

Green wheels, bright skies: New analysis unveils the connection between electric vehicles and photovoltaics

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People who own electric vehicles (EVs) are more likely to go a step further and add solar panels to their home, according to an analysis of a behavioral study by researchers at the U.S. Department of Energy's National Renewable Energy Laboratory (NREL). Conversely, the impact

of owning solar panels also has a bearing on whether a homeowner buys an electric vehicle but not as strongly.

The study relied on a survey of 869 households in the San Francisco Bay Area.

NREL's Shivam Sharda, lead author of the newly published research paper that analyzes the [survey results](#), said the owners of EVs may be more inclined to invest in photovoltaics (PVs) because the addition of [solar panels](#) might offset the residential portion of the energy bill needed to charge them at home.

"Both EVs and PVs have a complementary nature, which might play a pivotal role in energy systems resiliency, addressing concerns regarding grid stability and power management strategies," said Sharda, a computational research scientist in NREL's Center for Integrated Mobility Sciences.

[The paper](#), "The Electric Vehicles-Solar Photovoltaics Nexus: Driving Cross-Sectoral Adoption of Sustainable Technologies," appears in the journal *Renewable and Sustainable Energy Reviews*. The study is co-authored by an interdisciplinary team of researchers including Venu M. Garikapati, Janet L. Reyna, and Bingrong Sun, all from NREL, and researchers from the University of California Santa Barbara and Lawrence Berkeley National Laboratory.

The survey was conducted in 2018 as part of the WholeTraveler Transportation Behavior Study. The researchers noted a lot might have transpired from the year when the survey was conducted. They revisited the topic with the newly released 2022 Residential Energy Consumption survey and observed that EV-PV relationship might still hold true. In the 2018 survey, more of the participants owned or previously owned rooftop solar panels than an electric vehicle (9.1% vs. 6.5%). The

researchers noted PV technology has been around longer compared to EVs, and the cost of having solar panels is less than that of most EVs.

They found a correlation between the two technologies. Of EV owners, 25% also owned a PV system, while only 8% of the non-EV owners owned PVs. The behavioral survey highlighted two areas that might have prompted someone to adopt one or both technologies: being cognizant of them and being social enough to ask about them.

"If you have a friend or a family member who owns a rooftop solar panel or an EV, you become more educated about the technology, so you know the pros and cons by talking to them," Sharda said. "That has a significant influence on your owning EVs or PVs."

While governments offer incentives to adopt both EVs and PVs, the researchers suggested considering policies that jointly accelerate the acceptance of the two technologies. Because EV owners are inclined to use PV anyway, such incentives might provide a push for EV owners to adopt solar technology much earlier than what is currently observed. How soon a household adopts cross-sectoral sustainable technologies will play an important role in achieving decarbonization goals.

The researchers said while the [survey](#) provided valuable insights on EV-PV interconnection, more holistic surveys are needed to unpack the evolving transportation and residential energy use nexus to identify pathways to decarbonize energy use across sectors.

More information: S. Sharda et al, The electric vehicles-solar photovoltaics Nexus: Driving cross-sectoral adoption of sustainable technologies, *Renewable and Sustainable Energy Reviews* (2023). [DOI: 10.1016/j.rser.2023.114172](https://doi.org/10.1016/j.rser.2023.114172)

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