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2019 Reach Code Staff Report Template -- New Construction

# Fuel-Neutral Version

*This staff report template is intended as a companion to the fuel-neutral version of the new construction model ordinance. It should be customized to suit the scope of the actual ordinance, local findings, and climate zone. The charts are populated with data from Climate Zone 3 for illustration purposes. See companion workbooks for other climate zones. Instructions are in* blue*.*

*The most recent version of this template and related documents may be downloaded* [*here*](https://localenergycodes.com/content/2019-local-energy-ordinances/)*.*

# RECOMMENDATION

That Council adopt the first reading of an Ordinance amending the building code to require newly constructed buildings to meet stricter energy efficiency and renewable energy requirements [option] and to require that buildings which are served by natural gas or propane be constructed so that they are ready for conversion to all-electric service.

# BACKGROUND

The State has set ambitious renewable energy targets for new construction -- it aims to achieve zero-net-energy (ZNE) for all new residential buildings by 2020 and for all nonresidential buildings (including high-rise residential) by 2030. One of the State’s policy mechanisms is to include energy efficiency and renewable energy requirements in the energy code, which is part of the State building code and must be adopted and enforced by local agencies.

While the requirements of the 2019 version of the code (effective on January 1, 2020) move in the direction of ZNE performance, there are opportunities to achieve greater energy savings and accelerate decarbonization by improving energy efficiency and renewable standards. Such opportunities can be incorporated into the building code as local amendments, known as reach codes.

The proposed Ordinance would amend the building code to require the following:

* Newly constructed buildings are to comply with stricter energy standards through a combination of energy efficiency, renewable energy and energy storage.
* [Electrification Ready Supplement] New construction, including additions, are to be powered solely by electricity or include the necessary infrastructure to convert to all-electric in the future, with exceptions for industrial processes and commercial kitchens.

Higher energy standards are critical to decarbonization. High-efficiency equipment and design will lower energy requirements and reduce demand for fossil fuels and on-site renewables.

Likewise, all-electric buildings are one of the key strategies to decarbonizing the state’s building stock. The state’s electric system is rapidly becoming cleaner, driven by escalating renewable portfolio standards and cleaner product offerings by the utilities and community choice aggregators (CCAs) [local specifics may be added here]. And while it is theoretically possible to power buildings with renewable natural gas, there currently is no plan for large-scale conversion to renewable natural gas.

In addition, advances in electric heat pumps and other electrical equipment are yielding much higher overall efficiencies than their natural gas counterparts. Electric heat pumps, unlike traditional electric resistance heaters, do not generate heat, but concentrate and transfer it for end uses such as space conditioning and water heating. This process uses less primary energy and emits much less carbon, particularly when it is powered by renewable energy.

Many forms of renewable energy are not dispatchable, that is, they cannot be ramped up to match demand on a real-time basis. However, energy storage and load shifting technologies, combined with dynamic electricity pricing structures are helping overcome these limitations. Batteries, smart buildings and financial incentives enable alignment of the consumer demand and supply from intermittent renewable sources such as solar and wind.

The proposed building code amendments must be approved by the California Energy Commission. To be approved, the energy standards of the reach code must be cost-effective and result in a reduction in energy use beyond the State code. A study commissioned by the State’s utilities has found that the energy performance requirements of the proposed ordinance satisfy these conditions.

The all-electric readiness requirements are designed to enable buildings initially equipped with natural gas appliances to replace them with electric appliances at a later time without having to make electrical capacity upgrades or make other changes to the building. The all-electric readiness requirements are based on findings that all-electric buildings cause fewer GHG emissions. There are no cost-effectiveness findings for these provisions since, by themselves, they do not reduce energy. Including these is prudent as they are relatively inexpensive at the time of initial construction while enabling buildings to avoid much higher conversion costs in the future.

## Ordinance Development Process

The basic scope of the ordinance is similar to the approach other local governments are considering[/have adopted]. It is based on a model ordinance developed through a collaborative effort involving the California Energy Commission, the State’s major utilities, several community choice aggregators and representatives from local governments and energy policy agencies. [Add section on public/stakeholder outreach process and any commission/subcommittee actions]

## Implementation

The ordinance will become effective upon approval by the California Energy Commission, which is expected within 90 days of adoption. It will be administered as part of the normal building permit process. Staff training will be conducted prior to the effective date. Notices of the requirements will be posted at the Permit Service counter and will be [add other outreach plans such as newsletters, list serves, etc.]

# Proposed Requirements

The proposed requirements include a set of energy standards that apply to most newly constructed buildings, [option] and a set of all-electric readiness requirements which apply to newly constructed buildings and additions that include gas plumbing. They are codified as amendments to specific sections of the California Energy Code, Title 24, Article 6.

The energy standards apply to all newly constructed buildings except hospitals and are consistent with the structure of the State code, which offers two pathways for compliance – a performance pathway and a prescriptive pathway (certain mandatory measures apply to both pathways). The performance pathway allows for flexibility by requiring building designs to meet energy performance targets, as calculated using a building simulation. The prescriptive pathway sets forth specific equipment and installation parameters.

The requirements vary by building type as follows:

* Low-rise residential including residential occupancies in buildings of three stories or less:
  + Section 150.1 tightens the energy performance standards by reducing the required Energy Design Rating, a metric for energy performance where zero is a zero-net-energy building. This section includes certain exceptions to account for limited solar access and provides a credit if the energy analysis is performed by a Certified Energy Analyst. In lieu of the performance requirements, Section 150.1(c)16 specifies additional prescriptive measures and higher standards for systems and components.
  + Accessory dwelling units less than 400 square feet are exempt per Section 150.1(b)1.
* Nonresidential buildings, including high-rise residential:
  + Section 140.0(b)1 requires that solar PV panels be installed on a minimum of 15% of the roof area, the same area that is required to be solar-ready under the State code. The code has exceptions to the solar zone requirement to address limited solar access.
  + Section 140.1 tightens the energy performance standards by reducing the energy budget by 5-10%, depending upon the occupancy type. This section provides a credit if the energy analysis is performed by a Certified Energy Analyst. In lieu of the performance requirements Section 140.2 specifies additional prescriptive measures and higher performance requirements for some measures.

[Option] The all-electric readiness requirements apply only to buildings and additions that are plumbed for gas. The requirements include circuits and/or conduit for water and space heating equipment, cooking equipment and clothes dryers, as well as space requirements for water heaters (accessory dwelling units are exempt from the space requirements). The requirements do not apply to industrial processes and commercial kitchens. The specific requirements for low-rise residential buildings are at Section 150.0 and nonresidential requirements are at Section 140.0(b)2.

**IMPACTS**

The proposed requirements are based on a cost-effectiveness studies commissioned by PG&E with ratepayer funds. The studies analyzed several prototypical buildings. For each prototype, the studies simulated operating the buildings with different combinations of energy efficiency, solar and battery measures in order to determine the impacts on energy consumption, greenhouse gas emissions, costs and savings. Costs include incremental capital costs, and, in some cases higher energy costs. In general, the first costs of an all-electric building are lower than a mixed-fuel building due to the lack of gas plumbing.

Since there are many potential pathways to comply with the requirements of the ordinance, the impacts will vary depending upon what strategies developers use to comply. Several cases are presented in the tables that follow.

* Mixed-Fuel 2019 Code Compliant – Base Case. Typical construction in the absence of a local reach code.
* Mixed-Fuel Efficiency, Solar and Battery – Typical compliance strategy for a mixed-fuel building. Includes extra efficiency measures, a slightly larger PV system and a battery.
* All-Electric State Code Compliant – All-electric construction that is minimally compliant with the State code. For comparison purposes only; does not meet the reach code requirements.
* All-Electric Efficiency and Solar – Typical construction strategy for an all-electric building. Includes extra efficiency measures and a larger PV system.

The potential impacts of typical compliance strategies for different building types are summarized in the figures below.

**Environmental Impacts** [sample language and figures for Climate Zone 3]

The study finds that all-electric buildings, even those with no other energy performance enhancements, provide significant GHG reductions. The addition of energy efficiency and more solar can drive net energy use to nearly zero for some building types and GHG emissions to less than a third of a mixed-fuel 2019 State code compliant building.

The charts below compare total GHG emissions and net source energy consumption (after onsite generation) of various strategies for typical building types. Note, high-rise residential buildings have similar compliance requirements as hotels, including treating guest rooms as residential spaces, and should be comparable to the small hotel building prototype.

Figure : GHG and Energy Impact, Single Family Home

Figure : GHG and Energy Impacts, Low-Rise Multifamily Unit

Figure : GHG and Energy Impact, Medium Office Building

Figure : GHG and Energy Impact Small Hotel

Economic Impacts [sample language and figures for Climate Zone 3]

All-electric buildings are often cheaper to build due to the elimination of running expensive gas plumbing to the building. These lower first costs generally make all-electric construction more cost-effective on a life-cycle basis. This is particularly true for low-rise residential buildings, where it is also often increasingly more cost-effective for the owner to exceed the code by improving efficiency and adding solar. In fact, if one invests the savings from the gas infrastructure in additional PV capacity to offset more of the electricity load, in many cases the building is cost-effective for the owner and society from day one, meaning the building is both less expensive to build and cheaper to operate.

The charts below depict the incremental net present value costs and savings of various designs relative to a State-code-complaint mixed-fuel design. Note, each building type is examined from two perspectives: one from the owners/operator’s point of view; the other from society’s point of view. The latter reflects benefits that accrue to other ratepayers and society.

Cost values less than zero indicate lower capital cost; savings values less than zero indicate higher energy costs. Again, a high-rise residential building should be comparable to the small hotel building prototype.

Figure : Costs and Benefits - Single-Family Home

Figure Costs and Benefits - Low-Rise Multifamily Unit

Figure : Costs and Benefits - Medium Office

Figure : Costs and Benefits - Small Hotel

# FISCAL IMPACT

The energy performance amendments parallel the structure and terms of the State code and as such any incremental plan check and inspection time should be minimal. The electric readiness provisions will require plan checkers and inspectors to apply additional check lists to mixed-fuel buildings. These items are relatively simple and are not expected to require significant additional staff time. Any incremental costs of administering these requirements will be covered through existing permit fees.

# CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Adoption of the ordinance requires CEQA compliance. The ordinance includes findings that the requirements would not have the potential for causing significant adverse environmental impact and is therefore exempt from CEQA under Section 15061(b)(3).

Attachments:

* Cost Effectiveness Study
* Proposed Ordinance