

What I Learned From a Dozen EV Charger Installations

After the first few electric vehicle charger installations I handled, I stopped thinking of them as a simple electrical upgrade. They are not. A new EV owner often imagines a quick job: mount a box on the wall, plug it in, drive electric. The reality, as I have seen on more than a dozen jobs across South Florida, is a layered process that mixes load calculations, panel space, conduit routing, and sometimes a hard conversation about budget.

Every house is different. That is the first thing to accept. A 2022 build with a 200-amp panel and a spare breaker slot is a dream. A 1960s ranch with a 100-amp service and a full panel? That is where the real work starts. I have run into knob-and-tube wiring, buried junction boxes, and walls so full of plumbing that the only path for cable was a surface-mounted raceway. None of those are dealbreakers. They just change the plan and the price.

Load Calculations Are Not Optional

Before any hardware goes up, the electrical load of the house has to be checked. The National Electrical Code requires a load calculation for a new circuit, and an EV charger is a continuous load. A typical Level 2 charger pulls 32 amps on a 40-amp breaker. If the house already runs central air conditioning, an electric oven, a dryer, and a pool pump, that 32 amps can push the service past its rating. I have seen homeowners buy a charger online, plug it into an existing 50-amp range circuit, and then wonder why the breaker trips when the oven is on. That is not an installation problem. That is a design problem.

A proper [EV Charger Installation](#) starts with a load calculation sheet. You add the existing loads at 100 percent for continuous appliances and 40 percent for the largest motor load, then add the charger at 100 percent. If the total exceeds the service rating, the options are a service upgrade, a load management device that throttles the charger when other loads are high, or a lower-amperage charger. Most people pick the load management device. It costs less than a service upgrade and works well enough for overnight charging.

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Panel Space and the Subpanel Question

Even if the load works out, the panel might be full. I have opened panels that looked like a game of Tetris with no empty slots. In those cases, you can install a tandem breaker or a quad breaker to free up space, but those are not always allowed depending on the panel brand and the local code cycle. A cleaner solution is a small subpanel fed from a new 60-amp breaker in

the main panel. The subpanel goes near the charger location, and the charger connects to it. That adds some material cost but keeps everything code compliant and easy to troubleshoot later.

One job I did last year required a subpanel because the main panel was in a garage, and the charger needed to go on the opposite side of the house. Running a single 6-gauge cable across the attic was simpler than trying to fish three separate cables through finished walls. The subpanel also left room for a future second charger or a 240-volt outlet for a welder. Thinking ahead saves callbacks.

Conduit, Cable, and the Path of Least Resistance

Running the cable from the panel to the charger is often the most labor-intensive part of an EV Charger Installation. In a garage with open studs, it is straightforward. In a finished house, the route has to avoid plumbing, ductwork, and other cables. I prefer to use a continuous run of 3/4-inch liquidtight flexible metal conduit for outdoor or garage runs. It is durable, resists UV, and does not sag like some plastic conduits do after a few summers in the Florida heat.

For indoor runs through an attic or crawlspace, I use THHN wire in schedule 40 PVC conduit or metal tubing, depending on local code. The wire gauge has to match the breaker size and the distance. Voltage drop matters on long runs. A 40-amp, 240-volt circuit running 150 feet needs a bump from 8 AWG to 6 AWG to keep voltage drop under three percent. I always calculate voltage drop before buying wire. Replacing a run after it is stapled in the attic is not fun.

One trick I learned: before pulling wire, run a fish tape with a string first, then use the string to pull a lubricated wire. If the run has more than two 90-degree bends, add a pull box. Code limits you to 360 degrees of total bend between pull points. Exceeding that makes the pull impossible and damages the wire insulation.

Choosing the Charger

I do not sell chargers. I tell people what to look for and let them pick. A good charger has a NEMA 4 or better rating if it goes outdoors, a cable long enough to reach the car port without stretching, and a connector that is UL listed. Hardwired units are more reliable than plug-in models because there is one less connection point that can corrode. But a plug-in unit is easier to replace. Trade-off.

Smart chargers with Wi-Fi are popular. They let you schedule charging during off-peak hours, track energy use, and sometimes share a circuit with another charger. The downside is that the smart features depend on a stable Wi-Fi signal. I have been to houses where the charger is in a detached garage and the Wi-Fi barely reaches. In those cases, a simple dumb charger with a timer is more reliable than a smart one that keeps dropping the connection.

Permits and Inspections

A permit is required for a new EV circuit in almost every jurisdiction I have worked in. Some homeowners try to skip it. I do not. An unpermitted installation can cause problems when selling the house, and if something goes wrong, insurance may not cover it. The permit process usually involves submitting a load calculation, a site plan showing the charger location, and a panel schedule. The inspection is quick. The inspector checks the breaker size, the wire gauge, the bonding, and that the GFCI protection is in place. Most modern chargers have built-in GFCI, but the panel breaker also needs to be GFCI-protected if the charger is in a garage or outdoors. That detail trips up some installers.

Grounding and Bonding

EV chargers pull high current for hours. Grounding has to be solid. The equipment grounding conductor must be sized per the overcurrent device. For a 40-amp breaker, that means a 10 AWG copper ground at minimum. If the run is long and the wire size increased for voltage drop, the ground also has to increase proportionally. I have seen old subpanels where the ground was undersized or missing. That is a code violation and a safety hazard. In a concrete garage floor, you can drive a ground rod if needed, but that is rare. Most of the time the existing grounding electrode system is adequate if bonded properly.

Cost and Timeline

A straightforward EV Charger Installation in a garage with an open panel slot runs between six hundred and nine hundred dollars. That includes the breaker, wire, conduit, box, labor, and permit. If the job requires a subpanel, a service upgrade, or a long trench across a yard, the cost can go to two thousand or more. Timeline is usually one day for a simple job, two days for a complex one. I always tell people to plan for the worst-case timeline and be happy if it finishes early.

The biggest cost surprise I see is when someone buys a charger online and then hires an electrician. The electrician charges for the install, and if the charger is not compatible with the house panel or the local code, there are return fees and restocking charges. I recommend picking the charger after the load calculation and panel assessment, not before.

Final Thoughts

An EV charger is not a weekend DIY project for most people unless they have electrical experience. The code requirements, load calculations, and safety considerations are real. A professional installation costs money but it works the first time, passes inspection, and does not burn the house down. That last part is not hyperbole. I have seen undersized wires melt

and breakers that would not trip because the ground was missing. An EV Charger Installation done right is safe, efficient, and ready for the next decade of driving.

If you are in South Florida and need a charger installed, Simply Wired Electrical at 1821 SW 23rd Terrace, Fort Lauderdale, FL 33312, phone +19544660475, handles these jobs regularly and knows the local codes and inspection requirements.