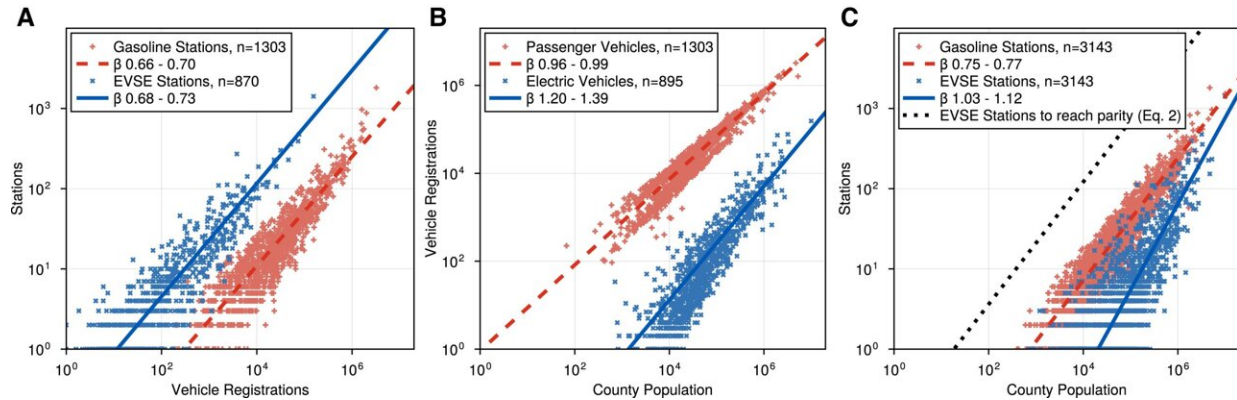


# How to optimize EV charging locations

January 3 2024



EVSE and gasoline stations scaling applied to different populations. a) EVSE and gas stations scale sub-linearly, following economies of scale, with their respective vehicle registrations per county. b) Passenger vehicle registrations scale linearly with the county population, while EV registration scales super linearly with the county population. c) Gasoline stations scale sub-linearly with the county population, while EVSE scale super-linearly with the county population; suggesting the influence of wealth/social interactions. Credit: *PNAS Nexus* (2023). DOI: 10.1093/pnasnexus/pgad341

Consumer interest in electric vehicles (EVs) is rising, but the lack of charging stations is a continuing concern to potential customers. No U.S. counties currently have a charging infrastructure that can deliver power equal to gasoline stations; many counties have no public EV charging infrastructure at all.

To equal the power of the existing gasoline network, the U.S. would need 1.8 million charging stations. But where should they be built? A recent paper titled "Scaling behavior for electric vehicle chargers and road map to addressing the infrastructure gap" published in *PNAS Nexus* provides a possible road map.

SFI's Christopher Kempes and co-authors used scaling theory to forecast future charging station needs. Their work relies on the infrastructure efficiency achieved for areas with higher population density and fewer stations per capita, and shows that areas with a lower population currently have a bigger charging-station gap.

So, using simple population data to plan future charging stations could result in excess urban infrastructure and underserved rural communities. Prioritizing charging development using scaling analysis could help guide the distribution of [charging stations](#) needed for the widespread adoption of [electric vehicles](#).

**More information:** Alexius Wadell et al, Scaling behavior for electric vehicle chargers and road map to addressing the infrastructure gap, *PNAS Nexus* (2023). [DOI: 10.1093/pnasnexus/pgad341](https://doi.org/10.1093/pnasnexus/pgad341)

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