

• Currently, the Cost Effectiveness Study prepared for Reach Codes for residential buildings does not include a cost-effectiveness pathway for central electric water-heating systems of buildings greater than 50,000 square feet. For comparison, 50,000 square feet is twice the size of the Habitat Humanity project on Jefferson Street, which consists of 20 residential units.
Staff have received feedback from contractors and designers regarding the difficulty of designing and constructing a non-electric central water heating system, and that the examples put forward are from states other than California where building codes are less restrictive. Gas powered central water heating systems are ideal because they take up less space, are easier to maintain, and have more reliable backup mechanisms. Mandating all-electric water heating systems for high-rise developments may reduce the number and size of residential dwelling units.

As an alternative to a central water-heating system, all-electric proponents propose multiple water heating systems for a limited number of units or individual water heating units per unit. However, while these approaches are available there can be impacts to residential living space, potential for increased utility costs, and unknown additional costs for maintenance.

PCE indicates that the compliance tools for high rise multifamily are under development and the California Energy Commission (CEC) is instituting a waiver process for all-electric high rise buildings. For this reason, PCE recommends this compliance pathway exception. The California Energy Commission is currently working to develop compliance software.

PCE noted at the December 9th, 2019, Board of Building Review meeting that cost studies that have been completed, for less than 50,000 square feet, do not take into account large residential houses or larger non-residential buildings. The studies also do not take into account the higher cost of construction in Redwood City and the Bay Area and instead use a state average construction cost.

This exception is unique to Redwood City, because other Reach Codes allow for mixed-fuel development. Examples include San Mateo and San Jose, which do not require multi-family buildings above three stories to be all-electric. PCE has indicated that other cities are considering allowing for this exception until a pathway for high-rise buildings approved by the CEC becomes available.

**Exception 8** – All-Electric Building requirements shall not apply to projects with planning entitlements approved by the City prior to the effective date of this ordinance.

- An entitled project is one that has received its land use permit but not its building permit.
- Berkeley has applied their gas ban when the project is pulling their land use permit, specifically to avoid surprises for projects that are already entitled.

**Exception 9** – Infeasibility Exception: If an applicant believes that circumstances exist that make it infeasible for their building to be an All-Electric Building, the applicant may request an exception. In applying for an exception, the burden is on the applicant to identify why the requirements for an All-Electric Building are infeasible. If the exception is granted, the Building Official or their designee shall document their findings in the files of the Building Division.

- For the purposes of this exception, feasibility to construct the building means either an all-electric prescriptive compliance approach is possible for the building under the Energy Code or the building is able to achieve the performance compliance standards under the Energy Code using commercially available technology and an approved calculation
method. The Building Official or their designee may consider a variety of limitations, and approval of this exception is at their discretion.

- Berkeley and Morgan Hill have this exception.

Legal Challenges

Staff is aware of at least three lawsuits that have been filed against two local agencies over Reach Codes and other stringent energy regulations.

- The Town of Windsor adopted Reach Codes in October of 2019 that require all newly constructed low rise residential buildings be all-electric. The lawsuits claim Windsor violated the California Environmental Quality Act by finding the ordinance exempt. The lawsuits further claim Windsor violated the California Energy Code’s requirement that locally adopted energy standards be supported by an analysis that the standards will be cost-effective by relying on a statewide cost-effectiveness study instead of a more local study regarding electricity rates in the Bay Area.

- The City of Berkeley adopted a ban on natural gas infrastructure in certain newly constructed buildings in July of 2019. Berkeley did so under its constitutional police powers, rather than as a Reach Code amendment to the California Energy Code. The California Restaurant Association has filed a lawsuit in U.S. District Court, Northern District, alleging the ban violates state and federal law because the ordinance attempts to regulate energy efficiency and building standards that are already regulated by the state and federal governments. The lawsuit also alleges that Berkeley could not use its police power to regulate energy standards. Berkeley also adopted Reach Codes in December of 2019, but they are mixed-fuel Reach Codes and are not being challenged by the lawsuit.

These cases are in their early stages. Staff will continue to monitor them as they progress.

Next Steps

If and when Reach Codes are adopted, staff will submit the ordinance to the CEC and the California Building Standards Commission for approval. The CEC requires a period up to 60 days for public comment prior to issuing approval of the City’s Reach Code. After the CEC’s approval, staff will submit the proposed Reach Codes to the Building Standards Commission for final approval. The ordinance will be become effective following final approval by the Building Standards Commission.

FISCAL IMPACT

Staff does not anticipate a significant fiscal impact to the City associated with the adoption of the Reach Code Ordinance. The ordinance will be administered by the Building Division and will require additional staff training and development of communication materials, both of which can be accommodated within the Division’s existing budget. All staff will need additional training to understand how the new requirements apply to building permit plan submittal, plan review and inspections. The Reach Codes will
not add any additional staffing requirement for either the mixed-fuel or the all-electric (with/without exceptions) options.

ENVIRONMENTAL REVIEW

This activity is not a project under California Environmental Quality Act (CEQA) as defined in CEQA Guidelines, section 15378, because it has no potential for resulting in either a direct or reasonably foreseeable indirect physical change in the environment. To the extent this activity is a project, it is exempt under CEQA Guidelines Section 15308 as an action taken by the City to assure the maintenance, restoration, enhancement, or protection of 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. Staff also notified interested parties of the study session date

ATTACHMENTS

Attachment A - Draft Mixed-Fuel with New EV Requirements
Attachment B - Draft All-Electric
Attachment C - Statewide Reach Code Residential Cost Effectiveness Study
Attachment D - Statewide Reach Code Nonresidential Cost Effectiveness Study
Attachment E - PG&E letter

REPORT PREPARED BY:

Christina McTaggart, Chief Building Official
cmctaggart@redwoodcity.org
(650) 780-7228

Christopher Dacumos, Management Analyst II
cdacumos@redwoodcity.org
(650) 780-5957

APPROVED BY:

Mark Muenzer, Community Development & Transportation Director
Melissa Stevenson Diaz, City Manager