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Superiority of Natural Gas Appliances - Let Californians Decide

The attached report “Superiority of Natural Gas Appliances_RKK_February 2020” documents the superiority of natural gas appliances over their electric counterparts for residential use.

I request that the 2019 Building Code be amended to remove the all-electric reach code option or the proposed 2022 Building Code remove this option. Homeowners and landlords/renters should have the choice as to what appliance to use, leaving it to them to decide the most economical solution for their home.

The government should not be in the business of picking appliance winners and losers either.

Thank you for your consideration,
Rob

Additional submitted attachment is included below.

Over-reaching Reach Codes – A Summary Defending Natural Gas Appliances

The Motivation to Look at the “All-Electric” Reach Code

After learning about reach codes while participating at a Cloverdale sub-committee meeting during October 2019, I decided to look into the many claims that didn't make sense about savings tied to forgoing natural gas appliances and the need to operate a rooftop solar system in order to, according to Sonoma Clean Power, “save the planet.”

The Gas Dryer Analysis, January 6, 2020

The proposed introduction of an all-electric home makes many household-proven appliances obsolete, including:

Gas Dryers

Water heaters – gas

Furnace for heating

Gas cook tops or stovetops

In this analysis, I'm supporting the retention of **gas dryers** as a homeowner requirement. This is the first in a number of analyses I'm undertaking during the next few months. I'm against a natural gas ban across Sonoma County.

Gas Drying is the Way to Go – Almost 40 Years of Experience with Gas Appliances

There are a number of reasons gas dryers are preferred over electric dryers. In addition to the fact that the Consumer Energy Center estimates using a natural gas dryer can result in up to 50 percent savings in dryer energy costs, the following benefits and savings are delivered with a natural gas-based drying solution:

Quicker heating

Runs hotter

Use of simpler 120-volt outlets

Shorter tumbling periods

Reduced wear and tear on clothing

Lower price for natural gas than electricity to run a given drying cycle

Less static cling

Less wrinkling of clothes

Protection against snagging

It's well known that gas dryers heat up much more quickly than electric ones. Furthermore, electric dryers require the larger three- or four-pronged, 240-volt electrical outlet, whereas gas dryers use the simpler 120-volt AC outlet. The fact that gas dryers run hotter, means most clothes tumble for a shorter period, saving both time to complete household chores and save energy consumption. By tumbling less, clothes also experience lower wear-and-tear since the fabrics spend less time in the gas dryer.

Gas dryers produce less static cling. When a gas dryer turns off, the heat dissipates quickly, reducing the amount of wrinkling. Furthermore, gas dryers typically feature surgical grade stainless steel drums. Tumbling clothes in this hygienic, smooth surface environment protects them from snagging.

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Economically, the price of natural gas is generally lower than electricity and depending on rates, drying a load with a gas dryer can save 8 to 17 cents per load. In fact, as of January 1, 2020, for Northern California customers, PG&E is raising electric rates by 2.7 percent, but lowering gas rates by 1.3 percent [1].

Electric-powered dryers rate poorly in energy efficiency. The electric coil takes some time before it is sufficiently hot. In the process, more energy is utilized. It also takes more electric energy to complete a drying cycle than gas. Electric dryers typically take twice the time that a gas dryer takes to dry clothes. This means clothes will be subjected to greater strain over time. Faster wear and tear from an electric-based laundry drying cycle is more likely and therefore an unnecessary drain on the household's clothing budget.

Anecdotally, the latest models of "high efficiency electric dryers" have been reported to take a minimum of 4 hours to dry clothes. No thank you. Maybe it's time to invest in clotheslines and hang the linens outside; they'd likely dry faster and be wrinkle-free too.

As stated at the outset, I'm against a natural gas ban and a forced all-electric environment where choice is removed. *Lack of energy diversity* that removes individual independence is just misguided policy.

[1] "Electricity customers who don't receive the low-income discount will see an increase of \$3.29 a month on their bills, a 2.7 percent increase, PG&E estimated on Friday. Gas customers will see a decrease of 65 cents in their monthly bills, a 1.3 percent reduction, according to estimates provided by PG&E."

<https://www.mercurynews.com/2019/12/27/pge-electricity-bills-head-higher-new-years-day-gas-bills-will-slip-lower/>

The Water Heater Analysis, January 13, 2020

"California's history as a state has been one of growth, but after more than a century of rapid population increases, growth has stalled. From 2018 to 2019, the state grew by less than a percentage point. More people moved out than moved in. The birth rate made up the difference, but it, too, is slowing."

-The Press Democrat editorial board, January 8, 2020

Excessive regulation is one of many factors leading to a shrinking California population. To wit, the proposed introduction of an all-electric home, through aggressive and excessive reach code-based regulation, makes many household-proven appliances obsolete, including:

Gas Dryers (see earlier analysis, submitted January 6, 2020)

Water heaters - gas

Furnace for heating

Gas cook tops or stovetops

In this analysis, I'm supporting the retention of **gas-fueled water heaters** as a homeowner requirement.

Superiority of Natural Gas Appliances

This is the second in a number of analyses I'm undertaking during the next few months. I'm against a natural gas ban across Sonoma County.

Natural Gas Water Heating is the Way to Go – Almost 40 Years of Experience with Natural Gas Appliances

There are a number of reasons gas-fueled water heaters are preferred over electric heat-pump water heaters.

The following partial list of benefits and savings are delivered with a natural gas-based water heater over a heat-pump water heater:

- Maintain hot water during an extended electric power outage [1]
- Less upfront initial first costs for the base unit
- Less costly to install
- Cheaper to operate
- Greater reliability; useful life typically 7 years longer
- Do not require a lot of space, nor clearance on all sides [2]
- Do not need stringent temperature ranges to operate
- Most suitable solution for North Bay ("cold" winter) climates
- Heats the water faster

BayRen cites Rheem in their electric versus gas water heater comparisons. As of February 2, 2020, Home Depot listed Rheem electric heat pump water heaters ranging from \$1,700 to \$2,000. Equivalent gas water heaters range from \$800 to \$1,000, providing a *\$1,000 initial first cost savings* for homeowners.

Depending on local utility costs, gas water heaters are typically cheaper to operate than their electric counterparts. In fact, as of January 1, 2020, for Northern California customers, PG&E has raised electric rates by 2.7 percent, but lowered gas rates by 1.3 percent [3]. And, I reiterate, gas water heaters also cost much less than an electric heat-pump equivalent.

Natural gas water heaters (and the older version electric water heaters) usually require less than 8 square feet of space in a house. The natural gas on-demand tankless water heaters take up even less space (3 square feet), since there is no associated tank. In fact, floor space underneath the unit is available for the homeowner.

Heat-pump water heaters, on the other hand, need a lot of space, roughly 1,000 cubic feet of air space around the unit. This metric usually means about 100 square feet of floor space in a typical residence. This begs the question, "Why give up a 100-plus square feet in a garage when a gas heater can fit into a tiny, out-of-the-way closet?" Even BayRen, a group pushing for an all-electric world, agrees with this assessment. In their December 2019 analysis of a hypothetical all-electric home, "... electric heat pump water heaters take up more space as they include a hot water storage tank."

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Above left photo: A tank-based water heater, which could be gas or electric. They are easily installed in small garages or very small closets. Above right photo: A tankless natural gas water heater (in white). Very little space in the garage is required to install this reliable on-demand water heating system.

Photos courtesy M. Timmerman and R.K. Koslowsky.

Electric heat-pump water heaters also need to be located in a spot in your home that consistently remains between 40 degrees and 90 degrees so they can draw on warm surrounding air. This rules out locating heat pumps in a small interior closet. In many garages, the temperatures will fall below 40 or rise above 90 degrees, unless the garage and its large car door are insulated. Although this latest in all-electric technology is deemed “the pinnacle of efficiency in electric water heaters . . . [it’s] best suited for use in warm climates.”

Unlike their electric water tank predecessors, electric heat-pump water heaters are not for the do-it-yourselfer. Some of these heaters are “side-piped” to eliminate the possibility of heat pump damage caused by leaking pipes. On those models, water pipes must be reconfigured. This can be quite costly.

Gas water heaters heat up more quickly than their electric counterparts. Because of its combustion, natural gas produces heat more quickly than an electric heating element. As a result, the recovery rate and first-hour rating (FHR)—two numbers that help consumers determine if a unit will meet their household’s needs—tend to be higher for gas water heaters than they are for comparable electric models with the same manufacturer and tank size.

BayRen, known for pushing all-electric reach codes, also concedes this point, “Rheem's 55 gallon unit can deliver 70 gallons of hot water in the first hour, enough for about four

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showers. For comparison, Rheem's gas equivalent delivers 79 gallons in the first hour.” Most builders and homeowners already knew this: a gas water heater produces 10 to 20 percent more hot water than an electric one.

When there is too much demand for hot water, heating coils are activated so that the electric heat-pump water heater can satisfy the increased demand. These heating coils are the same technology used in electric stoves potentially being banned in favor of induction stovetops.

Generally, tank-based water heaters last an average of 10 to 13 years, while natural gas tankless units last up to 20 years or longer. The average for electric heat-pump water heaters is similar to the tank-based heaters of the past, 12 to 15 years.

With these facts in mind, I'm against a natural gas ban and a forced all-electric environment where choice is removed. *Lack of energy diversity* that ensures individual independence is becoming a new concern.

[1] PG&E's PSPSs did not affect homeowners with natural gas water heaters. Hot water could still be provided even without the electricity turned off for days on end.

[2] Electric heat-pump water heater appliances must be installed in an area of at least 1,000 square feet, though, so they're a mediocre option for a roomy garage, but they're certainly *not* appropriate for a small utility closet.

[3] “Electricity customers who don't receive the low-income discount will see an increase of \$3.29 a month on their bills, a 2.7 percent increase, PG&E estimated on Friday. Gas customers will see a decrease of 65 cents in their monthly bills, a 1.3 percent reduction, according to estimates provided by PG&E.”

<https://www.mercurynews.com/2019/12/27/pge-electricity-bills-head-higher-new-years-day-gas-bills-will-slip-lower/>

[4] Consumer Affairs reports published during 2019 compare electric water heaters of years gone by with current models of heat pumps, which use 63 percent less energy. This metric is often cited, but it's comparing different electric water heater designs, not a comparison between electric and gas water heaters.

[5] Solar water heaters are not a good option (mounted on rooftops) due to initial costs, including freeze protection capability, and the attendant requirement for a storage tank and a back-up source of hot water, either a gas or electric tank water heater, to ensure a supply of hot water on cloudy and cold days or during a PG&E PSPS.

The Gas Furnace for Space Heating – An Analysis, January 26, 2020

PG&E's natural gas system serves about 15 million people across a 70,000 square mile service area in northern and central California. Sonoma County residents are a big consumer of natural gas in both Cloverdale and Santa Rosa where my family lives and had lived, respectively.

It turns out that about 80,000 miles of gas pipelines delivered 741 Billion cubic feet (Bcf) of gas, which equates to about 2 Bcf daily. During the North Bay firestorm era of 2017, conflagrations ignited by PG&E's electrical systems, the utility's residential and small commercial gas customers used about 38% of natural gas system throughput, but they

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provided around 80% of PG&E's gas revenues. How can the gas system be considered obsolete because of all-electric reach codes, when tens of thousands of homes use this dual energy solution: electric plus natural gas? Why would choice of energy supply be eliminated?

Please read on.

Energy Diversity at Risk

The proposed introduction of an all-electric home makes many household-proven appliances obsolete, including:

Gas Dryers (see earlier analysis, submitted January 6, 2020)

Water heaters – gas (see earlier analysis, submitted January 13, 2020)

Furnace for space heating

Gas cook tops or stovetops

In this analysis, I'm supporting the retention of **gas-fueled HVAC systems** as a homeowner requirement. I'm against a natural gas ban across Sonoma County.



▪ **Furnaces:**

- They have to be big enough to heat the house! Modern furnaces do not have much of a penalty for oversizing. People like to heat their house up in a hurry. Keep it within the next size up from the "right" size. Relax.



▪ **Air Conditioning:**

- In the west, cool the house on the hottest day or the phone will ring. Keeping it within the next largest size is okay (make sure it's installed right). Relax.



▪ **Heat Pumps:**

- Must be big enough to heat the house down to 30° F. Time to sweat the details a little. Getting the right size is crucial to saving energy for heat pumps.

The HVAC contractors' graphic – It's tricky to get it right when it comes to heat pump installs. Heat pumps have not been "field-proven" for home use like the natural gas water heaters and furnaces have been for the past 40-plus years.

Natural Gas Space Heating is the Way to Go – Almost 40 Years of Experience with Natural Gas Appliances

There are a number of reasons gas-fueled home (space) heating is preferred over electric heat-pump heating systems.

The following benefits and savings are delivered with natural gas-fueled HVAC systems:

Faster heating [1]

Cheaper to operate

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Do not need special heating options to operate at low temperatures
Suitable for North Bay (cold winter) climates
Better heat for comfort
No condenser location restrictions
Air handling units not required in living space (and not an eyesore)
Concern: Confusion on methane-or ethane based refrigerants used in heat pumps
and the potential for future use of flammable (explosive) refrigerants [2]

Economics

The higher cost of electricity makes electric heat more expensive than gas heat. This means that the lifetime cost of an electric heat-pump can be higher than a gas furnace operating under the same conditions, even when taking into account the longer lifespan of a heat-pump.

However, initial first costs appear to be a wash. Generally, the initial cost and installation of a gas furnace is cheaper than a heat pump. However, since our homes in Sonoma County require cooling, a furnace will need to be matched (paired) with an air conditioner. A heat pump, of course, can do both. Consequently home comfort costs might be less with a heat pump system. Of course, unit costs will vary depending on the size and model selected for both ways of implementing your desired HVAC solution. Homeowner choice is more important than having no choice to consider, which an all-electric mandate causes.

Performance

Despite the relatively high efficiency of most electric heating systems, electric heating is inherently inefficient. According to the EPA, most electricity is produced using techniques that are only 30 percent efficient. The introduction of utility-scale, renewable energy in the form of solar farms or fields of wind turbines will help increase the overall level of efficiency. Geothermal is another renewable energy source, which already serves Sonoma County well.

Cold weather performance of any heating system is most important during November through March for Sonoma County residents. A gas furnace burns fuel, quickly generating heat on the coldest of days. If the outside air temperature routinely falls near or below freezing, a heat pump may have a hard time generating enough heat to keep the home warm. Often, supplemental heating systems optionally work in tandem with a heat pump and produce the required auxiliary heat on the coldest of days. Unfortunately, these systems use a lot of energy, thereby canceling the energy efficient benefits of a heat pump.

The warmth produced by gas-fueled furnaces feels hot and toasty compared to the heat produced by a heat-pump. Generally, the air from a heat-pump isn't as hot as that coming from a gas furnace. Although the home is warmed it "blows cooler," something I've noticed with the heat coming from our ductless split system (electric heating) used in the lower level of our rebuilt home. I, like many others, don't like that aspect of electric heating.

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Our ductless split system (a mini-split heat pump), used in our finished lower level, warms the space, eventually. It's visibly mounted high on one wall, is noisier than the gas furnace heating provided upstairs, and blows in your face when sitting on the couch watching television. The companion condenser unit is located outside the house to support the interior electric heating or cooling. During the process, refrigerant [2] is used to optimize the heat exchange.

Photo courtesy R.K. Koslowsky

A number of users don't like the appearance of the indoor part of the mini-split all-electric system. While less obtrusive than a window room air conditioner, these units don't have the built-in look of a central furnace-air-conditioning system.

The location of the outdoor condenser unit may affect overall efficiency. The condenser should be protected from high winds, which can cause defrosting problems. The recommendation of strategically placing a bush or building a fence upwind of the coils to block the unit from high winds is not usually adopted by North Bay homeowners trying to mitigate wildfire risk in WUIs.

Check for Leaks

Refrigerant leaks in a heat pump have to be watched through regular maintenance. Refrigerant [2] is a chemical that moves through the coils and lines of a heat pump to provide the heat exchange function of bringing cooling in the summer and heating during the winter. Refrigerant does not dissipate during normal operation: it switches between

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liquid and gas and then back again, and its level doesn't lower unless there is a leak. Just a 10% loss in refrigerant can mean a 20% increase in electrical operating costs. When this occurs, all of the energy efficiency benefits are lost.

Refrigerant leaks contribute to global warming too. In fact, one commonly used refrigerant was banned on January 1, 2020 and its replacement is also supposed to be banned by 2025 in favor of a flammable (explosive) refrigerant yet to be clearly defined. Each change in refrigerant requires tweaks to equipment and certification to use.

I'll stick with my natural gas-based appliances.

I wrote to Sonoma County Supervisor, Susan Gorin, who, by choice, is rebuilding her home as an "all-electric." On January 14, 2020, she informed me, "I'm choosing to rebuild an all-electric home powered by solar panels and battery backup, heat pump, etc." That is Susan's choice.

On the electric heating front, I opted for a split heating-air system (ductless) in our "under the house" bonus room, but subjectively, I find that it's not as good as the regular ducted furnace system we use on the larger main floor.

With these facts in mind, I'm against any ban of gas-based household appliances. Choice must be preserved. Some choose to go all-electric. That's fine. But don't take away my choice. I chose a mix of energy supply – electric and gas for our new home in Cloverdale. Susan chose to be single sourced – all-electric for her rebuild in Santa the Rosa area.

We need to respect each other's choices.

[1] Furnaces heat up a home faster than electric heat because the gas furnace produces maximum heat as soon as the burners start running. An electric heat-pump must spend time powering up its heating element before it can start to warm the living space. This means waiting longer for the effects of turning up the thermostat to be experienced.

[2] R-134a (1,1,1,2-tetrafluoroethane) was one of the refrigerants that replaced Freon during the late 1980s to reduce damage to the Earth's ozone layer. Heat pumps using R-134a or R-22 Freon (difluoromonochloromethane) replaced this R-12 Freon (dichlorodifluoromethane) and they have similar thermodynamic properties but with much lower ozone depletion potential and a somewhat lower global warming potential. While natural gas is predominantly methane, heat pump refrigerants use either a methane- or ethane-based gas. There remains much confusion about what to do, short of banning all air conditioning. As of January 1, 2020, R22 Freon used in heat pumps was replaced by R-410a (Puron). R134A, however, can still be used for wine refrigerators – we live in Sonoma County, of course. But wait, there are ongoing discussions that this latest, new R410A refrigerant, may start to be phased out by 2025 and fully phased out by 2034. Then, the next new refrigerant . . . has not yet been decided. Discussions are leading to the use of a flammable refrigerant starting in 2025. This could cause hazardous situations for installers and homeowners. Installers would have to weld using torches with a flammable gas nearby and homeowners located in wildland-urban interfaces probably don't need an even more flammable gas as part of their all-electric heat pump system.

[3] "Electricity customers who don't receive the low-income discount will see an increase of \$3.29 a month on their bills, a 2.7 percent increase, PG&E estimated on Friday. Gas customers will see a

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decrease of 65 cents in their monthly bills, a 1.3 percent reduction, according to estimates provided by PG&E.”

<https://www.mercurynews.com/2019/12/27/pge-electricity-bills-head-higher-new-years-day-gas-bills-will-slip-lower/>

Gas Cooktops – An Analysis, February 3, 2020

Why people leave

“EDITOR: In writing about reasons residents are leaving Sonoma County, Staff Writer Martin Espinoza . . . failed to note, however, the restrictive new building requirements imposed by the county and the state. To name a few: sprinkler systems, electric car plug-ins in garages and exclusively electric appliances — no gas.”

— BEVERLY KELVIE, Santa Rosa, *Let the Public Speak*, The Press Democrat, Jan 29, 2020

“People really seem to like gas stoves. All-electric is less desirable, more so now because of fluctuating and increasing electric cost and power outages issues.”

— Drew Nicoll, W Real Estate

Choice is being removed. State government knows what’s best and has mandated that Californians must buy an *induction stovetop*, among other “all-electric” things, that is, if I choose to buy a new home in California going forward [1].

Residents of California, discovered in late December that their state government has decided to make both energy usage and appliance decisions for them. This is the same government that promotes diversity, except when it’s inconvenient. Energy diversity is one of those exceptions, and many cities seeking favor from “the State” are now over-reaching by implementing natural gas bans – Windsor and Santa Rosa – for example.

At least, in the City of Cloverdale (with elected council members) and throughout unincorporated Sonoma County (with elected supervisors), there is no natural gas ban. In part, because the economics to go all-electric do not make sense. Banning natural gas makes even less sense.

Energy Diversity Going by the Wayside

The introduction of all-electric homes makes many household-proven appliances obsolete, including:

Gas Dryers (see earlier analysis, submitted January 6, 2020)

Water heaters – gas (see earlier analysis, submitted January 13, 2020)

Furnace for space heating (see earlier analysis, submitted January 26, 2020)

Gas cooktops or ovens

In this analysis, I’m supporting the retention of gas **cooktops or ovens** as a homeowner requirement. I’m against a natural gas ban across Sonoma County.

What is Induction Cooking?

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As early as 2000, induction cooking has been hailed as the next big thing in cooking technology. Electric currents, produced by magnetic induction underneath a smooth glass cooktop, directly heat pots and pans instead of heating them by heat produced by gas or by radiant heat. As of 2019, *only 1 percent of stoves* in the United States have induction cooktops, according to a report by the Association of Home Appliance Manufacturers. That number *climbs to 15 percent among built-in cooktops*, but that's still a tiny share of all major cooking appliances in the country.

I Haven't Found an Induction Appliance, Yet, in Sonoma County

I popped into Home Depot (the Windsor store, in the city fighting to keep its gas ban) on February 1, 2020 and could *not* find a single induction cooktop or induction stove on display. Instead, this retail outlet offered only two radiant models (30-inch, all-electric) and dozens of gas cooktops and ovens and various gas combo units. I asked the department head if he was planning to display a 36-inch induction cooktop. The answer, "Not yet." There has been no demand for induction cooking, at least at this Home Depot outlet.

Natural Gas Cooking is the Way to Go – Almost 40 Years of Experience with Natural Gas Appliances

There are a number of reasons gas-fueled home cooking is preferred over induction cooktops.



It's easy to adjust the temperature of gas cooktops. Knobs adjust the "size of the blue flame" and hence the amount of heat needed.

The following benefits and savings are delivered with natural gas cooktops:

- Availability (which could be "fixed" through government decree telling stores what to sell)
- Lower appliance cost
- No need to purchase new pots or pans
- Operates during a power outage for cooking and boiling water
- No electric-magnetic fields, which some believe to be a health hazard
- Lower heat emission and better temperature control
- No indoor air quality issues if range hood is properly installed
- Spare parts availability and greater reliability

Initial First Cost

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Gas cooktops, are on average, about **\$900 less costly** than induction cooktops. This review is based on an online survey I did for a 36-inch induction replacement at Home Depot's website. Induction prices ranged from \$1,700 (Frigidaire) to \$2,200 (Bosch). The 36-inch gas cooktops ranged from \$800 (Fridigaire) to \$1,200 (KitchenAid). The links I perused are as follows:

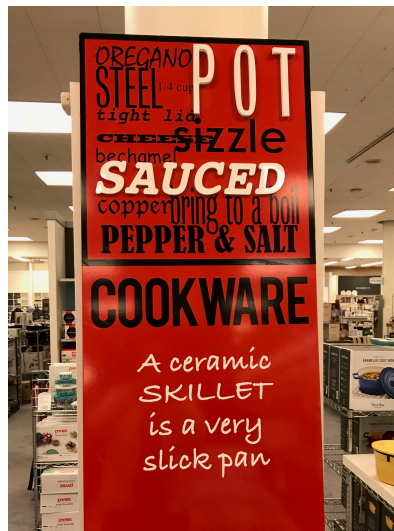
<https://www.homedepot.com/b/Appliances-Cooktops-Induction-Cooktops/36-in/N-5yc1vZc5lxZ1z1042g>

<https://www.homedepot.com/s/36%2520in.%2520gas%2520cooktops?NCNI-5>

Induction Cooking Requires Specific Cookware

Induction cooktops work only with certain cookware. Pots and pans need to contain enough iron to generate a magnetic field surrounding the cooktop surface and the cookware. Copper, aluminum, and ceramic wares don't work. Every manufacturer that Wirecutter blogger contacted (GE, LG, Samsung), "confirmed that the concern over compatibility is a major reason for the slow growth."

"Tim Calvert, a marketing director at GE Appliances," told Wirecutter, "because replacing an appliance is usually an unplanned expense, potential buyers are often turned off by the need for all-new cookware: 'It creates an added expense to an already unplanned purchase.'"



Changing out cookware can be expensive. When budgets are tight, paying \$900 more for the all-electric" appliance plus \$500 for new "magnetic" cookware, is not easily done. Pots and pans must be made of ferromagnetic metal like stainless steel or cast iron. Be sure to bring your magnet with you to test your prospective purchase.

If you are forced to begin shopping for new cookware, look for the more expensive pots and pans marked "induction-compatible."

BayRen, a government entity to compel cities to go all-electric, writes, "Currently, most people in California still prefer to cook with gas, although customer satisfaction with

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electric induction stoves are driving a trend toward electric cooking which is very popular in Europe and Asia.”

I agree with their findings: I use a gas cook top for most meals, except when I use an outdoor natural gas barbeque grill (no propane tanks needed). Why would the government take away an energy option that has served me well for 40 years of home ownership?

Operation During A Power Outage

BayRen acknowledges the superiority of gas during PG&E forced power outages [2], which lasted for days during 2019, “It is true that electric water heaters and induction cooktops will not be working in a power failure . . . most older models of gas stoves can be lit manually during a power outage . . .”

Enough said. I agreed with their findings. During PG&E’s October 2019 PSPSs, many of us used a match to light our gas cook tops to boil water for tea and coffee and cooked steaks and fish on the grill. Besides, homeowners don’t have to replace all of their pots and pans for new ones with steel or iron bottoms in order to work with induction cooktops.

Concerns over Electric-Magnetic Fields

And those afraid of electromagnetic fields that may interfere with pacemakers or cause cancer may not want induction cooktops in their homes either. Not everyone is comfortable with the standard assertion, which BayRen invoked [2], “According to the World Health Organization, there is no compelling evidence indicating medium-frequency magnetic fields have long-term health effects.” Using gas cooktops allay these fears.

Lower Heat Emission from Gas Cooktops

Gas cooktops remain cooler in the kitchen. Heat immediately disperses once the gas burner is turned off. Unlike induction cooking, which distributes heat around the appliance, gas cooktops don’t waste heat. The air around the stove top does not continue to be heated.

A More Accurate Cooking Temperature

Temperatures required for cooking are more accurately and easily achieved with gas cooktops. Whether you turn the flame lower or higher, it changes immediately. Induction cooking, on the other hand, requires more time for the change in heat to occur. There is a time delay to heat up, just like heat-pump heaters, or cool down.

Indoor Air Quality

A “Cook with induction power” class was held in Healdsburg. It was hosted by Chef Mateo Granados on January 21, 2020. The class was billed as “aligning with the city’s climate goals and may save time and money.” The plea continued, “Induction technology uses magnetic current to directly heat pots and pans. It’s viewed as energy efficient and does not affect indoor air quality.”

However, homes featuring gas cooktops sport an exhaust hood, consequently indoor air quality is not compromised. Smoking, fireplaces, deep fryers, and oven wok cooking on an induction cooktop hurt indoor air quality as much or more than gas cooktops.

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I love to cook with my gas cooktop. The exhaust hood filters and removes any harmful particulates. Gas cooking supports heat diffusion elements such as the “Melt” which allows for a consistent and even melts for fondues or chocolate sauces.

Photos courtesy R.K. Koslowsky.

One of many questions remain, “Why are restaurants and other establishments exempt from the natural gas ban when they’re food preparation areas run for hours at a time, while residential homeowners use gas cooktops for less than an hour each day?” Many new homeowners who’ve been victimized by actual or proposed natural gas bans, feel targeted. It won’t be long before the government tries to enforce a wider natural gas ban and compels pre-2020 homeowners to spend up to \$100,000 to retrofit their homes for all-electric.

Spare Parts and Cleaning

Induction cooktops are easier to clean. You simply wipe them off. However, they’re much harder to repair. Gas cooktops can be repaired easily using replacement parts such as burner heads, burner caps, grates and grate feet, igniters, orifice assemblies, and knob kits.

Consequently, gas cooktop reliability is higher. This appliance does not require a built-in computer either. Besides, I don’t think I need WiFi or Bluetooth for my cooktop, a feature of induction appliances touted by cities trying to ban gas appliances (e.g. Menlo Park).

Consumer Reports Says Induction Cooktops are Noisy

“A buzz or hum is common and often is louder at higher settings,” says Tara Casaregola, who oversees testing of ranges and cooktops for Consumer Reports. “And we often hear clicking of element electronics at lower settings, as well as the sound of the cooling fan for the electronics.” Heavy, flat-bottomed pans help reduce the vibrations that cause this buzz.

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So much for traditional wok cooking then. The \$100 blue steel woks leave little surface area touching the flat surface of the induction cooktop's surface. This problem is not encountered with gas cooktops as the thermal transfer is completed by the flame and not an electromagnetic field.

Consumer Reports Tells us to Throw Out Our Digital Thermometers

"The magnetic field of an induction cooktop can interfere with a digital meat thermometer, so you may need an analog thermometer" instead. Now that's what I call an old-fashioned solution to a modern-day problem wrought by induction cooking technology.

Professional Cooks' Pet Peeves Over Losing Gas Cooktops

Another feature that many chefs value is a visual indication of heat levels while they cook. A gas range's flames allow chefs to clearly see the heat level better than an induction cooktop.

Professional cooks have traditionally preferred gas knobs. Gas cooktops allow full control of the heat source, or flame, and provide an immediate on/off response.

For many reasons, I'm against giving up choice in the home and I'm against natural gas bans coupled with over-reaching government regulation.

"Authoritarian governments often impose control on the free flow of information to their advantage. With propaganda, they decide what to tell the public; with censorship, they decide what to hide from the public."

- Harvard researcher, 2018

[1] New home construction must be "all-electric" we're being told, in order to save the planet. Talk about fabricating an alarmist crisis to force poor public policy mandates. If the overwhelming propaganda push is set aside, the economics and practical implementation of this rushed regulation don't pan out . . . Even PG&E is looking into proposals to install massive natural gas generators at critical electric substations to drive electric power down its distribution lines in the event of a PSPS. Such a strategy will reduce the number of people adversely affected by a forced power shutoff during any wind event over 20-25 miles per hour.

[2] BayRen Source: City of Cloverdale, 12-17-19 DRAFT Agenda packet PCD.pdf, Appendix A, pp.25, 28.

[3] I've also been corresponding with the California Energy Commission, Sonoma Clean Power, and BayRen over the reported per home savings by eliminating natural gas. The reported \$6,171 in savings per home by eliminating natural gas is misleading. There is no savings, but a higher expenditure for all-electric. In a direct comparison, there is a minimum cost increase of \$27,750 to go "all-electric" and it can be as high as \$50,000, depending upon the addition of garage-based solar battery backup and an EV charging station.

[4] "Electricity customers who don't receive the low-income discount will see an increase of \$3.29 a month on their bills, a 2.7 percent increase, PG&E estimated on Friday. Gas customers will see a decrease of 65 cents in their monthly bills, a 1.3 percent reduction, according to estimates provided by PG&E."

<https://www.mercurynews.com/2019/12/27/pge-electricity-bills-head-higher-new-years-day-gas-bills-will-slip-lower/>

Appliance Savings Touted for “All-Electric Houses” Should Be Challenged

“Fossil fuels make the world go round, powering everything from cars to MRI machines. As for the climate, natural gas and fracking are the main reason that America’s carbon emissions have dropped in recent years.”

- Elizabeth Warren’s *Gas Royalties*, WSJ, February 1, 2020

“... the statewide Energy Code does not require all-electric construction. You will need to contact the local jurisdictions who have adopted all-electric ordinances for questions relating to local all-electric requirements.”

- E-mail excerpt from the CEC to R.K. Koslowsky, January 28, 2020

There are numerous organizations dedicated to telling California homeowners what to buy. The California Energy Commission (CEC) in concert with local jurisdictions is one such group, propelled by climate activists [1] fixated on a single agenda item – to take away all natural gas appliances, no matter what the cost.

When Did the “Cleaner with Natural Gas” Narrative Change?

Natural gas, once the darling of environmentalists for its clean-burning attributes was used, for example, to power busses and state vehicles as an example for improving air quality in the transportation sector. “The champagne of hydrocarbons” has fallen on hard times. Now, natural gas is out of favor with California environmentalists. In fact, methane [2] has become the latest pariah in growing list of what’s wrong with the world. Within the Golden State, the easiest target is homeowners, who can be forced to abandon their natural gas appliances by making them illegal by State decree.

Fifty-six percent of Americans list climate change as one of their top stressors, just eight percentage points behind work (64%) and fifteen percentage points below mass shootings (71%). The American Psychological Association conducted their *Stress in America* survey during the fall of 2019. Is it any wonder Californian homeowners’ stress levels have been amped up by intimidating reach codes. These over-reaching regulations mandate California building codes be amended to compel residential builders to *only* construct all-electric homes. Natural gas must be banned from new house construction, even though residential methane leaks are nothing but a blip on the list of greenhouse gas offenders.

When Did Logic Depart from the Narrative?

The rationale for all-electric residences is based on numerous *faulty* assumptions, consistent with those faulty assumptions included in the State’s AB5 law banning freelance work. The latter law hits workers’ pocketbooks immediately, hence the outcry to repeal AB5 and the subsequent political favor being carried to union members (e.g. truckers) to carve out exemptions for them. The former law, rooted in building reach codes is all but invisible to most homeowners, hence the lack of a backlash to date. Another difference: the State hasn’t banned the truckers’ dirty diesel engines, yet bans “clean burning” natural gas for homeowners.

Cooked up in backrooms and presented in powerpoint charts touting confusing climate change models, lacking clearly defined algorithms and faulty inputs (assumptions), coupled

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with misleading and erroneous Q&As, the hammer has fallen on unsuspecting homeowners. Ouch!

Assaulting Our Favorite Home Appliances

A CEC slide on the savings for homeowners giving up appliances using natural gas or propane is being used. It's just plain wrong:

Incorrect on All-Electric Appliance Savings

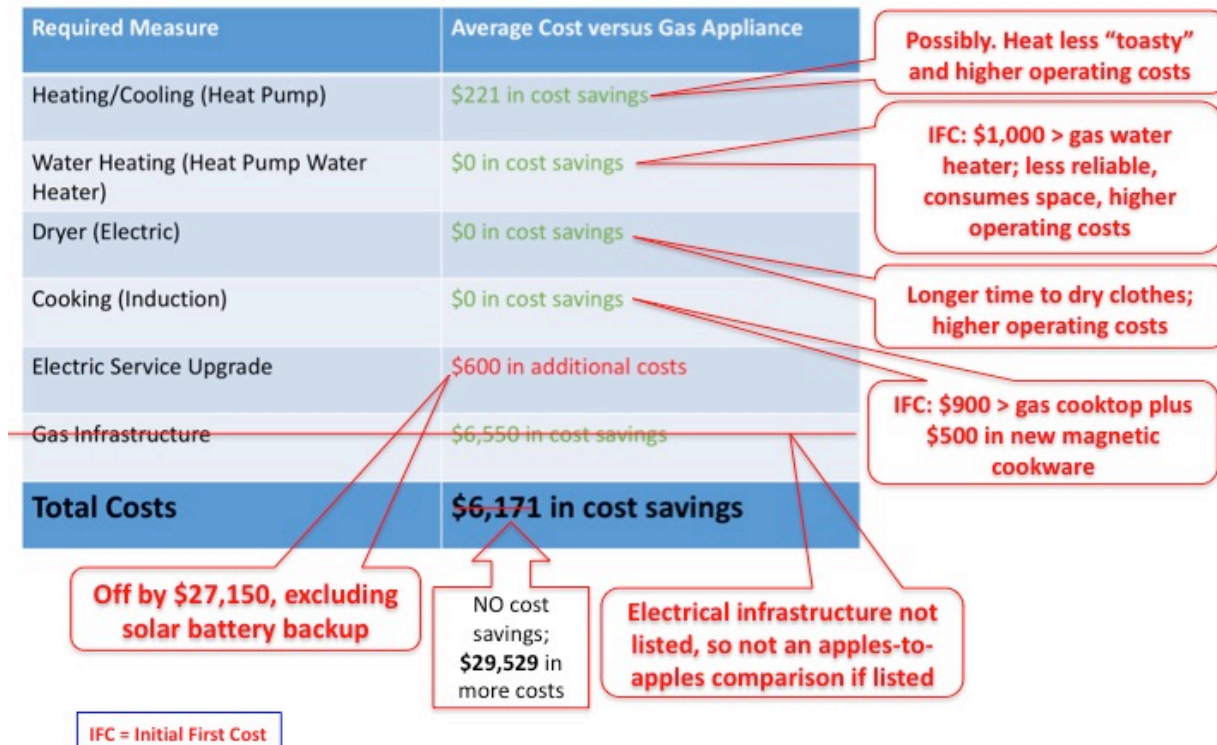


Table Source: California Energy Codes and Standards Cost-effectiveness Study - Low-Rise Residential
 Website posted: <https://srcity.org/DocumentCenter/View/25714/2019-09-19-Santa-Rosa-Builders-Roundtable?bidId=>

I added annotations to the CEC's chart, those red callouts above. I'll concede that the lowest cost heat pump for heating and cooling could provide some initial cost savings, although the confusion over banned refrigerants could alter the CEC's calculations. However, heat pumps are not field-proven. There are less than 2% of California homes using heat pumps, while more than 86% use natural gas furnaces.

Heat pump water heaters are just not field-proven and hence more costly to purchase and operate. They also don't continue to provide hot water during utility-forced power outages when Red Flag warnings are declared. The gas water heaters with pilot lights ensure the flow of hot water during a PSPS, unless you're on well water without a diesel or natural gas generator to power the pumps.

Electric dryers are just not as good as gas dryers and cost more to operate. This is a subjective assessment by most homeowners who have owned both. Besides, electric drying

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of a load of washed towels can take well over an hour and a half versus a gas dryer that can complete the task in less than 40 minutes.

Induction cooktops cost about \$900 more to purchase and present higher operating costs than gas cooktops. Unless you already have cast iron cookware, another \$500 is needed to buy new “induction ready” pots and pans. Dig through your utensils and locate your old “dial” meat thermometer too. Your digital ones won’t work due to the magnetic fields generated by induction. Gas cooktops ensure food can be cooked and water boiled during a PSPS. The burners can be lit with a match to provide the required heat.

The electric service upgrade for a new home is more than, as the CEC replied to me in January, 2020, six hundred dollars. The government agency wrote: “The *marginal* cost of adding four single-outlet circuits to the work of roughing in all the rest of the electrical system is small. It’s not zero, but it’s often in the low hundreds or even less.”

I talked with a Tubbs fire survivor in Santa Rosa on February 6, 2020. He said it cost him \$800 per 240-volt outlet added to his house rebuild. This is a far cry above the \$150 per outlet claimed by the CEC.

The CEC *italicized marginal* cost, however, is off by \$27,150. This is not a marginal cost increase. I enumerated these errors to the CEC. Their analysis versus mine gives me the feeling that their appliance cost story is being pushed to “impeach” natural gas from new home construction. All of the elements listed below are required to turn the sun “on” and produce power by converting photons into electrons. After all, SolarPV in the new 2019 building code is required for every new house. To wit, the electric service upgrade costs: Wiring runs (\$300), beefed up circuit breakers (\$300), solar mounting hardware (\$1,250), inverter(s) (\$2,750), controller-perf SW (\$1,500), solar panels(\$8,500), solar inspection (\$500), labor and overhead-profit (\$12,000) and solar meter (\$650).

On top of that, in three rebuild estimates I received from builders, the rough-in costs for the electric work are much more costly than the rough-in costs for plumbing, which includes the gas line runs.

So I have to ask, why are the published appliance savings incorrect and why are California homeowners being targeted to solve a problem that doesn’t exist in the grand scheme of things?

“Natural Gas is America’s Domestic clean foundation fuel for the present and our long-term future. Natural gas touches nearly every segment of American life. It is the dominant source of energy for heat and hot water in residences and businesses across this country. It also cooks our food, dries our clothes, powers industry and generates electricity. The natural gas industry supports the employment of nearly 3 million Americans in all 50 states. There is a tremendous opportunity for consumers and our nation as a whole through greater use of natural gas.”

- Dave McCurdy, *The Promise of the Gas Revolution*, [EnergyBiz](#), February 19, 2012

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“... if Greenpeace loses again [for its falsehoods], the outfit could soon be coughing up the internal documents behind its various campaigns of fear and intimidation world-wide.”

– *Pushing Back Against Progressive Bullies, WSJ, March 18, 2016*

[1] Climate activist organizations include BayRen, Building Decarbonization Coalition ((BDC) note: “Coal” in the name), Gridworks, Sunstone Strategies, Emerald Cities Collaborative (ECC), E3, Sierra Club, Association for Energy Affordability (AEA), and NRDC.

[2] It should be noted that NOAA and other science-based organizations report that methane (the major component of natural gas) breaks down in the atmosphere into carbon dioxide and water in less than 8 years. Current techniques to remove carbon dioxide ensure any greenhouse gas releases are properly managed/reduced. One of the more popular techniques is carbon capture & storage (CCS):

<http://www.ccsassociation.org/why-ccs/tackling-climate-change/>

Summary

Over a four-week period, I’ve presented the superiority of natural gas appliances over all-electric appliances: Advantages for Gas Dryers over all-electric heat-pump dryers was submitted January 6, 2020, for Gas Water Heaters over all-electric heat-pump water heaters was submitted January 13, 2020, for Gas Furnaces for space heating over all-electric heat-pumps was submitted January 26, 2020, and for Gas Cooktops over induction cooktops was submitted February 3, 2020.

Next, I showed that the CEC-provided “cost savings” data was incorrect. The touted \$6,171 in savings for using all-electric appliances is wrong. The costs to homeowners is \$29,529 more when forced to move to all-electric, and this doesn’t even provided battery backup during PG&E PSPSs.

As Patty Durand, SECC President and CEO, said on January 11, 2020, “with rooftop solar the top-three barriers are 1) uncertainty around the length of the payback period, 2) the inability to cover the high upfront costs and 3) lack of trust around the estimated savings.”

If savings are not provided the proposed reach codes are over-reaching and must be declared illegal and revoked. Even the 2019 California Building Code must be revisited.

In the meantime, Microsoft relies on back-up fossil fuel generators to keep the lights on at its facilities, and PG&E is planning to use natural gas generators at some of its substations to mitigate the loss of power during Red Flag events. As of this writing, my next door neighbor installed a whole-house natural gas generator in preparation for the next round of PG&E-forced power outages. Natural gas provides resiliency for residents, among other beneficial attributes.

Be prepared is what community leaders tell us. I am, however, I also believe we must respect but challenge authority. The CEC must be challenged on its roll-out of the 2019 Building Code.