Attachment C

Milpitas 2019 Energy Reach Codes

SUMMARY

ALL CONSTRUCTION MANDATORY

To provide for future electrification, all newly constructed mixed-fuel buildings and additions must comply with the following mandatory requirements:

- Water heating: 240V/30A circuit, condensate drain
  2019 California Energy Code (base code) requirement is for a 125V/20A circuit which would not be sufficient as currently available higher efficiency heat pump water heaters require a 240V/30A circuit.
- Clothes Drying: 240V/40A circuit
  No requirement in 2019 California Energy Code (base code).
- Cooking: 240V/50A circuit
  No requirement in 2019 California Energy Code (base code).
- Space-conditioning Equipment: Heat pump operation capability and / or 30Acircuit if only space heating provided
  No requirement in 2019 California Energy Code (base code).

RESIDENTIAL PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES

Explanatory Notes

1. The All-Electric Performance Paths given under item #1 below for all project types are not reach codes but new pathways for Energy Efficiency that have been made available per the 2019 California Energy Code.
2. Regarding Single, Two-Family, and Multi-Family construction of 3 stories or less, the Performance Path requirements for an energy budget are expressed as the EDR (Energy Design Rating) for the Proposed Design Building. All of the reach code EDR index numbers for the projects named below that are expressed in the following table represent higher efficiencies than the 2019 Energy Code Standard Design Building. These higher efficiency requirements were provided in the model reach code that Silicon Valley Clean Energy (SVCE) made available to local jurisdictions. These efficiency levels conform to requirements in the 2019 Cost-Effectiveness Study for Low-Rise Residential New Construction. Cost-effectiveness is one of two main criteria with which the California Energy Commission (CEC) uses to evaluate and approve reach codes. The other criteria that the CEC uses is that the reach codes must demonstrate higher levels of energy efficiency than the base 2019 California Energy Code.
3. Regarding Nonresidential construction, the Performance Path requirements are expressed as percentages of efficiency that are more than the base 2019 California Energy Code, instead of as an EDR. EDR is the required metric only for residential compliance starting Jan 1, 2020. So, to reflect that, the new code has to use EDR (as a number) rather than compliance margin (as a percentage) for residential requirements. Non-residential still uses compliance margin (in percentages).

Project Type and Size	Performance Path Requirements	Prescriptive Path Requirements
Single and Two-family New Construction	1. **All Electric.** Demonstrate that the proposed home will be all-electric, OR	**Build All Electric** and Meet 2019 California Energy Code.

	3. **Mixed Fuel Buildings.** Proposed Design Building shall be at least 11 EDR points less than the Total Energy Design Rating calculated for the Standard Design Building, OR	**Mixed Fuel Building** a. Install R-10 perimeter slab insulation at a depth of 16-inches. b. Compact hot water distribution per 2019 Reference Appendices RA4.4.6. c. Maximum fan efficacy of 0.35 Watts/cfm and verification by a HERS rater according to 2019 Reference Appendices RA3.3. d. Either 1) 2.75 kWh battery per dwelling unit OR 2) A solar water heating system with a minimum solar savings fraction of 0.20. e. Meet the requirements of Verified Low Leakage Ducts in Conditioned Space (VLLDCS) in the 2019 Reference Appendices RA3.1.4.3.8, with less than or equal to 25 cfm leakage to outside. f. Install a roofing product that's rated by the Cool Roof Rating Council to have an aged solar reflectance (ASR) of greater than or equal to 0.25.
Low Rise Res Alterations	Meet 2019 California Energy Code.	Meet 2019 California Energy Code.
Low Rise Res Additions	Meet 2019 California Energy Code.	Meet 2019 California Energy Code, **including** shall meet the requirements of Sections 110.0 through 110.9, Sections 150.0(a) through (q) and 150.0(s), and either Section 150.2(a) 1 or 2.

NONRESIDENTIAL PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES

Nonresidential New Construction	**All Electric.** Demonstrate that the proposed building will be all-electric, OR	**Build All Electric** and Meet 2019 California Energy Code.
	Mixed Fuel Buildings, All Occupancies Except Group B (office) and M (mercantile). Demonstrate that the energy use of the proposed building is 6% more efficient than the 2019 California Energy Code.	**Mixed Fuel Building, All Occupancies Except Office and Mercantile, as applicable:** a. Install fenestration with a solar heat gain coefficient no greater than 0.22. b. Design Variable Air Volume (VAV) box minimum airflows to be equal to the zone ventilation minimums. c. Include economizers and staged fan control in air handlers with a mechanical cooling capacity ≥ 33,000 Btu/h. d. Reduce the lighting power density (Watts/ft2) by ten percent (10%) from that required from Table 140.6-C. e. In common areas, improve lighting: 1) Control to daylight dimming plus off per Section 140.6(a)2H 2) Perform Institutional Tuning per Section 140.6(a)2J f. Install one drain water heat recovery device per every three guest rooms that is field verified as specified in the Reference Appendix RA3.6.9.

Attachment D

Milpitas 2019 Green Building Reach Codes

SUMMARY

EV Charging Proposed Reach Code for the 2019 California Green Building Standards Code

Unlike amendments to the California Energy Code, a cost-effectiveness study is not required for amendments to the California Green Building Standards Code (CALGreen), which covers items such as electric vehicle charging infrastructure. Staff worked closely with SVCE 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 developer and keeping construction costs as low as possible.

Electric Vehicle Charging Infrastructure Categories and 2019 CALGreen EV Requirements

Electric Vehicle 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 the 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 Standards Code increases requirements for electric vehicle charging infrastructure in new construction, including the following:

- 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.

Milpitas Proposed Reach Code for EV infrastructure for New Buildings in 2019 CALGreen

While the code amendment language can be found in the proposed ordinance, proposed reach code for EV infrastructure for new buildings is summarized below:

Residential Buildings

- Single Family Dwelling: One Level 1 EV Ready circuit, and one Level 2 EV Ready circuit.
- Multi-Family Dwelling: ≤20 units: 15% of dwelling unit parking spaces provided with access to at least one Level 2 EV Ready circuit and an additional 35% provided with access to at least one Level 1 Capable circuit
    - Exception: Not required for units without parking.
- Multi-Family Dwelling: >20 units: 20% of dwelling unit parking spaces provided with access to at least one Level 2 Ready circuit and an additional 35% of dwelling unit parking spaces provided with access to at least one Level 1 Capable circuit
    - Exception: Not required for units without parking.

- Exception: For multi-family affordable housing projects:
  ≤ 20 units, 5% of parking spaces to be provided access to at least one Level 2 Ready circuit and an additional 35% of spaces shall have access to one Level 1 Capable circuit
  < 20 units, 10% of parking spaces to be provided access to at least one Level 2 Ready circuit and an additional 15% of parking spaces shall have access to at least one Level 1 Capable circuit

Office Buildings

- 5% of the parking spaces, Level 2 Electric Vehicle Supply Equipment (EVSE) (complete charging infrastructure installed).
- 10% of the parking spaces, Level 1 EV Ready circuits.
- 20% 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.

Other Nonresidential Buildings

- When 10 or more parking spaces are provided, 4% of the spaces shall be equipped with Level 2 Electric Vehicle Charging Stations (EVCS).
- An additional 3% shall be at least Level 1 Capable.
- Over 100 spaces: option for one 80kW Fast Charger per 100 spaces
  - NOTE: Installation of each DC Fast Charger with the capacity to provide at least 80 kW output may substitute for 6 Level 2 EVCS and 5 EV Ready spaces after a minimum of 6 Level 2 EVCS and 5 Level 1 EV Ready spaces are installed.

Attachment I

Reach Code Efforts in Other Cities

City	Building Electrification Requirement	Electric Vehicle Charging Infrastructure	Solar Requirements	Council Date (if known)
Fremont	TBD – Process ongoing, target Reach Code development for Spring 2020. Considering the following recommendations. **Low Rise Residential:** all-electric required, electric preferred. **Non-residential:** all-electric required, electric preferred (exemptions for industrial manufacturing, biotech, and commercial kitchens).	TBD – Process ongoing, target Reach Code development for Spring 2020. Considering the following. **Single-Family/Duplex:** meet 2019 California Energy code. **Multi-family:** 10% of all new parking spaces to be EV Ready. **Non-residential:** 10 – 20% of new parking spaces to be EV Ready.	TBD – Process ongoing, target Reach Code development for Spring 2020. Considering the following recommendations. **Low Rise Residential:** PV and battery required, meet 2019 California Energy code. **Multi-family** (4-6 stories): Mandatory PV sizing TBD based on cost-effectiveness. **Non-residential:** Mandatory PV sized to the Solar Zone, approximately 15% of roof space. *all building types that do not have PV batteries, must be battery ready.	Potentially in January or February of 2020, date not set.
Hayward	**Low Rise Residential:** all-electric required **Non-residential:** Favors all-electric, and has extra requirements for mixed-fuel buildings.	**Single-Family/Duplex:** Two Level 2 EV Ready (each dwelling unit with only one parking space install one Level 2 EV Ready ADU's). **Multi-Unit:** 0-20 Spaces 1 EV2 Ready, 20 or more Spaces, 75% EV2 Ready, remaining dwelling units with parking spaces shall be provided with at least a Level 2 EV Capable. **Office Buildings:** 10 or more parking spaces, 20% of parking shall have Level 2 EVCS, an additional 30% shall be at least level 2 EV Capable. **Non-residential:** 10 or more parking spaces, 15% Level 2 EV Ready,	**Low Rise Residential:** meet 2019 California Energy code. **Non-residential:** When using mixed-fuel must have solar panels on the entire Solar Zone (if this exceeds the annual electric load for the building, it may be reduced to meet the annual load).	Nov. 19, 2019

City	Building Electrification Requirement	Electric Vehicle Charging Infrastructure	Solar Requirements	Council Date (if known)
		(exception a Level 3 DC Fast charger with 80kW or greater output may substitute for 15 Level 2 EV Spaces after at least 15 Level 2 EV Ready spaces are installed.		
Mountain View	**Low Rise Residential:** All-electric required. **Non-Residential:** For-Profit Kitchens may appeal to use natural gas for cooking equipment (must prewire for electric appliances). **Commercial:** Natural Gas allowed in Factory, Hazardous Materials, and Laboratories (must prewire for electric appliances).	**Single-Family/Duplex:** One Level 1 EV Capable, One Level 2 EV Ready (excludes ADU's). **Multi-Unit & Mixed-Use:** 0-9 Spaces 1 EV2 Ready, 10 or more Spaces, 15% EV2 CS, 85% EV Ready, 1 Level 3 DC Fast Charger per every 100 spaces.	**Single-Family/ Duplex:** PV must accommodate annual all-electric building kWh offset. **Multi-Family, Mixed-Use, Hotel/Motel, Commercial:** PV installed on 50% of Roof Area, and meet Energy Code (**low rise residential** buildings are excluded from the 50% PV requirement).	1st Reading Oct. 22, 2019 2nd Reading Nov. 12, 2019
Oakland	TBD – Process ongoing, target Reach Code development for Spring 2020. Discussion on the following. **Low Rise Residential:** All-electric required. **Non-Residential:** Mixed fuel must be 10% more efficient. Or all-electric.	TBD – Process ongoing, target Reach Code development for Spring 2020. Discussion on the following **Multi-family:** 10% EV Ready, 10% EV Capable, rest of spaces with Conduit for future EV installation.	TBD – Process ongoing, target Reach Code development for Spring 2020.	Expected in 2020, no date set
Palo Alto	**Single-Family/Duplex:** Mixed fuel must be 14% more efficient and be electrification ready. Or all-electric. **Multi-family low-rise:** Mixed fuel 8% more efficient. Or all-electric. **Office/Retail:** Mixed fuel 14% more efficient. Or all-electric.	**Single-Family/Duplex:** Provide Conduit Only, EVSE Ready Level 2, or EVSE Installed Level 2 for each residence. **Multi-Unit & Mixed-Use:** Provide Conduit Only, EVSE Ready Level 2, or EVSE Installed Level 2 for each residential unit in the structure. **Guest parking:** Provide Conduit Only, EVSE Ready Level 2, or EVSE Installed	**Single-family Residential*:** At least 500 square feet of PV. **Multi-family residential*:** Install enough PV to at least result in 12% energy efficiency savings. **Non-residential*:** Install at least 5kW of PV.	Nov. 4, 2019

City	Building Electrification Requirement	Electric Vehicle Charging Infrastructure	Solar Requirements	Council Date (if known)
	Hotel low-rise: Mixed fuel 6% more efficient. Or all-electric.	Level 2 for at least 25% of guest parking spaces, and at least 5% (at least one) EVSE Level 2 Installed. **Hotels (new):** Provide Conduit Only, EVSE Ready Level 2, or EVSE Installed Level 2 for at least 30% of parking spaces, and at least 10% (at least one) EVSE Level 2 Installed. **Non-residential:** Provide Conduit Only, EVSE Ready Level 2, or EVSE Installed Level 2 for at least 25% of parking spaces, and at least 5% (at least one) EVSE Level 2 Installed.	*All electric construction is exempt from PV requirements. (this info is as of 2017 Palo Alto hasn't yet published new solar requirements.)	
San Jose	**Single-Family/Duplex:** Mixed fuel must be at least a 10 point EDR reduction and be electrification ready. Or all-electric. **Multi-family low-rise:** Mixed fuel must be at least a 10 point EDR reduction and be electrification ready. Or all-electric. **High-rise Multi-family, Hotel/Motel:** Mixed fuel 6% more efficient. Or all-electric. **Non-residential:** Office & Retail: Mixed fuel 14% more efficient. Or all-electric, all electrification ready. Industrial /Manufacturing: Mixed fuel 0% more efficient. Or all-electric, all electrification ready.	**Single-Family/Duplex:** One Level 2 EV Ready space (includes ADU if there is a parking space). **Low-rise Multi-family:** 10% EVSE, 20% EV Ready, 70% EV Capable. **High-rise Multi-family:** 10% EVSE, 20% EV Ready, 70% EV Capable. **Hotel:** 10% EVSE, 0% EV Ready, 50% EV Capable. **Non-residential:** 10% EVSE, 0% EV Ready, 40% EV Capable. (all EV is at least Level 2)	**Low Rise Residential:** PV to meet 2019 California Energy code. Battery with at least 5kWh shall be installed. **Multi-family:** PV sized to offset 100% of the estimated site electricity load. Battery storage with capacity equivalent to the PV system shall be installed.	Oct. 1, 2019

City	Building Electrification Requirement	Electric Vehicle Charging Infrastructure	Solar Requirements	Council Date (if known)
	All others: Mixed fuel 6% more efficient. Or all-electric, all electrification ready.			
San Mateo	**Single-Family/Duplex:** Mixed fuel must be at least 15% more efficient than the Energy code minimum efficiency. Or be all-electric. **Office:** Mixed fuel must be at least 10% more efficient than the Energy code minimum efficiency. Or all-electric. **Multi-family:** TBD likely mid-code cycle.	**Single-Family/Duplex:** One Level 2 EV Outlet installed. **Multi-family:** 15% Level 2 EV Capable spaces. **Non-residential:** 10% Level 2 EV Capable spaces, 5% Level 2 EVSE Installed spaces.	**Single-family/Duplex & Multifamily (3 stories or less):** Meet 2019 Energy Code. **Multi-family (4 stories or more)*:** Minimum 3kW PV system or solar thermal. **Non-residential (<10,000 SF)*:** Minimum 3kW PV system or solar thermal. **Non-residential (>10,000 SF)*:** Minimum 5kW PV system or solar thermal. ***Exception:** May provide a solar hot water system with a minimum collector area of 40 square feet.	1st Reading Aug. 19, 2019 2nd Reading Sept. 3, 2019
Santa Clara	**Single-Family/Duplex:** Mixed fuel must be at least a (TBD) point EDR reduction and be electrification ready. Or all-electric. **Non-residential:** Mixed fuel must be at least 5% more efficient and be electrification ready. Or all-electric.	**Single-Family/Duplex:** Considering 2 EV Ready spaces **Multi-family (40 units or less):** An EV Ready space per unit **Multi-family (40 + units):** 100% EV Ready (w/ load management) **Non-residential:** 10% EVSE, 10% EV Ready, 50% EV Capable.	Meet 2019 California Energy code.	TBD – estimated November 2019.
Sunnyvale	TBD – Process ongoing, target Reach Code development target date not set.	TBD – Process ongoing, target Reach Code development target date not set.	TBD – Process ongoing, target Reach Code development target date not set.	TBD – no target date set, anticipated in 2020

Attachment I

City	Building Electrification Requirement	Electric Vehicle Charging Infrastructure	Solar Requirements	Council Date (if known)
Milpitas	***Single and two-family:*** *Mixed fuel energy consumption must be at least a 10 point EDR reduction. Or electrically heated mixed-fuel shall be at least 2 EDR points less. Or all-electric.* ***Multi-family low-rise:*** *Mixed fuel must be at least a 11 point EDR reduction. Or electrically heated mixed-fuel shall be at least 1 EDR point less. Or all-electric.* ***Non-residential except office and mercantile:*** *Mixed fuel 6% more efficient. Or all-electric.* ***Non-residential office and mercantile:*** *Mixed fuel 14% more efficient. Or all-electric.*	***Single and two-family:*** *install one Level 2 EV Ready circuit, and one Level 1 EV Ready circuit.* ***Multi-family (20 units or less):*** *15% access to Level 2 EV Ready circuit.* *35% access to Level 1 Capable circuit.* ***Multi-family (20 + units):*** *20% access to Level 2 EV Ready circuit.* *35% access to Level 1 Capable circuit.* ***Office:*** *5% access to Level 2 EV Charger System installed. 10% access to Level 1 EV Ready. 20% access to Level 1 EV Capable or EV Ready.* ***Other Non-residential:*** *4% access to Level 2 EV Charger System installed. 3% access to Level 1 EV Capable. Over 100 spaces, one 80kW Level 3 DC Fast charger per 100 spaces.* ***Exception:*** *Installation of each Direct Current Fast Charger with the capacity to provide at least 80 kW output may substitute for 6 Level 2 EVCS and 5 EV Ready spaces after a minimum of 6 Level 2 EVCS and 5 Level 1 EV Capable spaces are installed.*	***Residential:*** *Meet 2019 California Energy code.* ***Non-residential (<10,000 SF)*:*** *Minimum 3kW PV system or solar thermal.* ***Non-residential (≥10,000 SF)*:*** *Minimum 5kW PV system or solar thermal.* ****Exception:*** *May provide a solar hot water system with a minimum collector area of 40 square feet.*	*1st Reading Nov. 5, 2019* *2nd Reading Dec. 3, 2019*