

Are All-Electric Homes A Good Idea?

By Frank Scotti - 2023 Home builders are on a mission to build all electric homes, at least here in California. New homes and buildings that are constructed in 2023 will have to have electric supply panels and circuitry to support all-electric appliances and heating under the new building code. Existing homes and buildings won't entirely be off the hook under the new building code. Those that undergo substantial upgrades will also be required to meet the new mandate.

The new building code doesn't ban the sale of natural gas appliances outright — that will come in 2030, in a mandate from the California Air Resources Board that is designed to lower the “carbonization” of structures and improve indoor air quality.

The reason for this shift to all electric homes really has its roots in the desire to move Californians to clean energy coming from wind, solar, and other renewable sources. Natural gas is not part of that mix. I've evaluated some PRO's and CON's of transitioning to all-electric homes below.



By eliminating natural gas or propane from the home, we are also removing the safety hazards that are associated with natural gas and propane. Gas appliances release carbon monoxide, formaldehyde, and other harmful pollutants into the air. We can also eliminate the estimated 4,200 home structure fires per year started with the ignition of natural gas. This is fully in the PRO's column.

There are extreme external safety issues as well. A 2020 study published by the American Chemical Society found there are an estimated 630,000 natural gas leaks every year in the U.S., just in the local distribution systems. So, aside from the dangers in the home, there are extreme dangers in the natural gas delivery system. Also in the PRO's column.

When it comes to existing homes, converting to all-electric is a bit trickier. If the existing water heater is gas, converting to an electric water heater will require 220V circuit. Same for a clothes washer or dryer. Any home with a 100-amp main service panel may need to upgrade to a 200-amp panel. And that can be expensive. Even homes with a 200-amp panel may need some main service panel work to accommodate the increased electrical load. In addition, we may be prematurely adding still operational appliances to landfills. Teetering in the CON's column.

The best strategy for existing homes to go all-electric is to do so when a current system fails, or is about to fail, such as a water heater. It is wasteful and not as cost effective to replace a perfectly functioning water heater with new, even in the case of replacing a natural gas water heater with a new electric water heater.

When upgrading, it will be worthwhile to also consider a smart electrical panel. Smart panels are now available that will help manage the electrical load of the home, integrating grid energy, solar energy, battery storage energy, calculating time of day, grid demand, grid energy prices, sending and receiving energy to minimize home energy use and maximize home energy savings. Product and energy management innovation will allow older homes to upgrade to all-electric appliances easier generating energy savings that lead to a positive rate of return on the investment.



If upgrading, you should skip right over electric-only water heaters and HVAC systems and opt for the even more energy efficient heat pump water heaters and heat pump HVAC systems. They cut electric use by 60% or more over conventional electric counterparts.

This technology is not new. Heat pumps have been around for a number of years. I really like the heat pump water heating and heat pump HVAC technology. I have personally tested and currently use both systems and I am satisfied with their performance. I have also tested a new heat pump clothes dryer. Although more expensive to buy, the 5-year operating costs of a heat pump clothes dryer is significantly lower. As I suggested earlier, I am waiting for my existing standard electric clothes dryer to fail before upgrading.

But I digress. There are three more issue to consider when answering the question, is an all-electric home a good idea.

The first issue is whether or not the existing grid infrastructure can handle the increased load demand. I would love to dive into this topic deeper, but I am not an engineer, an analyst, or a policy maker. The addition of all electric homes will not be much of an issue. The rapid adoption of electric cars is most likely where the grid challenges will emanate from. For the sake of avoiding an even longer and more boring article, I will just assume that the energy grid will be able to accommodate our transition to all-electric homes in California. The second issue is in the CON's column. An all-electric home is completely at the mercy of electric energy costs. I have to use PG&E as my electric utility, an investor-owned utility company, and I have to pay whatever they want to charge for their product. If electric rates skyrocket, which they have, I guess I just turn the lights and the HVAC off. This is the one downside of committing to all electric homes. We are putting our trust in the

government-run CPUC to fairly regulate the utility companies on our behalf. That hasn't really worked out very well for me, or for the other 17 million customers that PG&E serves, as the utilities look to kill rooftop solar, and peak energy rates exceed \$0.50/w.

The third issue is more in the PRO,s column. Electricity is cleaner energy than gas only when the power is generated with an energy source that has a zero emissions or low emissions footprint. Most grids use a mix of sources. PG&E's 2020 energy portfolio currently consists of 30% renewable, 16% fossil fuel-fired, 42% nuclear, and 10% hydro¹. So, if there is an increase in electric grid demand, the additional energy will come partly from non-renewable resources. On-site solar electric energy generation and storage can really help ease grid demand, and thus, theoretically, reduce and eliminate the use of fossil fuel-fired energy.



Eliminating gas and other fossil fuels and switching to all-electric homes is all part of the bigger plan. I guess it has to happen. California legislature aims for 90% of clean electricity by 2035, and 100% zero-carbon electricity with zero greenhouse gas emissions by 2045. These are aggressive goals, and ones that I believe are achievable.

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Frank Scotti is a sustainable energy advocate and chief marketing officer at Solarponics. Located in San Luis Obispo County, Solarponics is the oldest continuously operating solar energy company in California. Mr. Scotti has been working in the solar energy sector since 2008. At the time, there were just over 50 solar-powered homes in San Luis Obispo County. Today there are over 16,000 solar-powered homes. Frank can be reached at frank@solarponics.com.

¹ https://www.pgecorp.com/corp_responsibility/reports/2021/pf04_renewable_energy.html