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WHITE PAPER: BATTERY ELECTRIC VEHICLE (BEV) CHARGING

A PG Electric Company is a full-solutions provider of electrical contracting services to homeowners in Sonoma County.

As we take a first major step towards reducing greenhouse gases by jettisoning a fossil-fuel burner, we can use the arrival of your new BEV to leverage a shift in electric use in your home.



Your new BEV is just one of 5-6 new 240V appliances that you're going to be bringing into your home. Other appliances include heat pump technologies, induction cooktops, solar and batteries that are all incentivized by the [Inflation Reduction Act](#) (click for info). It is our intent to help you “futureproof” your home so that you can “program” how much and when you invest in these new systems.

Who I am. My name is George Moskoff. I'm the owner of the APG Electric Co. and the father of our 34 year old lead technician, Alexander Moskoff. I hold a graduate degree in Biochemistry from the University of Michigan (1978) so, hopefully, I know how to analyze situations and come up with innovative solutions. I've been serving homeowners, doing my own rehabs since 1995. That was when we lived in Illinois. I obtained my GC license in California in 2006 and my C-10 in 2011.

Along with Damian Dean, our colleague, the three of us successfully navigate a landscape of increasingly demanding customer expectations: we're proud of the 200+ 5-star reviews we have on [Yelp](#) and [Google](#).

WHERE WE ARE, THE LANDSCAPE

Electrical Vehicles (BEV's) will make up about 25% of new vehicles sold in the United States in 2023. The volume of sales is growing about 30% each year. Tesla vehicles make up 65% of the BEV's that are sold in the U.S. in 2023.

If you're concerned with the health of the planet and its inhabitants, these are all good developments. And, thank you for participating with the purchase of your new BEV. The [Inflation Reduction Act](#) is helping to move things along as well.

Tesla's cars use a charging gun that uses a proprietary configuration called North American Charging Standard (NACS). Until recently, all other car makers have used a Combined Charging System (CCS/J1772 or “J” charging gun. Most car makers are moving to the

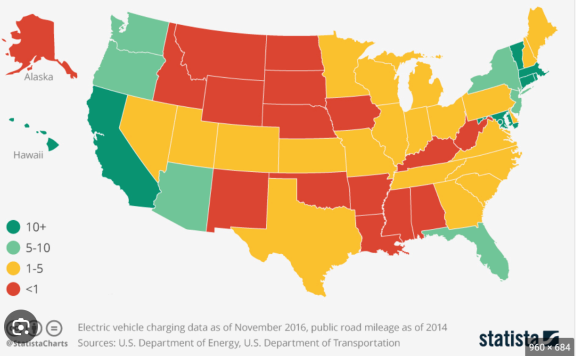
Americans bought more electric vehicles in the second quarter than in all of 2019
Roughly 295,000 EVs were sold between April and June 2023 — a new record.

Number of battery-electric vehicles sold in the United States, by fiscal quarter



Density of Electric Vehicle Charging Stations in the U.S.

Public electric vehicle charging stations per 1,000 miles of public road



WHERE WE ARE (cont'd.)

Making sure that your BEV has enough power in its batteries to get you to your destination has created a new psychological phenomenon called “range anxiety.” It’s a known problem that car makers and charging network companies are working to address.

Even though there are 130,000 public charging stations in the U.S., there aren’t enough....and not all of them are found to be working 100% of the time. A new move in progress: U.S. car makers are collaborating to install 30,000 more public charging stations through the year 2025.

YOUR HOME’S ELECTRICAL INFRASTRUCTURE

The electric panel (the box with the electric meter) in your home is, probably, not something you have thought about with any intention: it’s a passive piece of equipment, like your water pipes, that’s just there. But, when we look to install a new 50 Amp, 240 Volt circuit to this analog, 100-year-old technology, the limitations of the existing system can become acute.

Your main panel could be an impediment to the installation of BEV charging.

The panel could be...far away from where you want your charging station...out of room...a brand that is known to be troubled (Zinsco, FPE)...So, instead of a simple \$1,000 or less installation, the project becomes one that could run up to \$7,000 with the replacement of your main panel and the new EV charging circuit.



Public Charging Stations

As of November 2022, according to the Alternative Fuels Data Center,



If the installation for your new BEV is not simple, it could be a good time to exploit the opportunity by looking at the future of electric appliances in your home: let’s leverage the opportunity to make sure we can also take care of the future fossil-fuel replacing appliances: heat pump water heater; heat pump HVAC; induction cooktop. All of these are 240V devices and

require two slots in your electric panel.

HOME BASED AND PUBLIC CHARGING STATIONS

If you don’t have room in your electric panel, we have at least two moderately-priced options that can help. It requires a conversation.

There are three charging levels for BEV’s:

- Level 1: 120V Charging. Usually about 3-5 miles per hour of charging. 3 Prong plug.
- Level 2: 240V Charging. About 24 to 40 miles per hour of charging. 4-Prong plug or hard-wired.
- Level 3, Fast Charging. Fully charging a depleted battery in about 40 minutes.

Of these three options, Level 2 and DC Fast Charging options can be found in public settings.

The cord that comes with your vehicle is called a “mobile charging cord.” While these can be used for every day charging, most owners find it beneficial to leave these charging cords in the car....just in case it’s needed.

That’s where a “charging station”, like the Juicebox 40 pictured on the right, comes in handy for your home charging: it mounts on the wall, talks to a mobile app via your home’s wireless network, and delivers electricity to your BEV.



Instead of spending \$500+ on a home wall charger, you can get one [almost free from Sonoma Clean Power](#). SCP is one of 13 “Community Choice Aggregators” created through California legislation in the early 2000’s. (If you live in Healdsburg, this benefit does not apply.)

The future calls for more standardization on “charging guns” but this will happen in the next couple of years and, hopefully, be easily accommodated.

CONCLUSION

Preparing for your new Battery Electric Vehicle (BEV) charging is a chance to take stock of your home’s electrical system and make an investment now while considering probable future demands to your home’s electrical system. The Inflation Reduction Act (IRA) is providing tax incentives and rebates to help us move away from fossil-fuel-burning appliances.

“Future Proofing” is what we call the chance to make investments now that have payoffs 10-years down the road.

Practically, if you live in California, you can spend as little as \$750 to get Level 2 (240V) charging. That would be good news. If you’re unlucky and much of your system is out of capacity, it would be easy to spend upwards of \$7,500 to upgrade your systems.

There is money from the Inflation Reduction Act (IRA) to help with this transition but it is geared towards low- and moderate-income households.



Damian and George taking a break.