**TO**: <Name of Environmental/Sustainability Subcommittee>

**FROM**: <Name, Title>

**PREPARED BY**: <Name, Title>

**MEETING DATE**: <Date>

**SUBJECT**: Reach Codes – Proposed Electrification Reach Codes for 2019 Energy Code

**RECOMMENDATION**

Staff recommends the City Council adopt electrification reach codes as written, to be established on January 1, 2020; to help reduce carbon emissions associated with new construction, reduce costs in new construction, improve indoor air quality and safety of our building stock, support affordable housing, and increase adoption of electric vehicles

**BACKGROUND**

The City of <name of city> demonstrated leadership in sustainability when <proof that this City has demonstrated leadership in sustainability>.

In alignment with the above, staff recommends modifying Part 6 and Part 11 of the California Building Code. This report provides an overview of the Statewide cost-effectiveness study, details findings, and provides language recommended for the associated reach code for the 2019 building cycle.

**Reach Code Adoption Process**

Every three years, the State of California adopts new building standards that are organized in Title 24 of the California Code of Regulations, referred to as the California Building Standards Code. This regular update is referred to as a “code cycle.” The last code cycle was adopted in 2016 and was effective as of live on January 1, 2017. The next code cycle will be adopted in 2019 and will be effective January 1, 2020. Cities and counties can adopt reach codes that require items that are above and minimum state code requirements. However, these reach codes must be filed with the State.

In addition, the California Energy Commission (CEC) requires that a cost-effectiveness study be conducted and filed in the case of local amendments to the Energy Code (Title 24, Part 6). It is required that the City demonstrate to the CEC, using a cost-effectiveness study, that the amendments to the code are financially responsible and do not represent an unreasonable burden to the non-residential and residential applicants. A cost-effectiveness study is not required for amendments to the Green Building Code (Title 24, Part 11).

**Statewide Cost-Effectiveness Study for Energy Code Reach Codes**

Funded by the California investor-owned utilities (IOUs), the California Statewide Codes and Standards Program (Statewide Program) led the development of a cost-effectiveness study for Energy Code reach codes that examined different performance-based approaches for new construction of specific building types. There are two kinds of reach code approaches: performance-based ordinances and prescriptive ordinances. Performance-based ordinances mandate an increase in the overall energy efficiency required but leave flexibility for the builder on how to achieve this goal. In contrast, prescriptive ordinances mandate implementation of a specific measure (such as solar panels or cool roofs). The Statewide Program’s analysis focused on performance-based ordinances but some conclusions about prescriptive measures can be made from the results.

**Building Prototypes**

The Statewide Program’s analysis estimated cost-effectiveness of several building prototypes including one-story and two-story single-family homes, a two-story multifamily building, a three-story office building, a one-story retail building, and a four-story hotel. The single-family homes and office building prototypes are directly applicable to <city name> development. The City has averaged <number of single-family homes permitted year> new single-family homes constructed each year over the past five years. Additionally, many approved development projects include <type of non-res buildings most commonly permitted>

**Electric Vehicle Charging Infrastructure**

Electric Vehicle (EV) charging requirements in California can generally be broken into three categories:

* EV Charging Installed: all supply equipment is installed at a parking space, such that an EV can charge without additional equipment.
* EV Ready: Parking space is provided with all power supply and associated outlet, such that a charging station can be plugged in and a vehicle can charge.
* EV Capable: Conduit is installed to parking space, and building electrical system has ample capacity to serve future load. An electrician would be required to complete the circuit before charging is possible.

EV charging capacity and speed can be summarized as three categories:

* Level 1: Capable of charging at 120V, 20A. This is a equivalent to a standard home outlet.
* Level 2: Capable of charging at 240V, 30-40A. This is the service capacity typically used for larger appliance loads in homes
* Level 3 (DC Fast Charging): Capable of charging at 20-400kW. This is the type of charger used for Tesla Superchargers and DC Fast Chargers at some supermarkets.

The 2019 California Green Building Code Update (Title 24, Part 11) increases requirements for electric vehicle charging infrastructure in new construction; including:

* New one- and two-family dwellings and townhouses with attached private garages: must be Level 2 EV-capable
* Multi-family dwellings: 10% of parking spaces must be Level 2 EV-capable
* Non-residential: 6% of parking spaces must be Level 2 EV-capable

**DISCUSSION**

**Building Appliance Electrification**

For multiple reasons including health, safety economics and environmental benefits, there is considerable interest in mandating all-electric new construction, or “building electrification,” which means that the buildings would not have any fossil fuel services. All-electric buildings have electric appliances for space heating, water heating, clothes-drying, and cooking. The interest in building electrification stems from the fact that <Peninsula Clean Energy (PCE) or Silicon Valley Clean Energy (SVCE)> is providing >90% (if PCE) 100% (if SVCE)> carbon-free electricity and eliminating the use of natural gas can greatly reduce greenhouse gas emissions from the building sector.

There are two potential approaches to proliferate all-electric new construction. The first would encourage all-electric new construction by giving builders the choice of two options:

* achieving a higher energy efficiency level than the Energy Code using mixed fuels (natural gas and electricity); or
* building an all-electric building at the minimum efficiency as required in the Energy Code.

The second approach would mandate all-electric new construction by restricting the installation of natural gas plumbing or requiring that only electric appliances be installed.

**Electric Vehicle Charging Infrastructure**

Local residents are showing a significant interest in electric vehicles. For example, the number of registered plug-in vehicles in <San Mateo County increased by 36% in 2018. By comparison, registrations for vehicles powered by fossil fuels grew by only 2% that year. > <Santa Clara county increased by 31% in 2018 By comparison, registrations for vehicles powered by fossil fuels shrank in 2018.> It is widely known that availability of EV charging infrastructure is a critical component to EV adoption. Meanwhile, it is significantly more expensive to install charging infrastructure as a retrofit than it is during new construction. As such, ensuring that newly constructed residential and non-residential parking has ample EV charging capability will reduce long-term costs of EV infrastructure installation, while helping to increase EV adoption and decrease transportation-related greenhouse gas emissions. While California’s new minimum requirements are a step forward, it is unlikely that the requirements for multi-family dwellings and non-residential buildings are enough to keep pace with expected EV growth looking towards 2030. The Statewide Program’s team reviewed approaches to increase the amount of EV infrastructure in new construction buildings, while keeping construction costs as low as possible.

**FINDINGS**

**Building Appliance Electrification Reach Codes:**

Staff have worked closely with the <PCE or SVCE> consultants to interpret the study’s results and infer what options may or may not be cost-effective for the building types that are prevalent in <city name> but were not analyzed by the team. Peninsula Clean Energy and Silicon Valley Clean Energy have also provided consultant support to assist cities in understanding the cost-effectiveness study results and adopting reach codes. The proposed reach codes meet the requirements of the CEC for cost-effectiveness, and are also are a cost-effective approach for constituents, contractors, and developers pursuing new construction with the city limits. In addition, the analysis results show that all-electric buildings are typically less expensive to construct.

<If city is pursuing electric-preferred approach, use this language and delete following paragraph. Otherwise delete this paragraph> Recommended reach code requirements for newly constructed buildings using gas or propane are:

* Require mixed-fuel buildings to perform 15% better than the baseline simulated building within the standard CEC-required energy simulation.
  + Exception: a prescriptive path for energy efficiency improvements has been provided which is laid out in the corresponding ordinance language document
* Require a dedicated 240V, 30-amp circuit with receptacle next to water heaters with breaker space on the panel
* Require a dedicated 240V, 40-amp circuit next to clothes dryers with breaker space on the panel
* Require a dedicated 240V, 50-amp circuit next to cooktops with breaker space on the panel
* Require 3kW solar photovoltaic system on new non-residential buildings with less than 10,000 square feet of gross floor area, and 5kW solar photovoltaic system for non-residential buildings with greater than 10,000 square feet of gross floor area
  + Exception: as an alternative to the solar photovoltaic system, require a solar thermal system with a minimum 40 square feet collector area

<If city is pursuing electric-mandate approach, use this language below and delete paragraph above, otherwise delete this paragraph> Recommended reach code requirements for newly constructed buildings are to mandate all-electric new construction. This approach would allow for exceptions for specific types of appliances or building occupancies, as long as an electrical connection is provided that will facilitate future electrification replacement of the appliance. Additionally, the reach code would require 3kW solar photovoltaic system on new non-residential buildings with less than 10,000 square feet of gross floor area, and 5kW solar photovoltaic system for non-residential buildings with greater than 10,000 square feet of gross floor area. A solar thermal system with a minimum 40 square feet collector area is allowed as an alternative to the solar photovoltaic system.

**Electric Vehicle Charging Infrastructure Reach Codes**

Unlike amendments to the Energy Code, a cost-effectiveness study is not required for amendments to Title 24, Part 11, or the Green Building Code “CALGreen” which covers items such as electric vehicle (EV) charging infrastructure. However, to evaluate the financial impact on first costs, <PCE/SVCE> commissioned an analysis of the total cost of implementing various EV infrastructure measures. Staff have worked closely with Peninsula Clean Energy, Silicon Valley Clean Energy, and the Statewide Program’s team to establish new construction EV requirements which are more in-line with local EV adoption trends, while providing flexibility for the builder and keeping construction costs as low as possible.

Recommended requirements for EV infrastructure are:

Residential

* Single Family Dwelling: One dedicated “plug and play” Level 1 circuit, and one dedicated “plug and play” Level 2 EV circuit.
* Multi-Unit Dwelling, <20 units: Per unit, a single “plug and play” Level 2 EV circuit
  + Exception: Not required for units without parking
* Multi-Unit Dwelling, >20 units: 75% of the units, a single “plug and play” Level 1 EV circuit; 25% of the units, a single “plug and play” Level 2 EV circuit
  + Exception: Not required for units without parking

“Plug and play” is defined as a full circuit installed including capacity to deliver electricity and outlet.

Non-Residential Office

* 10% of the parking spaces, Level 2 EV charging infrastructure installed
* 10% of the parking spaces, “plug and play” Level 1 EV circuits
* 30% of the parking spaces EV capable at the pinch points utilizing at least Level 2-sized conduit with panel capacity for 2kW per EV capable parking space

Non-Residential, Non-Office

* 6% of the parking spaces, Level 2 EV charging infrastructure installed
* 5% of the parking spaces, “plug and play” Level 1 EV circuits
* For parking lots with over 100 spaces, first hundred spaces must adhere to Level 1 & Level 2 requirements, with option to substitute 80kW DC fast charger for subsequent sets of 100 spaces.

**Ordinance Language**

Full text of recommended ordinances is available in corresponding document titled <ordinance document title>

**BUDGET IMPACT**

No significant fiscal impact.

**ENVIRONMENTAL DETERMINATION**

In accordance with CEQA Guidelines section 15378(b)(5), action on this item is not a project subject to CEQA because policy direction is an administrative action that will not result in a physical change to the environment.

**NOTICE PROVIDED**

All meeting noticing requirements were met.

**STAFF CONTACT** <staff contact name>

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