



Introduction to Electrification

To help meet California's greenhouse gas reduction goals over 40 of California's local jurisdictions in the last year have banned natural gas connections to new homes. Many more cities are preparing to follow suit. All electric homes are more than just a part of California's fossil-fuel-free future. Updating the mechanical systems of your home to all-electric provides significant comfort, health, and safety improvements as well.

Back in the 1960's utility power companies claimed nuclear generation would provide the public with electricity "too cheap to meter." This briefly provided a boost in the construction of all electric homes, but unfortunately both electric generation and electric appliance technology of the time was too primitive live up to live up to these claims, primarily because the heat pumps of that era were inefficient, and electric rates were anything but free.



Over the following fifty years natural gas for space conditioning and water heating acquired a reputation as less costly to operate, while the environmental consequences of the burning of fossil fuels were not commonly recognized. Eventually early 80 percent of all homes in California were currently connected to the natural gas system. Since then though, major improvements have been made in heat pump technology, and with the need to reduce greenhouse gas emissions, all electric homes are coming back in a major way.

The average monthly utility bill for a typical California household is about \$175 a month. The biggest component of that expense goes the system that heats, and sometimes cools indoor space. Today the most desirable mechanical system for this most basic of home system is undoubtedly electric heat pumps.

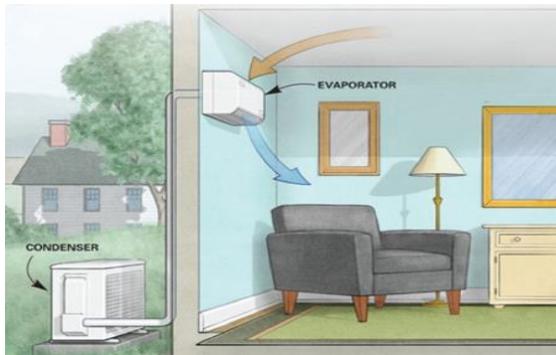
According to a 2019 study by the California Energy Commission "electrification of buildings, and particularly the use of electric heat pumps for space and water heating, leads to lower energy bills for customers over the long term than the use of natural gas. In addition, building electrification improves outdoor air quality and public health outcomes, particularly in the winter"¹

The report further states that "in all of the scenarios evaluated here, many gas consumers will find it in their economic self-interest to electrify. In any future where California meets its long term climate goals, natural gas demand is likely to decline, putting upward pressure on gas rates and bills of the remaining gas customers."



Getting off burning methane (“natural gas”) in our houses typically involves changing out the mechanical systems that most often utilize burning gas to operate (listed in the order of the largest amount of gas typically used):

- A central forced air gas furnace with ducting.
- A gas fired water heater.
- A gas fired clothes dryer, and
- A gas fired range.
- Decorative fireplace.



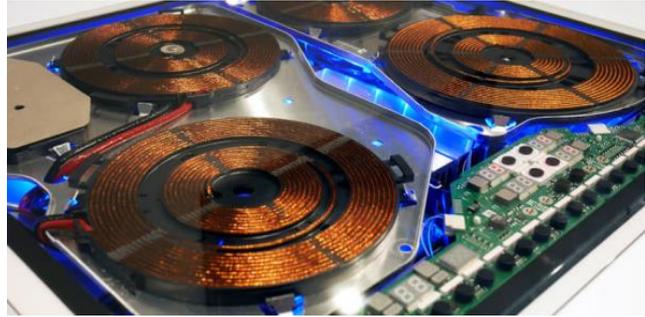
Consider space heating and cooling. An electric minisplit heat pump allows one space conditioning system to be both an air conditioner and heat source. These systems only use electricity, so their energy consumption can be offset by a grid-tied solar installation. In addition, many of these systems do not use forced air or ducts, so they are quieter and cleaner. They are also efficient because they don't require extra energy to push air through

ducts and to make up for energy loss through the duct walls.

For the technically inclined here is a link that explains the operating principle of heat pump operation: https://en.wikipedia.org/wiki/Heat_pump.

Water heaters and clothes dryers are now both available with heat pump technology, making them much more efficient and economical to operate than older electric resistance heat dryers and electric water heaters.





Next in order to replace gas are induction ranges. They operate by creating an electromagnetic field that heats the pan directly not the surface of the range. No open flame, precise temperature control, smooth surface for cleaning, no breathing of combustion gases, less heating of the kitchen.

And today there are even incredibly realistic electric fireplace inserts. They allow you to add heat the areas of your home that you use the most. They cost only pennies an hour to run. Because the heat and “flames” operate separately (it is an illusion after all, basically a light show), you can use your electric fireplace year round, not just winter. And there is the satisfaction of knowing you are not triggering breathing related health issues with your neighbors; you can enjoy your fire even during Spare the Air Alerts



Add solar generation to these appliances, snug up the home’s thermal enclosure with air sealing and generous insulation, and it’s entirely possible to have a minimally polluting all electric ZNE building. We have the technology, tools, and knowledge needed to do this right now. The costs of the technology to go all electric have plummeted; photovoltaic systems and LED lighting are good examples.

A final reason to kick the gas habit is gas is a real hazard in earthquake prone California. Broken gas lines are a real fire hazard both for individual houses and the community at large. (Do you have a wrench close to your gas meter valve?)

In short, all electric homes are healthier, safer, more comfortable, more durable, and cost no more to operate than houses that are still burning gas, while delivering multiple societal benefits including cleaner air and water, and a bankable power grid resource.

All-electric living is back, and not a moment too soon.