

# 2019 Building Electrification & EV Infrastructure Reach Code Initiative

## Frequently Asked Questions



### Topic: Cost Effectiveness Studies

- 1) Q: Is the study based on IOU utility rates or PCE/SVCE's?  
A: Currently, the study is based on specific IOU utility rates.
  
- 2) Q: For tenant/landlord situations, who is paying for the measures vs. who receives the benefits?  
A: It depends on the metering situation and rental agreement between tenant and landlord.
  
- 3) Q: Are the models adjusted for upstream fugitive emissions? Do they account for Renewable Portfolio Standard requirements? Is there a consideration for hydrofluorocarbons (HFC's) in GHG emission saving analysis?  
A: The GHG emission factors do account for future Renewable Portfolio Standard requirements. However, the GHG emissions factors do not reflect current emissions rates which may be ahead of the RPS requirements, do not include fugitive emissions, and do not include emissions associated with HFCs.
  
- 4) Q: What geographical regions do the cost effectiveness results apply to?  
A: The statewide IOU study covers all geographical regions in California. This initiative focuses on San Mateo county (CEC climate zone 3) and Santa Clara county (CEC climate zone 4). The most up-to-date draft of cost effectiveness study can be found at: <http://localenergycodes.com/content/2019-local-energy-ordinances/>
  
- 5) Q: Does the PV sizing in analysis result in over production?  
A: For most scenarios, no. The residential code allows for a slight over generation for all-electric homes with battery storage.
  
- 6) Q: Was there a sensitivity analysis performed on cost benefit?  
A: The studies were performed with a set of assumptions that the consultant teams assumed would be most realistic. Sensitivity analysis has not yet been performed.
  
- 7) Q: Why are different compliance margins found to be cost effective between residential and nonresidential buildings?  
A: The variance in compliance margins depends on occupancy type of the building and location (climate zone). These two determinants impact the energy consumption of the building, the state building code requirements, and subsequently the extent that additional energy efficiency measures are cost effective.

8) Q: Is it truly cheaper to build all-electric? How reliable is electric equipment compared to natural gas?

A: The studies have found that for the major building end-uses all-electric appliances have a negligible impact on installation costs as compared to gas appliances. Building all-electric has substantial cost savings for avoided natural gas infrastructure. These studies examine the upfront costs, maintenance costs, and operational costs of all-electric designs and support these conclusions:

- i. [Residential Building Electrification in California](#)
- ii. [2019 Residential New Construction Cost-effectiveness Study - DRAFT](#)
- iii. [2019 Nonresidential New Construction Cost-effectiveness Study - DRAFT](#)

9) Q: For the reach code path "Option 3: Electrically Heated Building", How will the maintenance cost of a residential house be over the house life expectancy? Will it be more expensive in utility bills without solar panel installations?

A: Generally speaking, yes an all-electric building operational cost improves dramatically with a) more efficient HVAC/DHW systems and b) more solar PV.

10) Q: What are the baseline PV sizing requirements for low-rise residential buildings as per 2019 Title 24 code?

A: The PV system offsets the electricity usage of a mixed-fuel home. An all-electric home is required to have a baseline PV system size equivalent to a similar mixed-fuel home.

### Topic: Technologies

11) Q: Can a heat pump water heater match the performance of a gas system?

A: Yes, a heat pump water heater can equal the performance of a gas equivalent. For example, Rheem's 55 gallon unit can deliver 70 gallons of hot water in the first hour, enough for about four showers. For comparison, Rheem's gas equivalent delivers 79 gallons in the first hour. When selecting any hot water heater, no matter the fuel, make sure it is the right size for your use type. A home with a big family or a vacation home might need a larger 80 gallon tank.

12) Q: Will the heat pump water heater need to be supplemented by electric resistance?

A: Heat pump water heaters are typically designed with hybrid heating capability, including a backup electric resistance coil. This enables the heat pump to work when its bitterly cold, and also helps the heat pump replenish its hot water supply more quickly. In most cases, the electric resistance coil is idle.

13) Q: Can the central heat pump water heater distribute adequate water supply temperature to multiple units simultaneously?

A: Yes, when designed appropriately. Many entities are supporting design guideline development, expected to be publicly available in early 2020.

14) Q: How reliable is the electric grid as compared to natural gas?

A: The natural gas grid and electric grid both go down on occasion. In fact, during California's primary natural disaster events, wildfires and earthquakes, utilities are supposed to turn the gas off. If 100% reliability is a goal for your home or project, electrification with battery and solar backup via microgrid is the way to get there.

15) Q: With the rapid change in technologies, how soon will these all-electric technologies become irrelevant?

A: Most electrification technologies have been around for over a century. They will likely become slightly more efficient over time, but the current options available will be relevant for the life of the system.

16) Q: How does the induction cooking compare to the current more favorable gas cooking?

A: Induction cooking has more specific temperature control, is much safer, easier to clean, and can vary heat settings faster than gas.

17) Q: How do the costs for electric space heating and water heating compare to that of natural gas-based options?

A: The answer largely depends on the product chosen, climate, and occupant behavior. Generally, energy costs can be treated as similar. This is because while electricity is about four times more expensive than gas, heat pumps are about four times more efficient. Capital costs for new construction are lower because a building owner can avoid the high cost of a new gas meter.

18) Q: Are natural gas systems more efficient than all-electric?

A: In every case, all-electric systems operate more efficiently than natural gas systems.

19) Q: What if the new building does not have air conditioner? Are there any other requirements to later convert from a gas heater to electric heat pump?

A: The latest model code will include requiring electrical capacity minimums for gas-based space heating.

### Topic: Electric Vehicles

20) Q: Can you explain different types of EV terminology?

A: PEV - Plug-in Electric Vehicle, which includes both PHEV and BEV as subsets  
PHEV - Plug-in Hybrid Electric vehicle, which includes a conventional combustion engine.  
BEV - Battery electric vehicle, which does not include a conventional combustion engine.

21) Q: How are the electric vehicle charging spaces shared between tenants in multifamily buildings?

A: The model codes require that each parking space in a multifamily building be provided with EV infrastructure, even parking spaces that are unassigned to specific dwelling units.

22) Q: What are the typical costs of EVSE (Electric Vehicle Supply Equipment)?

A: Residential chargers - \$400-\$1200 per outlet  
Nonresidential chargers - \$1000-\$5000 per outlet

- 23) Q: Will a very aggressive deployment of EV readiness may put a sudden load to the electric grid?  
A: Significant effort is going into planning at the infrastructure level, and smart charging capability at the EV charging station to ensure this is not an issue. Utilities are planning and preparing for increased levels of EV deployment.

### Topic: Model Code-Ordinance

- 24) Q: Do the local governments work with public utilities on developing the ordinance?  
A: Local governments must receive approval from the California Energy Commission before adopting local building energy ordinances. (All other ordinance types must be submitted to the Building Standards Commission). This initiative supports local governments in developing ordinances that are ready for CEC application and promote regional consistency.
- 25) Q: How will the code be implemented against current standard practices?  
A: The Statewide Utility study researched design approaches that are market ready as well as cost effective. The model codes as part of this initiative will support a flexible design approach with multiple compliance pathways.
- 26) Q: Can we directly adopt the San Francisco EV ordinance?  
A: Yes, cities can adopt EV ordinances they feel are best for their community, subject to the constraints of their own local ordinance development process. This initiative is building upon and enhancing other EV ordinances to recommend model codes.
- 27) Q: How do we apply the cost effectiveness study to develop a prescriptive approach for model ordinance?  
A: The cost effectiveness studies determined the maximum performance level that can be achieved cost effectively through a certain set of measures. The intent was to identify a market ready performance threshold, while allowing for it to be achieved in a variety of ways. Local jurisdictions can choose to allow for an alternative prescriptive compliance path that requires this set of measures.
- 28) Q: Can reach codes promote better air quality in addition to energy efficiency?  
A: Indoor air quality impacts are not explicitly studied, though studies have shown that avoiding indoor natural gas combustion can result in better air quality.
- 29) Q: Are retrofits being considered in the electrification reach code?  
A: Retrofits are not considered for the current scope of this initiative.
- 30) Q: How will the ADU's be addressed?  
A: The team is considering having mixed-fuel additions, alterations, and ADUs only comply with the mandatory electric-ready requirements, as relevant when installing an appliance. These building types will be exempted from meeting the new construction energy performance requirements.

31) Q: How will mixed-use buildings comply?

A: The compliance margin percentage will be calculated as a weighted-average of the individual building results.

32) Q: How will high-rise multifamily buildings comply?

A: Cost effectiveness results for high-rise multi-family building will be available in late summer or early fall. It's likely that a compliance pathway will be available for all-electric, and a model code can be applied.

33) Q: What building types are covered under the reach code?

A: Cost effectiveness studies were performed on single family, low-rise multifamily, hotel, office, and retail prototypes. At a minimum, most buildings falling under these size ranges comply with the reach code buildings. This initiative's model code applies the cost effectiveness findings to an expanded set of building types.

34) Q: How do the proposed model reach codes affect the implementation/plan-check process?

A:

For Performance Path - Plan check would utilize the usual compliance outputs (the CF1R report for residential, or PRF-01 for nonresidential) to review the fuel type: "Natural gas" or "All-electric," and the characteristics of the water heating and HVAC systems and whether they are gas or all-electric. Based on this information, plan check will know what compliance margins the Proposed Design will need to show compared to the 2019 code compliant Standard Design, and verify that those compliance margins are achieved.

For Prescriptive Path – Plan check would need to review the plumbing drawings for the locations of natural gas piping, and which appliances are served by a natural gas pipe (if any). Plan check will then cross-reference the energy efficiency characteristics of the home as compared to the standard prescriptive requirements in Title 24 Part 6 as part of usual procedures. However, if there is natural gas piping, there will be short list of additional efficiency measures that plan check must review in addition to those required with Part 6.

Mandatory – Plan check will review the electrical drawings to ensure that adequate electrical capacity is supplied to space heating, water heating, cooking, and clothes drying end-uses.

35) Q: Can you please advise the Energy Design Rating (EDR) equivalent to compliance margin requirement?

A: The proposed reach code language refers to EDR reductions from the 2019 code compliant baseline design. It is challenging to develop an exact relationship between an EDR reduction and a compliance margin because EDR includes whole-building energy use, while a compliance margin includes only a limited set of end-uses (not including solar PV or battery, for example). The full range of compliance margins and associated EDRs are available in the residential cost effectiveness study, but as an example an efficiency-only EDR reduction of 1 is approximately equivalent to a 5% compliance margin.

36) Q: Please clarify the exclusion for “heavy industry and process loads” from the nonresidential portion i.e. does the nonresidential category cover warehouse or any other industrial uses?

A: The energy code only lightly regulates industrial processes. The reach code doesn’t cover any research into how these industrial processes could be made more efficient. Common building systems (e.g., envelope, HVAC, etc..) that must already comply with Title 24 must comply at a reach level, and the industrial processes (which are NOT part of the compliance margin) are not affected.

37) Q: Does 2019 Title 24 Part 6 require residential buildings to be all-electric? Will the reach code?

A: Neither will make all-electric construction a mandatory requirement. All-electric construction will be one of the compliance pathways.

38) Q: Can a reach code still require PV?

A: Yes, cost effectiveness justification is provided for both Residential and Non-Residential buildings. We are including this in the model code.