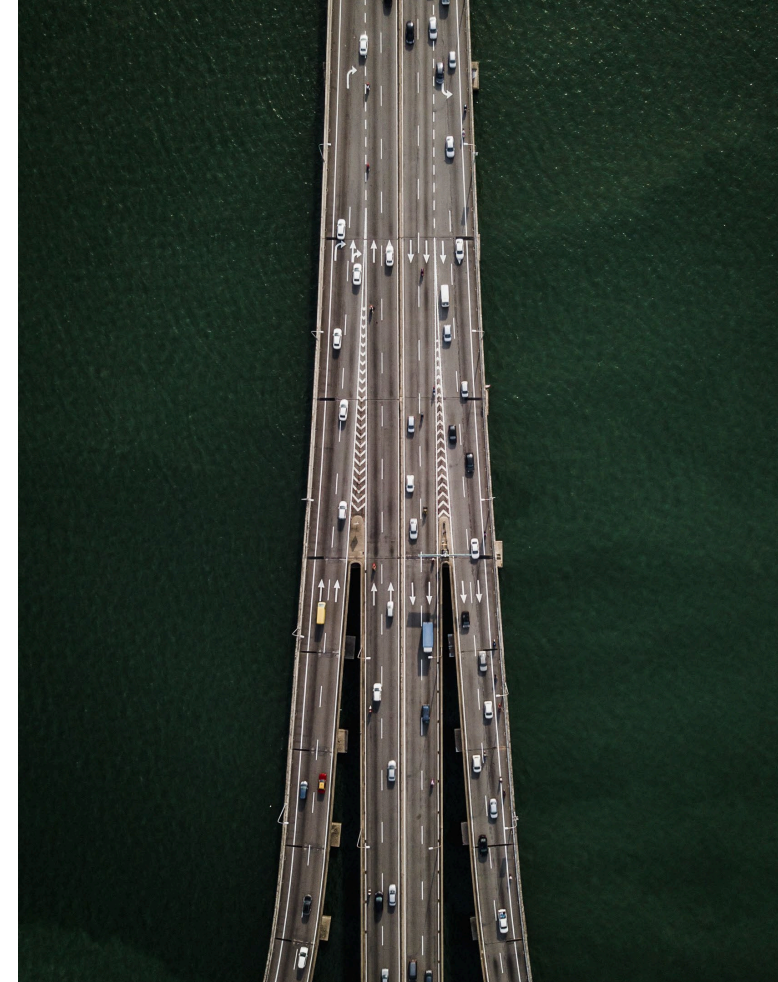
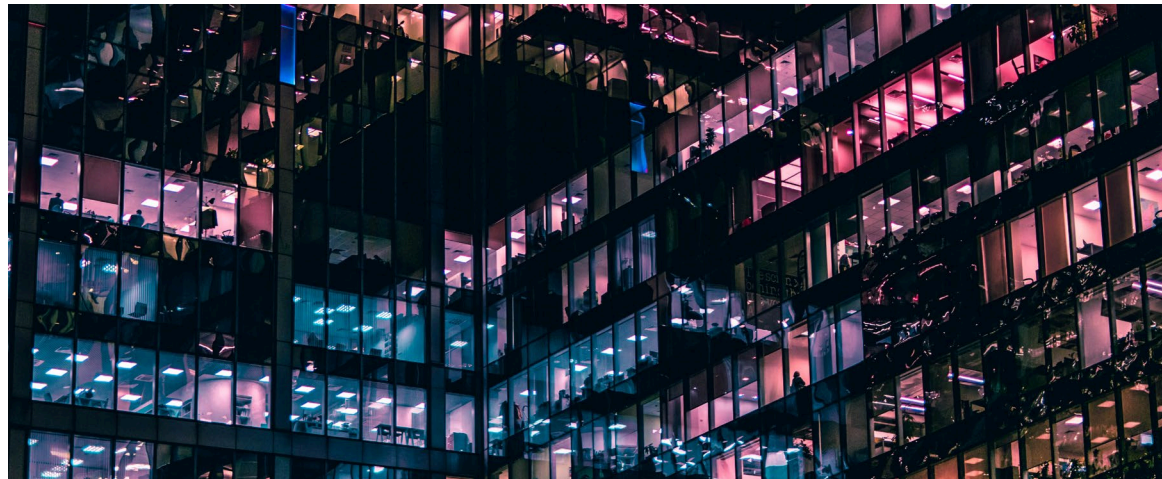




How charging networks can meet the transportation needs of all EV drivers

Nick Millar, Product Manager

October 28th, 2021

evconnect

Potential Benefits of EV charging compared to ICE vehicles

More Convenient Fueling

In The United States

150,000 gas stations

&

1 million fuel pumps



Photo by [Mehluli Hikwa](#) on [Unsplash](#)

Potential Benefits of EV charging compared to ICE vehicles

More Convenient Fueling

In The United States

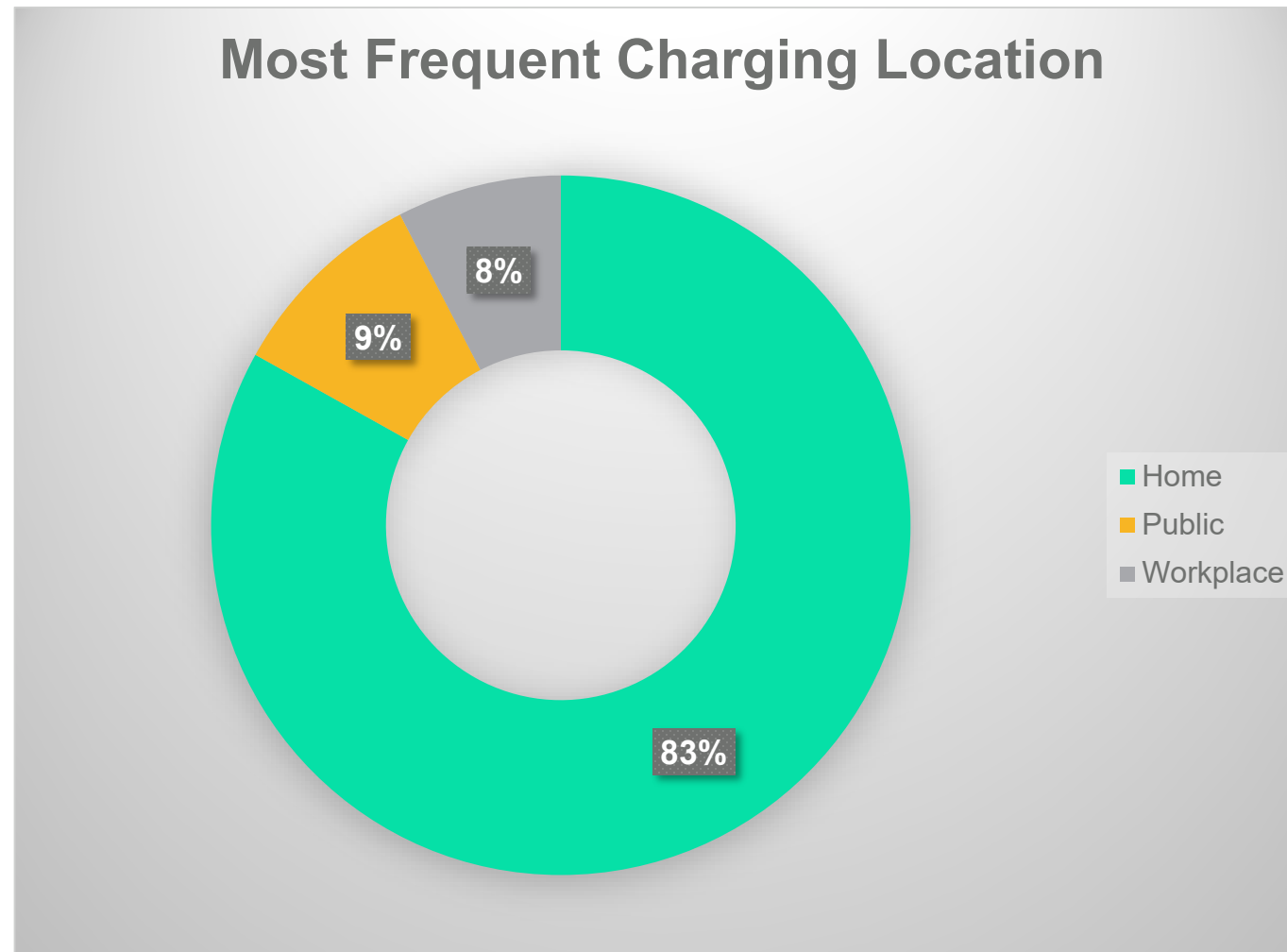
5-20 billion electric outlets



Photo by [George Kroeker](#) on [Unsplash](#)

Potential Benefits of EV charging compared to ICE vehicles

More Convenient Fueling



EV Connect Driver Survey

Challenges to Access

Non-standardized connectors

Major DC Fast Connector Types in US

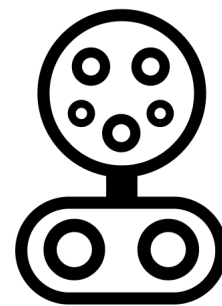
CHAdeMO



Tesla



CCS

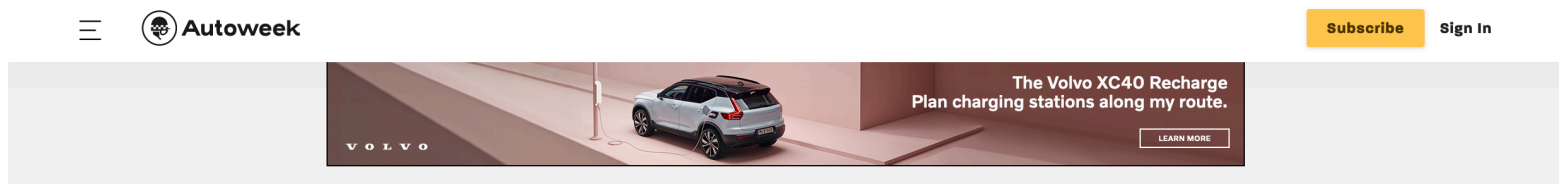


Adds cost to station owners

Increases complexity for drivers

Challenges to Access

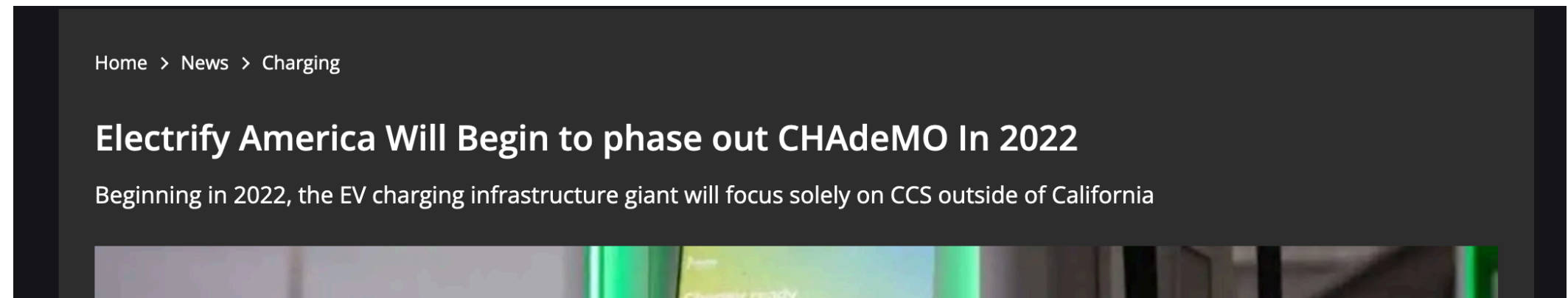
Non-standardized connectors



Tesla Says CCS Adapter for US Owners Is on the Way

The end of Supercharger network's exclusivity appears close, as third-party charging stations surge.

BY JAY RAMEY ♦ OCT 20, 2021



Sources: <https://www.autoweek.com/news/green-cars/a38014613/tesla-ccs-supercharger-station-adapter-plug/>
<https://insideevs.com/news/522882/electrify-america-ends-chademo-installations/>

Challenges to Access

Availability of Overnight Charging

EVC Driver Survey

81% of our current drivers
own their own home

95% have access to
dedicated parking

U.S. Demographics

59% of Americans own
their residence*

56% have access to private
parking^

*US Census Bureau

^Carnegie Mellon report

Challenges to Access

Availability of Overnight Charging

IECC introduced provisional requirements to include EV charging infrastructure for multi-family buildings in new construction in 2021 IECC model code

There are a multitude of incentive programs aimed at closing the gap for residential charging access for non-homeowners

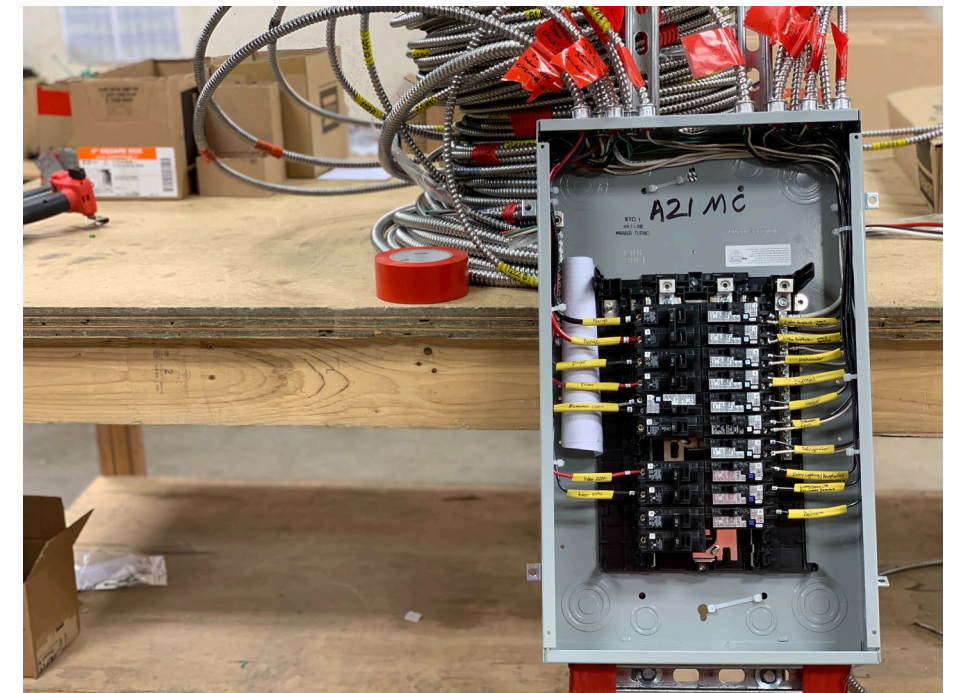


Photo by [Troy Bridges](#) on [Unsplash](#)

Challenges to Access

Closed Networks

Charging should:

not require dozens of apps & subscriptions

allow common payment methods

Have easy to understand pricing

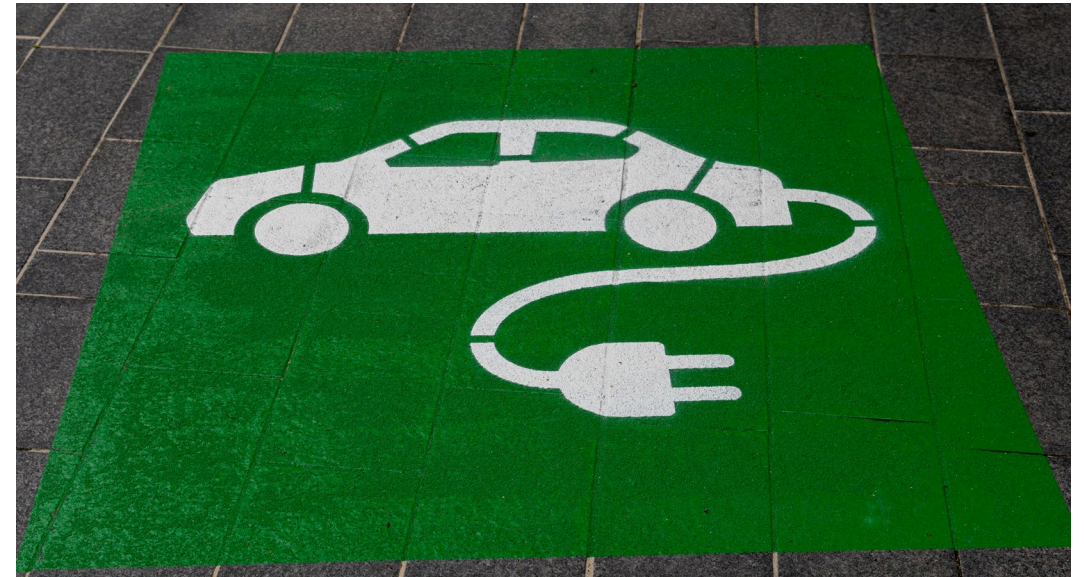


Photo by [Michael Marais](#) on [Unsplash](#)

Challenges to Access

Closed Networks

Jun 24, 2021 - Economy & Business

Exclusive: EV charging providers to allow roaming across their networks



Joann Muller, author of [What's Next](#)

Sources: Charged EV Magazine, Axios, Detroit News

California to ban time-based billing for EV charging

Posted December 27, 2019 by [Charles Morris](#) & filed under [Fleets and Infrastructure](#), [Newsire](#), [The Infrastructure](#).



GM

GM makes deals with networks to simplify EV charging

Kalea Hall The Detroit News

Published 4:02 p.m. ET April 28, 2021

[View Comments](#)



Detroit — General Motors Co. on Wednesday said it has signed seven agreements with major charging providers to make the electric vehicle charging experience more seamless.

The agreements with Blink Charging, ChargePoint, EV Connect, EVgo, FLO, Greenlots and SemaConnect will connect customers through GM's vehicle mobile apps, allowing them to eventually find a charging station and pay to charge through the app.

Potential Benefits of EV charging compared to ICE vehicles

Lower Fueling Costs

Average Retail Gasoline
Price in 2020-21*:
\$2.73 per gallon

For an average mid-sized SUV
getting ~ 23 mpg, this equates
to

~ 12 cents per mile



*EIA All Grades Retail Gasoline Prices, 10/19/2020 – 10/11/2021

Photo by [Chris Haws](#) on [Unsplash](#)

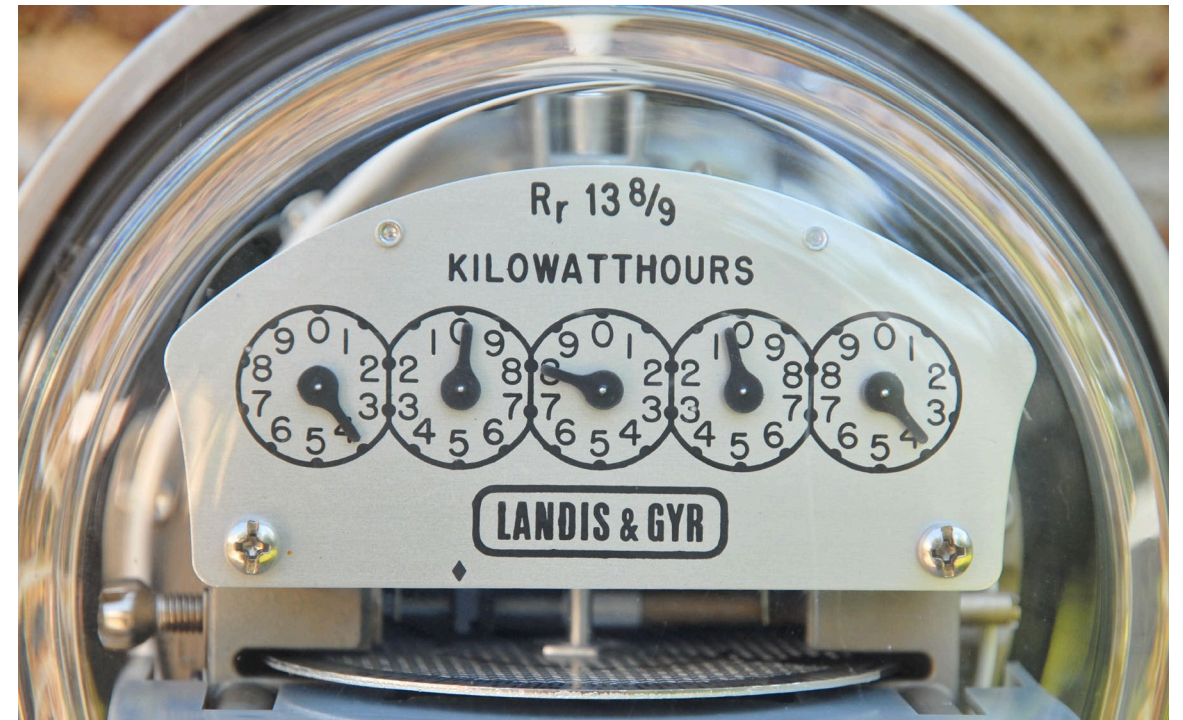
Potential Benefits of EV charging compared to ICE vehicles

Lower Fueling Costs

Average Retail Electric
Price in 2020-21*:
\$0.11 per kWh

For an average mid-sized SUV
EV getting ~ 2.9 miles per
kWh, this equates to

~ 4 cents per mile



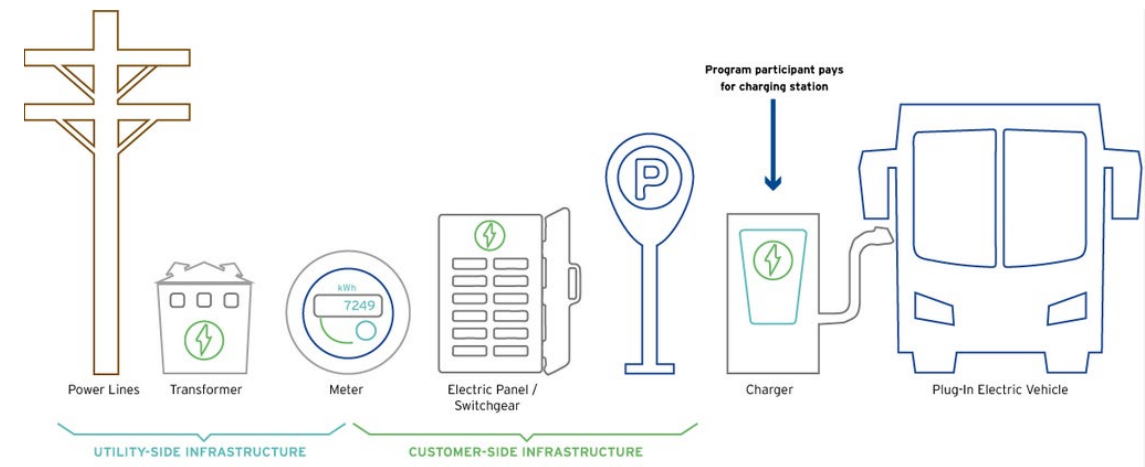
*EIA Average Retail Price of Electricity, 8/2020 – 7/2021

Photo by [Robert Linder](#) on [Unsplash](#)

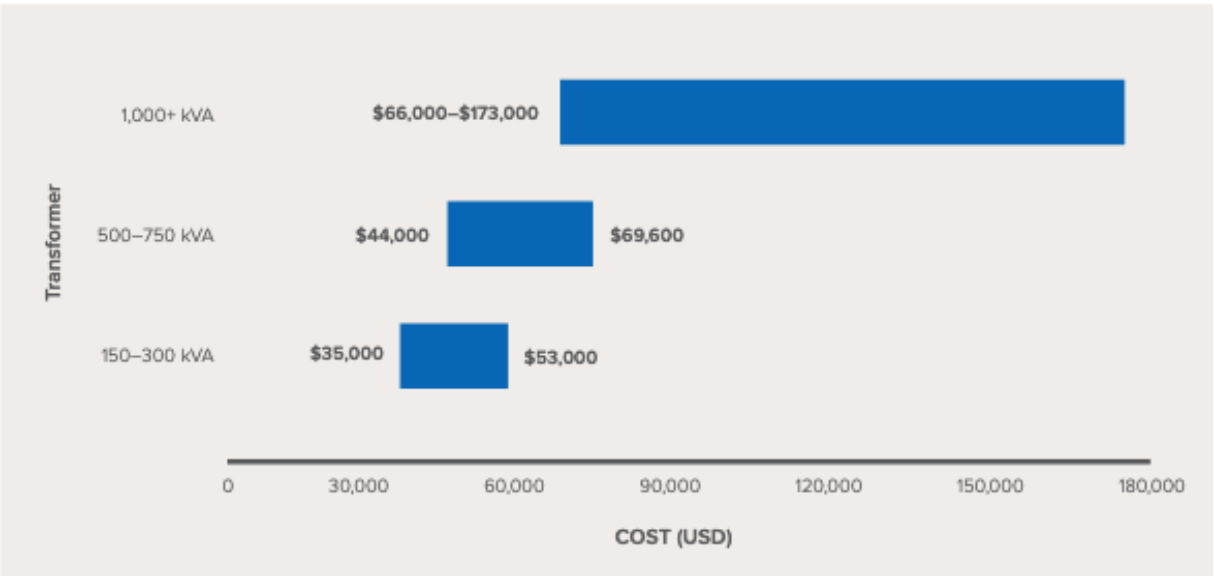
Challenges to Low-cost Charging

Infrastructure Upgrade Costs

The charger may be the least expensive part of the installation!



Source: SDG&E



Source: Rocky Mountain Institute

Challenges to Low-cost Charging

Infrastructure Upgrade Costs

Dynamic charge limiting and power balancing to reduce equipment upgrade requirements

Energy code updates to make 'EV charger ready' at the time of construction



Photo by [NeONBRAND](#) on [Unsplash](#)

Challenges to Low-cost Charging

Underdeveloped embrace of flexibility

TOU price signals not always well understood

DR aimed at networked EV charging still being developed

Consumers may not be fully ready to embrace curtailed charging in exchange for lower prices



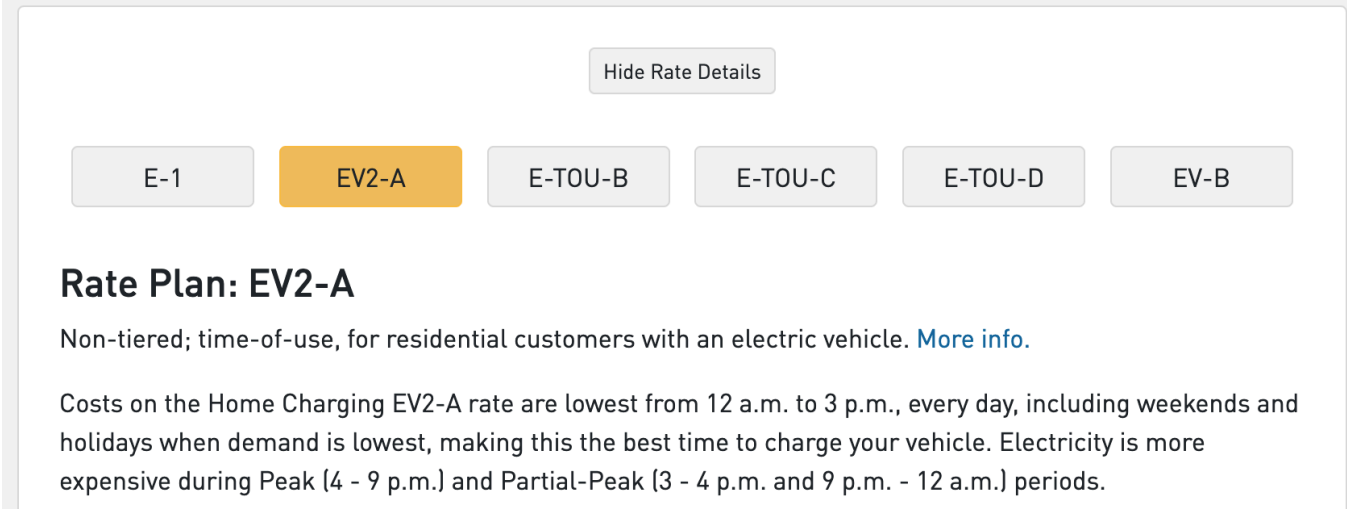
Source: Green Car Reports

Challenges to Low-cost Charging

Lack of incentives to embrace flexibility

Rates being designed explicitly for EV charging, including submetering to allow for individual charging decision making

Increasing participation of chargers in demand response programs



The screenshot shows a web interface for selecting a rate plan. At the top, there is a button labeled "Hide Rate Details". Below this, a row of six buttons is displayed: "E-1", "EV2-A", "E-TOU-B", "E-TOU-C", "E-TOU-D", and "EV-B". The "EV2-A" button is highlighted in orange, while the others are light gray. Below the buttons, the text "Rate Plan: EV2-A" is displayed. Underneath, a description reads: "Non-tiered; time-of-use, for residential customers with an electric vehicle. [More info.](#)" A paragraph follows: "Costs on the Home Charging EV2-A rate are lowest from 12 a.m. to 3 p.m., every day, including weekends and holidays when demand is lowest, making this the best time to charge your vehicle. Electricity is more expensive during Peak (4 - 9 p.m.) and Partial-Peak (3 - 4 p.m. and 9 p.m. - 12 a.m.) periods."

Source: PG&E

Fleets

Highest usage vehicles

Most able to benefit from electric's
lower cost-per-mile than ICE

Holistic charging solutions for fleet –
hub, public, and home – will help
speed charger coverage for non-fleet
vehicles



Photo by [Markus Winkler](#) on [Unsplash](#)



Thank you

Nick Millar, Sr. Product Manager