CRACKING THE GASOLINE CODE

Using new gasoline consumption data to lift the most gasoline-burdened Americans and cut gasoline use faster and more efficiently

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Moving Beyond Gasoline

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Photo: Tracie Rodriguez

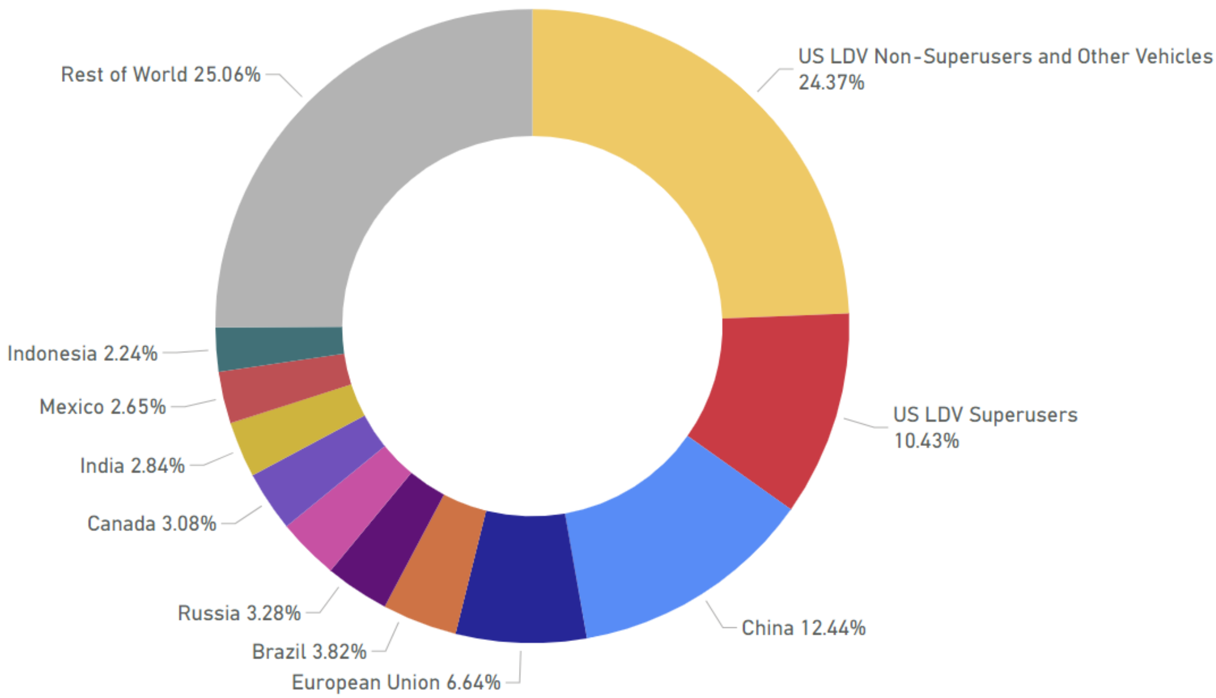
I. Executive Summary

Extreme levels of gasoline use are deeply woven into American society. The US burns 370 million gallons of gasoline every day – three times more than China and far more than any other country.[1] Gasoline use causes one-sixth of US carbon emissions and costs US households more than $450 billion a year. Gasoline use is not going down nearly fast enough to meet climate goals.

Driving America's stratospheric gasoline use are drivers in the top 10% in terms of their gasoline consumption ("Gasoline Superusers"). Superusers collectively use 35% of all gasoline used in private light-duty vehicles (LDVs) and individually spend on average 10% of their household income (on average $530 per month) to purchase it.

The 21 million US Gasoline Superusers make up just 0.24% of the world's population, but they use 10.4% of the world's gasoline – nearly as much as all of China.

Superusers Consume 10.4% of the World's Gasoline



Gasoline consumption by country/region, with US Superusers denoted in red. Source: EIA 2021-2022, Coltura analysis.

Switching from a gas-powered vehicle to an electric vehicle (EV) is an excellent way to displace large amounts of gasoline. There is a major opportunity to reduce gasoline use faster with new, data-driven strategies for accelerating Superusers' switch to EVs.

This report reveals what a new dataset tells us about Americans' consumption of gasoline. It shows in granular detail:

- How geography, income, vehicle type, and demography correlate with the volume of gasoline a person uses;
- The financial burden of gasoline purchasing on the people who use the most gasoline; and
- The outsized climate and social equity benefits from converting the drivers who use the most gasoline to EVs.

We recommend that governments 1) make gasoline reduction a central goal and metric of policymaking and 2) pivot away from inefficient one-size-fits-all EV policies to data-driven ones which prioritize the switch of the biggest gasoline users to EVs. Policies prioritizing the biggest gasoline users for EVs maximize the vehicle emissions and air pollution avoided per EV, bring financial relief to the drivers who spend the biggest share of income on gasoline, and maximize diversion of cash flow away from oil companies and toward EVs and cleaner energy.

Findings:

Gasoline Consumption

- The top 10% of US private light-duty vehicle drivers in terms of their gasoline use ("Gasoline Superusers") consume 40 billion of the 115 billion gallons of gasoline used annually by all US private light-duty vehicles. Superusers use 35% of the gasoline – more than the bottom 72% of drivers combined.[2]
- Annually, Superusers drive on average 40,242 miles and burn 1,895 gallons of gasoline, versus non-Superusers at 8,598 miles a year and 392 gallons.

Superuser Demographics and Vehicles

- 57.7% of Superusers (12.1 million) live in rural areas or small towns, while 9% (1.9 million) live in major cities. The rest of the Superusers live in suburbs and mid-sized cities.
- In rural areas, an average of 19.1% of drivers are Superusers, whereas in major cities an average of 5.4% of drivers are Superusers.
- Black drivers represent 12.4% of Superusers and 9.9% of non-Superusers. Asian drivers represent 3.3% of Superusers and 5.9% of non-Superusers. The percentage of White, Hispanic, and other race Superusers is proportional to their overall share of the population.
- Superuser vehicles get on average 19.5 miles per gallon (MPG), versus non-Superuser vehicles at 23 MPG.
- The five most common Superuser vehicles are the Chevrolet Silverado, Ford F150, GMC Sierra, Ram 1500, and Jeep Grand Cherokee.

Superuser Driving

- Superusers drive on average 116 miles on weekdays and 97 miles on weekends, versus non-Superusers at 24 miles on weekdays and 24 miles on weekends.
- Superusers make on average 5.1 daily trips on weekdays and 4.2 daily trips on weekends, versus non-Superusers at 3.4 daily trips on weekdays and 3.2 daily trips on weekends.

Superuser Income, Gasoline Expenditures, and Savings

- The majority of Superusers (58.2%) have household incomes of less than $100,000 and 42.9% of Superusers earn less than the national median household income of $74,580.[3]
- Superusers spend on average 10.2% of household income on gasoline, versus non-Superusers at 3.5%.
- Superusers spend on average $530 per month on gasoline, versus non-Superusers at $110 per month.
- Superusers would save on average $4,318 a year in fuel costs (the difference between gasoline costs and equivalent electricity costs where they live) by switching to an EV.
- Black Superusers spend on average 14.5% of income on gasoline, followed by Hispanic Superusers at 12.6%, White Superusers at 9%, and Asian Superusers at 6.2%.

Superuser Readiness to Switch to EVs

- 86.1% of Superusers live in single-family homes, where there are typically fewer barriers to installing Level 2 EV charging.
- 86.3% of Superusers drive on average fewer than 150 miles/day – a distance well within the range of modern EVs.

Impact of Superusers Switching to EVs

- A Superuser switching to an EV displaces on average 5.3 times as much gasoline as a non-Superuser switching, with the result that many fewer total EVs are required to achieve climate targets.
- An average Superuser switching to an EV achieves a net CO2 reduction of roughly five times as much as the average non-Superuser switching (11.3 metric tons per year, versus a non-Superuser at 2.3 metric tons per year).
- All Superusers switching to EVs would reduce net carbon emissions from light-duty vehicles by 243 million metric tons a year – or 3.8% of all US carbon emissions.[4]
- Cutting US gasoline use in half would require 79 million drivers switching to EVs if the biggest gasoline users switched first, versus 191 million drivers if the biggest gasoline users switched last.
- All 21 million Superusers switching to EVs would avoid the use of 40.5 billion gallons of gasoline a year and shift $149 billion in consumer spending annually away from gasoline expenditures and toward the EV transition and cleaner energy.

Policy Recommendations:

Policymakers should:

- Establish gasoline reduction as a primary climate goal and metric.
- Employ detailed gasoline use data to focus EV and transportation policies on the biggest opportunities to reduce gasoline consumption.
- Maximize the climate and equity impacts of every EV by prioritizing gasoline-burdened Superusers' switch to EVs.
- Spur utilities to prepare for the added electric demand required by the conversion of the biggest gasoline users to EVs.

In order to ensure that the positive economic and environmental impacts of EVs are maximized, it is critical to understand at a granular level the who, what, where, and why of gasoline use in the US. Coltura's data shows that putting a premium on programs to help the most gasoline-burdened drivers switch to EVs will save those drivers more money and avoid more pollution while optimizing the impact of public and private investments in cleaner transportation.

Visit data.coltura.org for a detailed gasoline consumption map, data insights, and EV cost savings calculator.

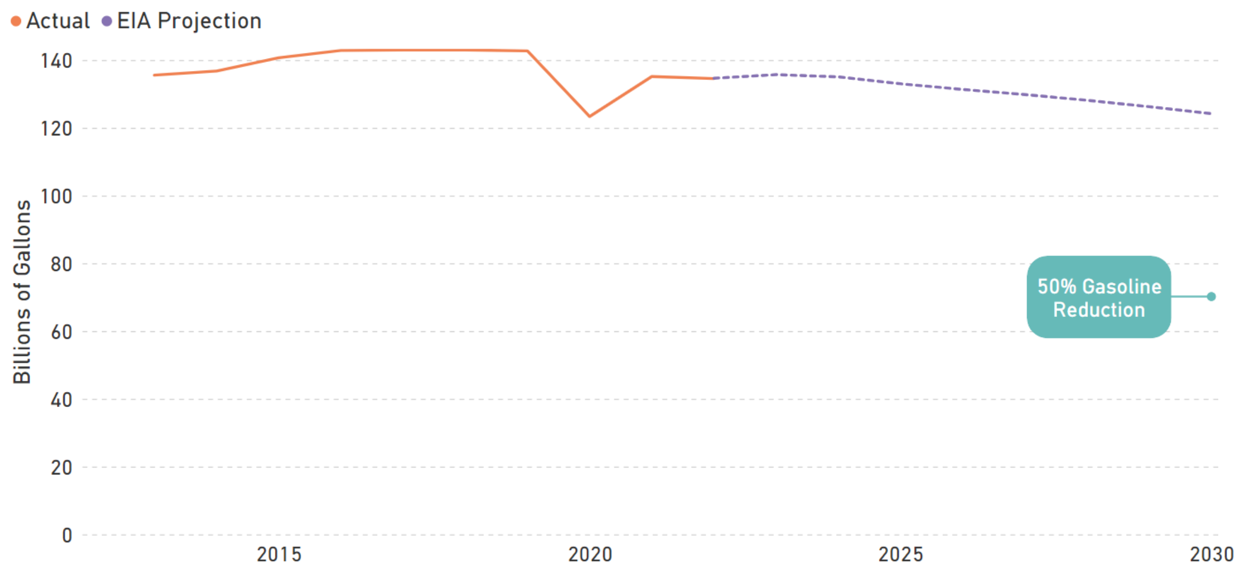
II. Introduction

Danielle Fury of the small rural town of Bloomsburg, PA shuttles her minivan 200 miles a day between housecleaning jobs, art classes, music gigs, sales calls, and her son's school and band practice. She spends $360, 35% of her household's income, buying 80 gallons of gasoline a week. Pedro Jimenez, a handyman from the small northwest Georgia city of Dalton, spends $400 to $500 a week (about 30% of his household income) buying around 120 gallons of gasoline for his pickup truck, which he drives up to 300 miles a day to get to various job sites. Kadeem Fils of St. Cloud, FL drives his SUV 100 miles a day to commute to his job at SeaWorld and to attend school, using 40 gallons a week and spending 9% of his income to do so.

Danielle, Pedro, Kadeem, and millions of other Americans rely on large volumes of gasoline to navigate their lives. They have few viable alternatives to driving long distances. They spend enormous sums on gasoline and contribute an outsized share of climate-warming vehicle emissions.

Americans' profound dependence on gasoline is the principal reason US gasoline use is not going down fast enough to meet the climate crisis. Burning gasoline and diesel in light-duty vehicles accounts for 16% of US carbon emissions.[5] The Biden Administration, consistent with the Intergovernmental Panel on Climate Change (IPCC), set a target of cutting US emissions from all sources by 50-52% by 2030, and thus gasoline use must also go down at least 50% by 2030 to contribute its proportional share. However, the US Government's Energy Information Administration (EIA) projects gasoline use by light-duty vehicles to drop by just 10% by 2030 – well below the 50% target.[6]

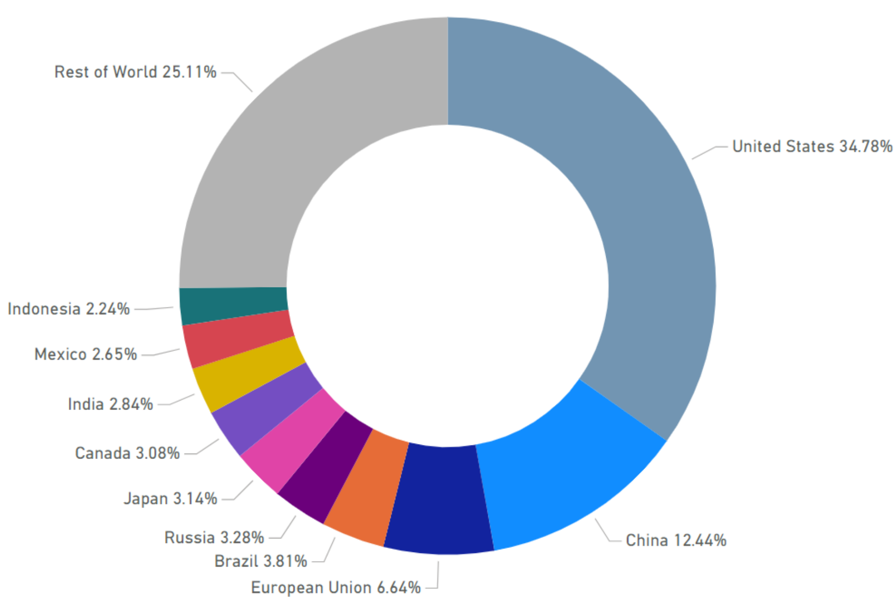
US Gasoline Use: Not Going Down Fast Enough



Actual and forecast US gasoline consumption from 2013 through 2030. Source: EIA 2023.

US gasoline consumption is a global climate issue. The US accounts for nearly 35% of world gasoline consumption – much more than any other country. US gasoline consumption accounts for 2.8% of total worldwide carbon emissions from fossil fuels.[7]

The US Burns Almost 35% of World Gasoline



Distribution of world motor gasoline consumption by country/region. Source: EIA 2021-2022.

The US used 135 billion gallons of gasoline in 2022 (more than one-third of global use), and light-duty vehicles consumed about 85% of that amount.[8] Total US household expenditures on gasoline were $458 billion in 2022.[9]

Despite gasoline's substantial negative impacts on the climate and to household budgets, neither the federal government nor state governments have set clear gasoline reduction goals, nor have they aligned their electric vehicle policies with the achievement of any specific level of gasoline cuts.

EV incentives and tax credits have been central to federal and state EV policymaking.[10] These programs were successful in helping jump-start production of electric vehicles and grow the US EV market in 2023 to nearly 8% of US new car sales[11] and more than 40 EV models.[12] However, these programs benefit and have been utilized primarily by relatively affluent drivers[13] who drive less than an average amount of miles.[14] Between 2016 and 2022, electric cars were driven 38% less (4,500 fewer miles per year) than gasoline-powered cars, and electric SUVs were driven 21.5% less than gas-powered SUVs.[15]

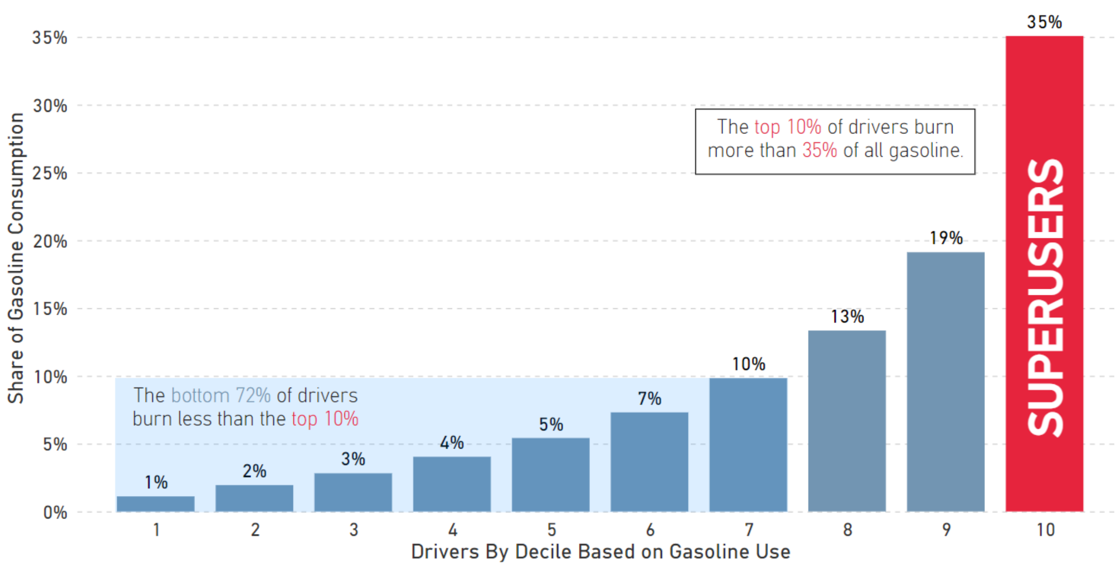
The Problem with Conventional Gasoline Data

Until now, detailed gasoline consumption data showing which drivers are using the most gasoline, where, in what types of vehicles, and for what purposes has not been available to guide EV policies. Instead, broad state and national aggregate gasoline supply data, sourced from weekly oil industry reports on barrels of gasoline supplied by their refineries, have been relied on by governments to track consumption and gas tax revenue. These aggregated numbers obscure huge differences in gasoline consumption among American drivers and lead to the widespread and faulty assumption that every EV displaces an "average" amount of gasoline.

To reduce gasoline use faster, more efficiently, and more equitably, we must refocus EV policies around the biggest gasoline users.

US private light-duty vehicle drivers in the top 10% in terms of gasoline consumption ("Gasoline Superusers") burn 35% of the gasoline used annually by US private light-duty vehicles (40 billion of 115 billion gallons) – more than the bottom 72% of drivers combined.

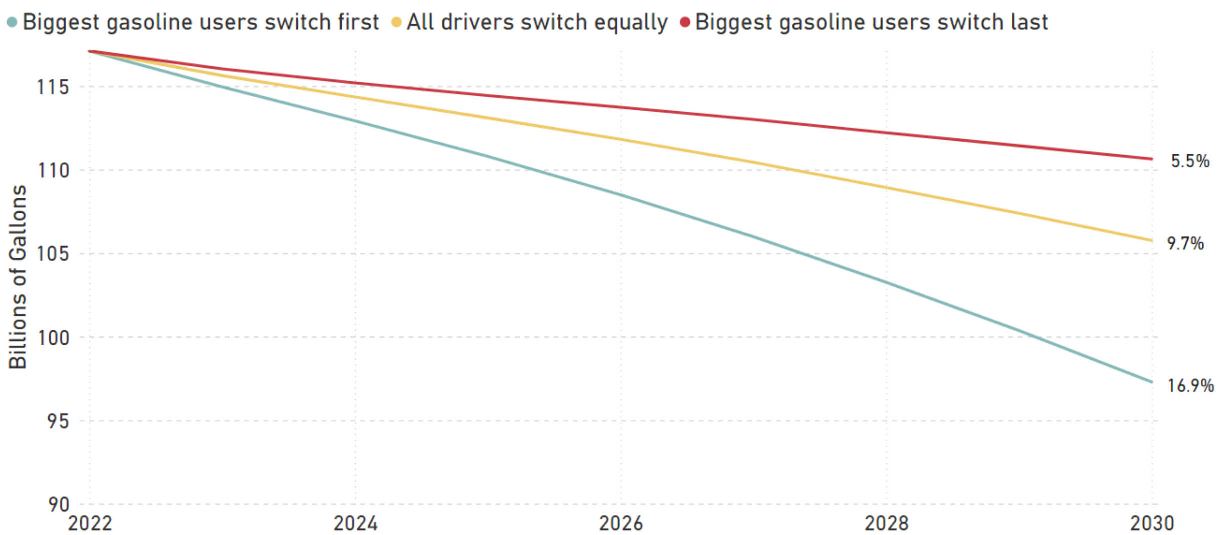
Superusers Burn 35% of Gasoline



US private light-duty vehicle drivers sorted by decile based on their gasoline consumption. The top 10% of gasoline consumers burn 35% of the gasoline – more than the bottom 72% combined. Source: Coltura Census-Level Gasoline Model.

The faster Superusers switch to EVs, the closer the US can get to achieving its 2030 climate goals. According to the US EIA's reference case projection, there will be 14.8 million EVs on US roads by 2030. If the biggest gasoline users switch to EVs first, these EVs will result in a 16.9% decrease in gasoline use by 2030. If the biggest gasoline users switch last, there will only be a 5.5% decrease in gasoline use by 2030.

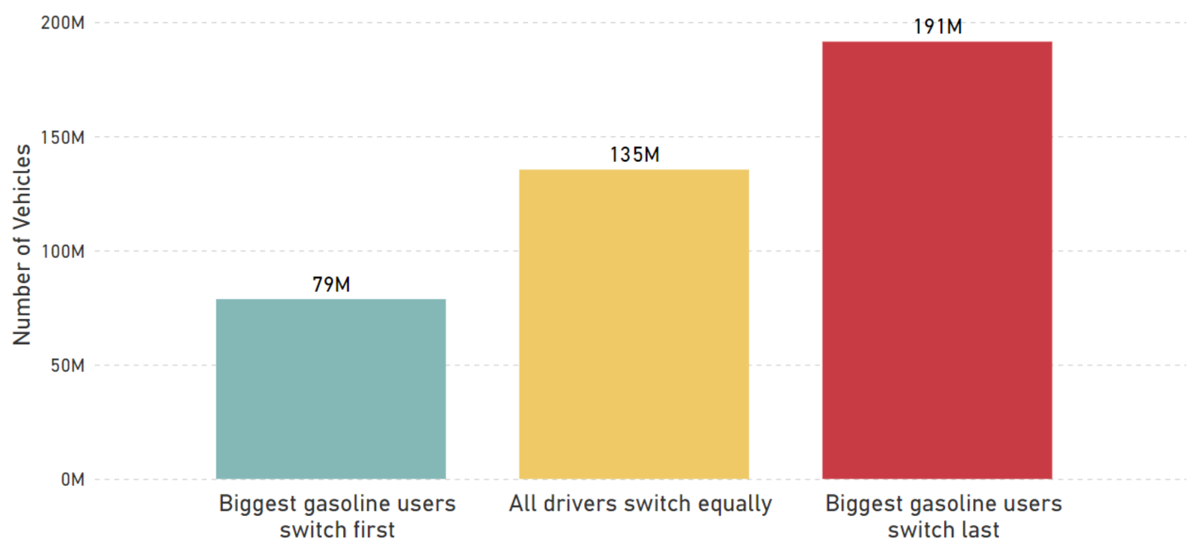
Decrease in Gasoline Consumption Depends on Which Drivers Switch to EVs First



Share of gasoline avoided by 2030 if the biggest gasoline users switch to EVs first, last, or equally with all other drivers, assuming 14.8 million EVs. Source: EIA Reference Case LDV Stock, Coltura analysis.

A Superuser switching to an EV displaces on average 5.3 times as much gasoline as a non-Superuser switching, with the result that many fewer total EVs are required to achieve climate targets. Cutting US light-duty vehicle emissions in half would require 79 million drivers to switch to EVs if the biggest gasoline users switched first, versus 191 million drivers if the biggest gasoline users switched last.

Fewer EVs to Reach 50% Emissions Cut if Biggest Gasoline Users Switch First



Comparison of number of light-duty vehicles switching to EVs required to achieve a 50% cut in US light-duty vehicle emissions by 2030. Source: Coltura analysis.

> *Using carefully designed incentives to switch [Superusers] to EVs sooner than the rest of the driving population could make a big difference in 2030 climate pollution levels.*[16]
>
> - RMI, "Closing the Transportation Climate Pollution Gap"

Focusing EV policy on helping low/middle-income Superusers switch to EVs would also advance social equity. About 9 million of the 21 million Superusers (42.9%) earn below the US median household income of $74,580.[17] These Superusers are disproportionately people of color and the majority drive vehicles that are at least 11 years old. They are particularly vulnerable to surges in gasoline prices and unexpected car repairs. Millions of Superusers are suffering severe financial burdens from using large amounts of gasoline. About 5.4 million Superusers (25.8%) spend more than 10% of household income on gasoline.[18] The experiences of the Superusers profiled in this report are a testament to the burden that gasoline expenditures are placing on millions of American families.[19]

The granular gasoline consumption data described in this report provides a deeper view into Superusers across the US – who and where they are, why they are using so much gasoline, and the financial burdens they bear. It allows the identification of those Superusers most easily able to transition to EVs and those for whom the switch is most financially beneficial. The data enables electric utilities to plan for the increased load that Superusers switching to EVs places on the grid. It supports governments in designing EV policies, programs, education, and outreach to more efficiently and effectively displace gasoline, and in setting and measuring progress toward gasoline reduction goals.

We must cut gasoline consumption faster, more affordably, and more equitably. A deeper understanding of gasoline use will help us achieve those goals.

III. Data Sources and Methodology

A. Data sources

The consumer-level gasoline consumption data for this report is derived from three primary datasets:

- The Replica dataset uses anonymized mobile phone data and other GPS data to identify billions of vehicle trips taken by 210 million drivers and assigns those trips to a statistically representative "synthetic" person in a census block group.
- The L2 Data dataset provides comprehensive demographic and vehicle data concerning 110 million American households.
- A national car and truck data service (NCTDS)[20] dataset provides odometer readings on individual vehicles.

B. Method for calculating consumer gasoline consumption

We combined the Replica trips data with the household and vehicle data from L2 Data and used machine learning to predict the miles per gallon for each trip reported by Replica. We then calculated the gasoline consumption of each trip and assigned it to the synthetic person that Replica associated with the trip. The combination of these data sources allows for the prediction of gasoline usage of consumers from the census block group[21] level to the national level. Because many drivers drive multiple vehicles,[22] this approach captures all driving done by a driver across the different vehicles they drive.[23]

C. Method for creating representative sample of US drivers

We also created a representative sample of 65,830 vehicles and their owners from the L2 dataset and obtained odometer readings on those vehicles from NCTDS. Then we calculated the gasoline consumption of the drivers in the sample by dividing the annualized miles that their vehicle traveled by their vehicle's MPG rating. This approach assumes that each driver drives only one car. In the event that a person in the representative sample owns multiple cars, we assume that the person only drives the car with the most mileage on it. The demographic characteristics of drivers described in this report are based on the representative sample.

Full Methodological Description:

An in-depth description of Coltura's gasoline data methodology is available at data.coltura.org/methodology.

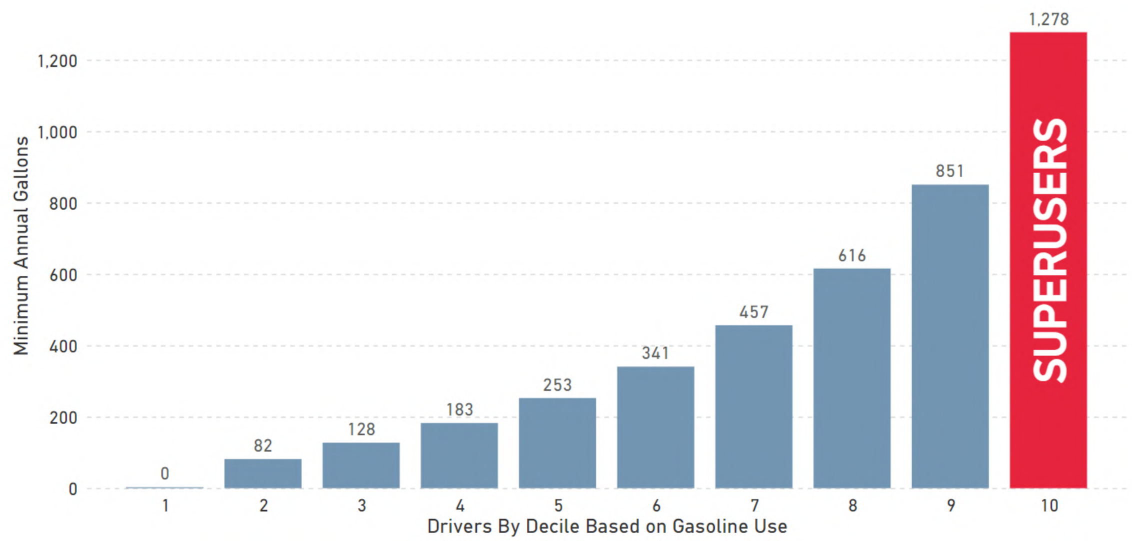
IV. Understanding Superusers

Switching Superusers to EVs rapidly, efficiently, and equitably requires a deeper understanding of the top gasoline consumers, beginning with who and where they are, the factors that drive their gasoline consumption, and their unique financial burdens.

A. Who are Superusers?

1. Gasoline consumption: Superusers are the US private light-duty vehicle drivers in the top 10% for gasoline consumption. They use at least 1,278 gallons of gasoline a year.

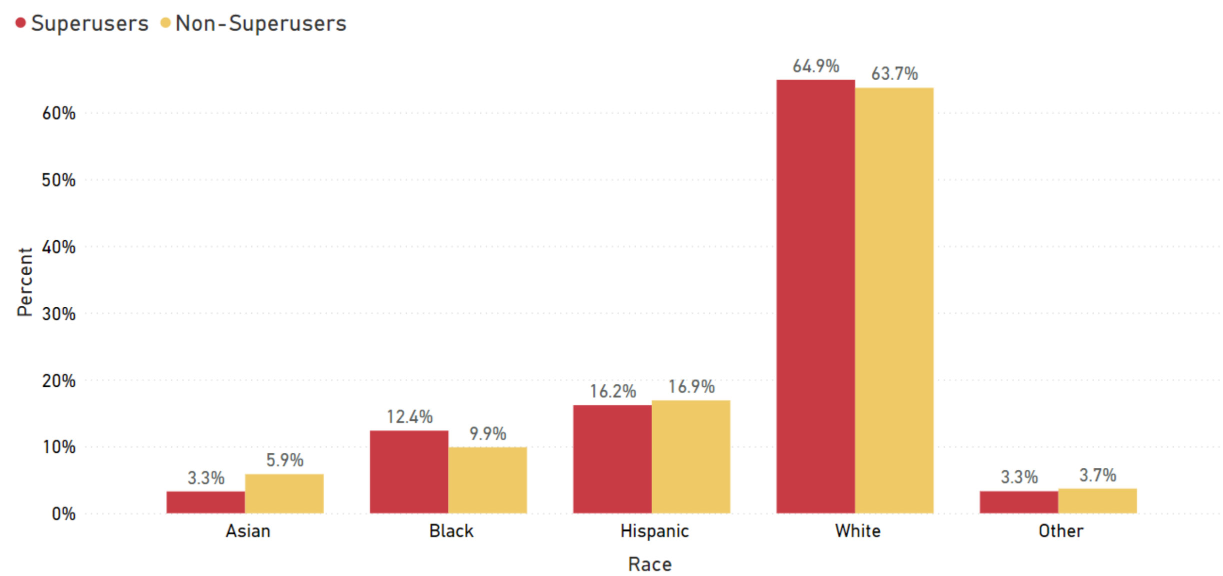
Superusers Burn At Least 1,278 Gallons Annually



Minimum annual gallons of gasoline burned by light-duty vehicle drivers, with gasoline consumption broken down into deciles. The top 10% of gasoline users (Superusers) burn at least 1,278 gallons annually. Source: Coltura Census-Level Gasoline Model.

2. Race: Black drivers represent 12.4% of Superusers and 9.9% of non-Superusers. Asian drivers represent 3.3% of Superusers and 5.9% of non-Superusers. The percentage of White, Hispanic, and other race Superusers is proportional to their overall share of the population.

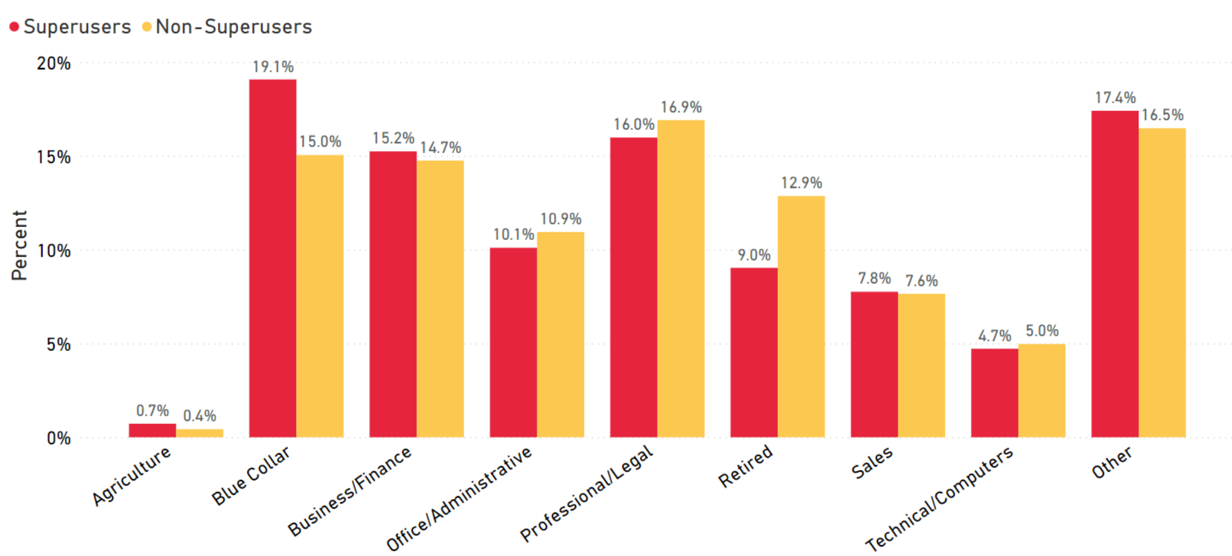
Share of Superusers and Non-Superusers by Race



Distribution of Superusers and non-Superusers by race. Source: Coltura Representative Sample.

3. Occupation: Superusers are more likely than non-Superusers to be blue-collar workers and less likely to be retired.

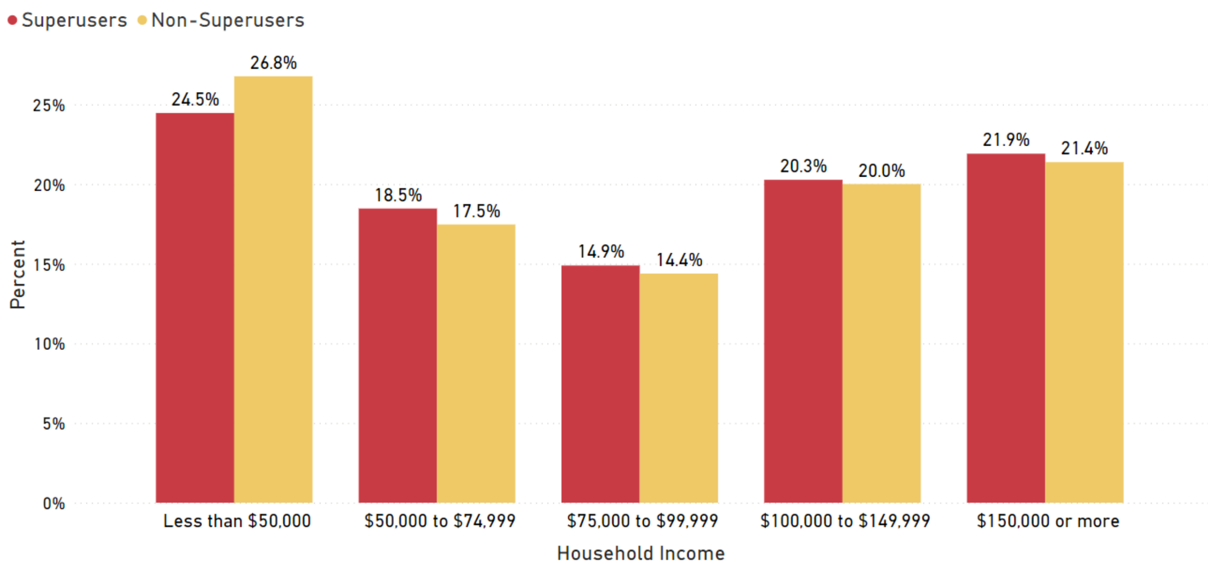
Share of Superusers and Non-Superusers by Occupation



Distribution of Superusers and non-Superusers by occupational category. Source: Coltura Representative Sample.

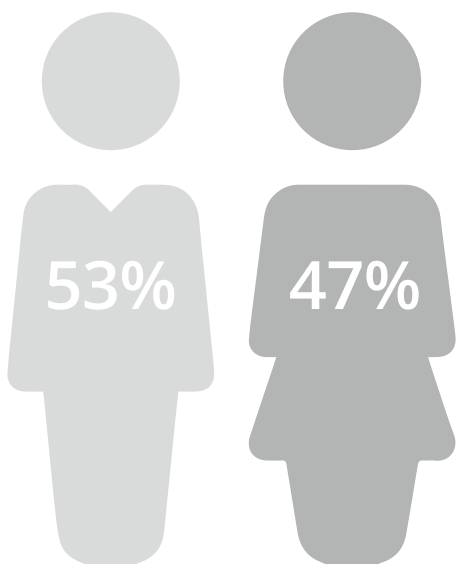
4. Income: One-quarter of Superusers live in households with income below $50,000 per year. Roughly 42.9% of Superusers earn less than the US median household income of $74,580 per year.

Share of Superusers and Non-Superusers by Household Income



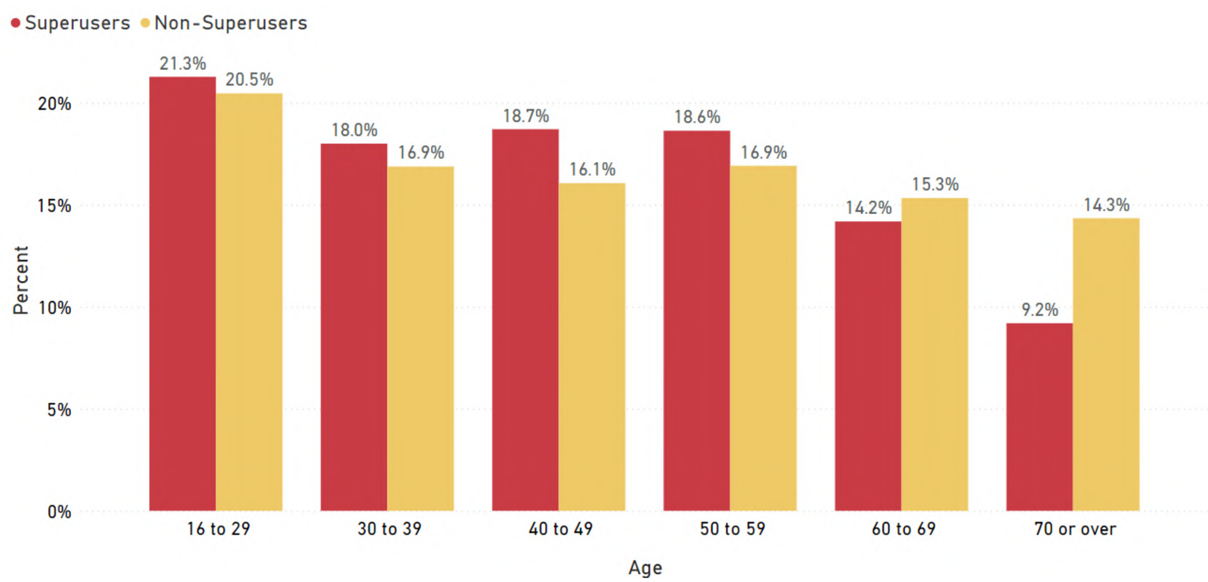
Distribution of Superusers and non-Superusers by household income. Source: Coltura Representative Sample.

5. Gender: 53% of Superusers are men, and 47% are women.



6. Age: Superusers are most likely to be in the 16-29 age group, and least likely to be in the 70+ age group. 55.3% of Superusers are 30 to 59 years old.

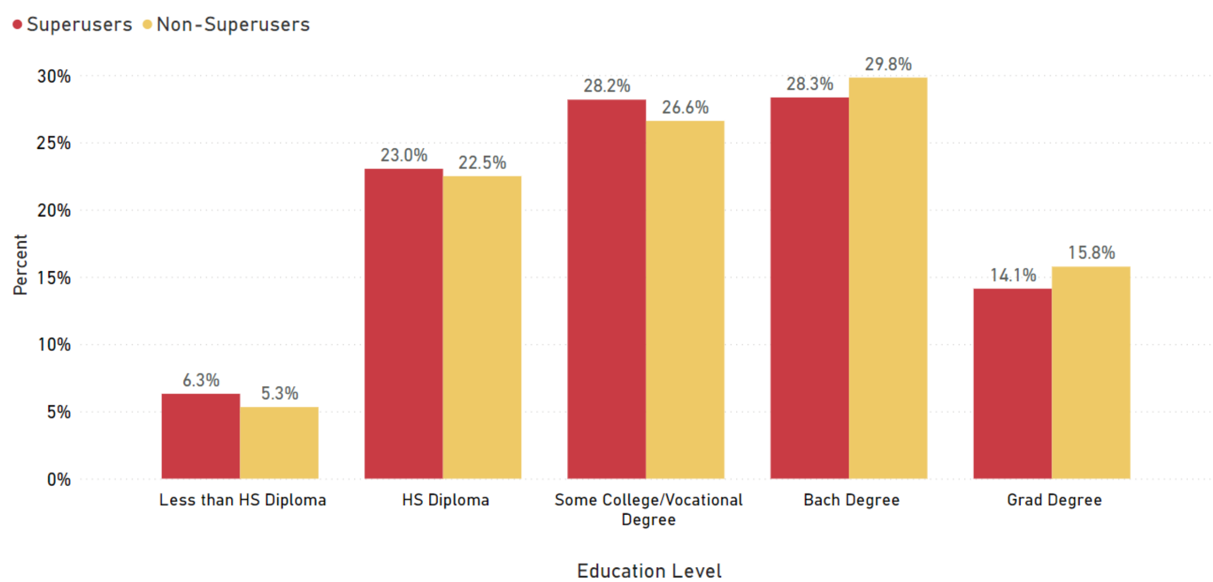
Share of Superusers and Non-Superusers by Age



Distribution of Superusers and non-Superusers by age. Source: Coltura Representative Sample.

7. Education: Superusers are less likely to have a college degree than non-Superusers.

Share of Superusers and Non-Superusers by Education Level



Distribution of Superusers and non-Superusers by education level. Source: Coltura Representative Sample.

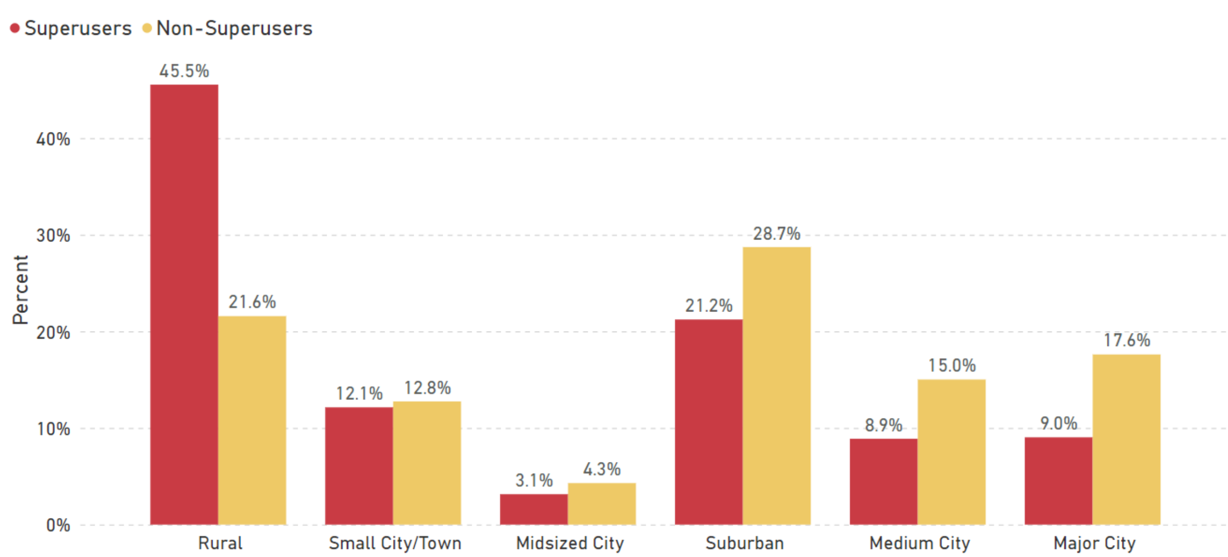
8. Dwelling type: 86.1% of Superusers live in single-family homes and 13.9% in multi-family, as compared to 83.6% and 16.4% of non-Superusers, respectively.

In sum, Superusers are a heterogeneous population, with demographics broadly similar to the US population as a whole.

B. Where are Superusers?

The population density of where a person lives is a principal factor determining their likelihood to be a Superuser. People living in rural areas are roughly twice as likely to be Superusers as compared to people living in cities and suburbs. The most densely populated areas, which tend to have better access to transit, have the lowest percentage of Superusers.

Share of Superusers and Non-Superusers by Population Density

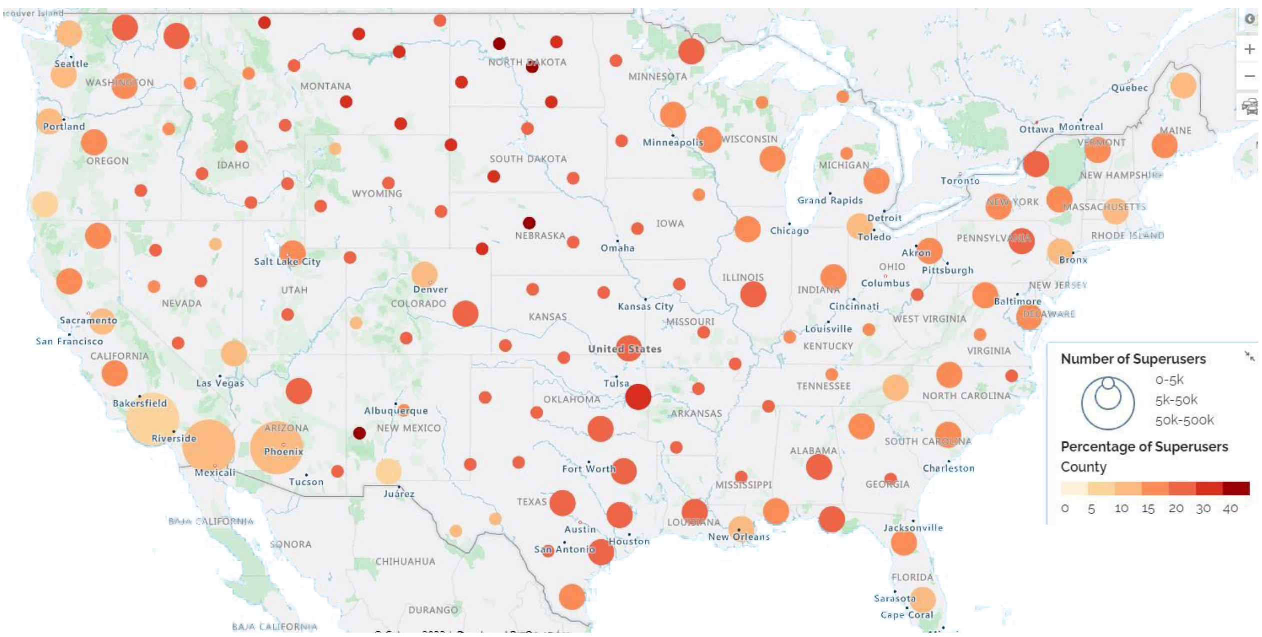


Distribution of Superusers and non-Superusers by the population density of their census tract. Source: Coltura Census-Level Gasoline Model, Rural Democracy Initiative.[24]

57.7% of Superusers (12.1 million) live in rural and small-town America, where 19.1% of drivers are Superusers. Nine percent (1.9 million) live in major cities, where 5.4% of drivers are Superusers.

The bubble map below shows where the largest numbers of Superusers are located and their relative concentrations. Urban centers have a much higher absolute number of Superusers, even though their concentrations are lower.

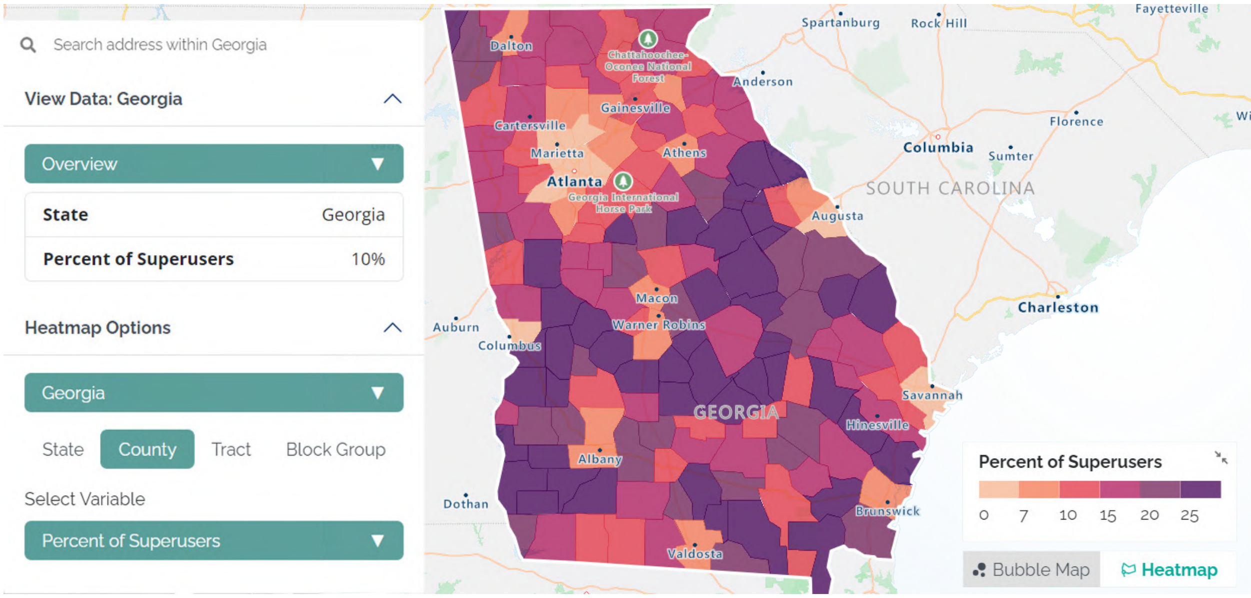
Superuser Populations and Concentrations in US



Superuser numbers and concentrations in counties (in the case of large counties) or aggregations of counties (in the case of smaller counties). Source: Coltura Census-Level Gasoline Model.

Superuser concentrations and numbers can be determined at state, county, census tract, and census block group level. In the following county-level gasoline consumption map of the state of Georgia, the darker the color, the higher the concentration of Superusers in that county. The counties where major cities are located tend to have lower concentrations of Superusers. The more rural counties outside the major metropolitan areas have much higher concentrations of Superusers than urban counties.

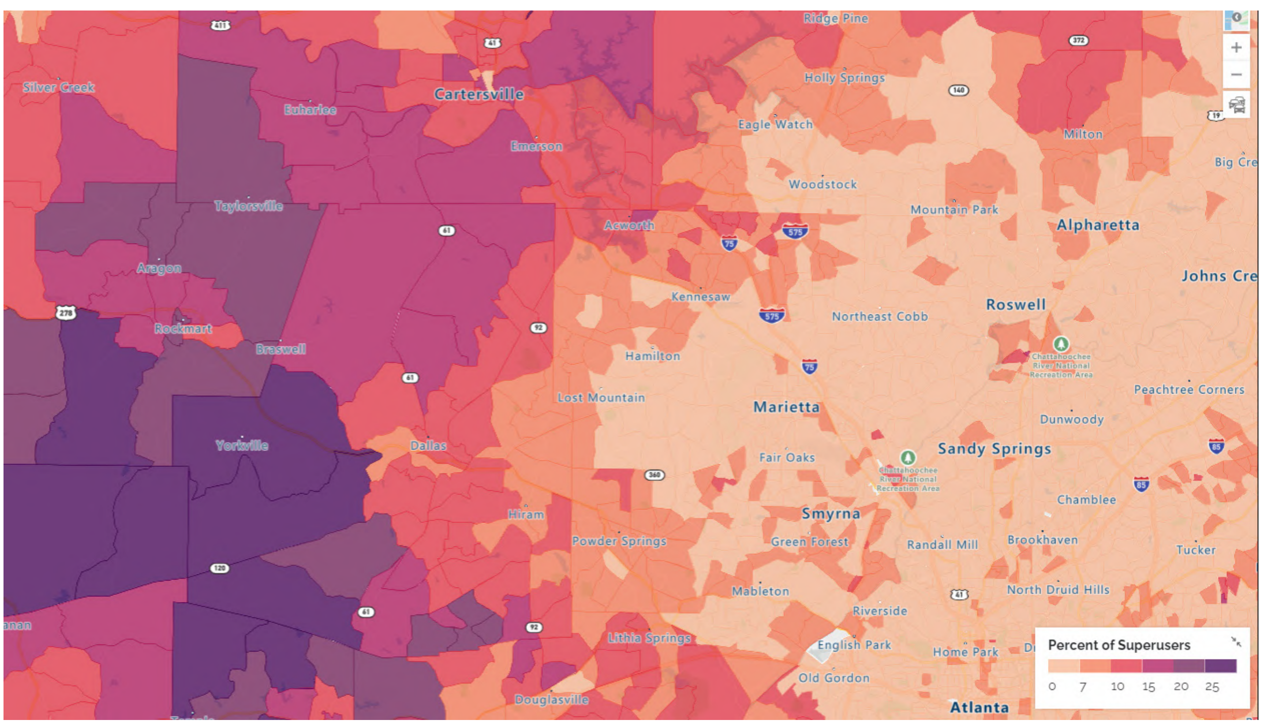
Superusers by County: Georgia



Georgia by county, with the percent of Superusers in each county indicated by color. Source: Coltura Census-Level Gasoline Model.

The census block-group-level map below provides a more granular view.

Superusers by Census Block Group, Northwest of Atlanta

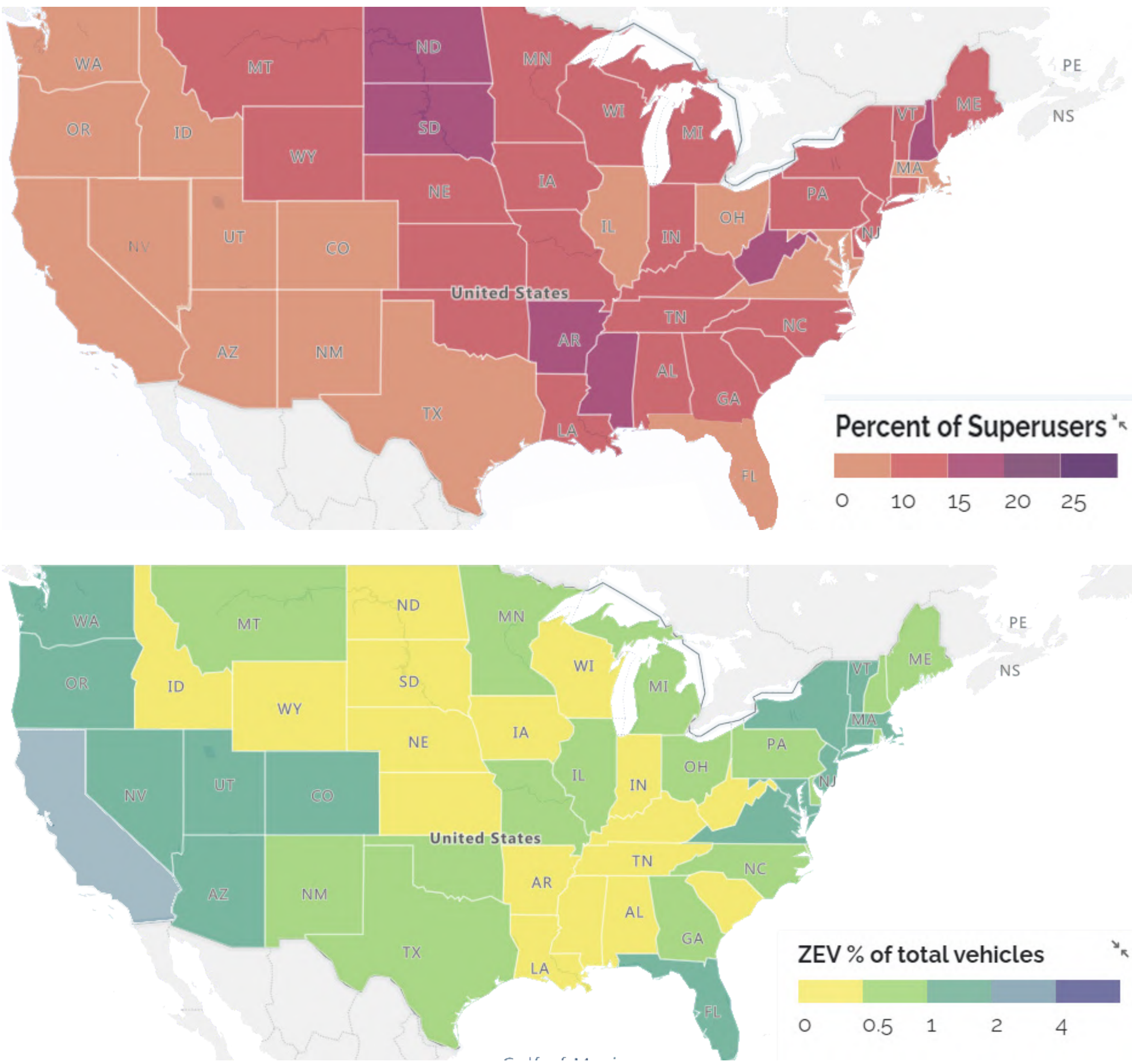


The area northwest of Atlanta, with the percent of Superusers in each census block group indicated by color. Source: Coltura Census-Level Gasoline Model.

In the fast-growing counties 50 miles northwest of Atlanta, Superusers are highly concentrated, with many census block groups, especially those on the rural boundaries of the metropolitan area, having a 25%+ concentration of Superusers. The pattern of Superuser densities increasing as one moves away from the urban center exists in all major US metropolitan areas.[25]

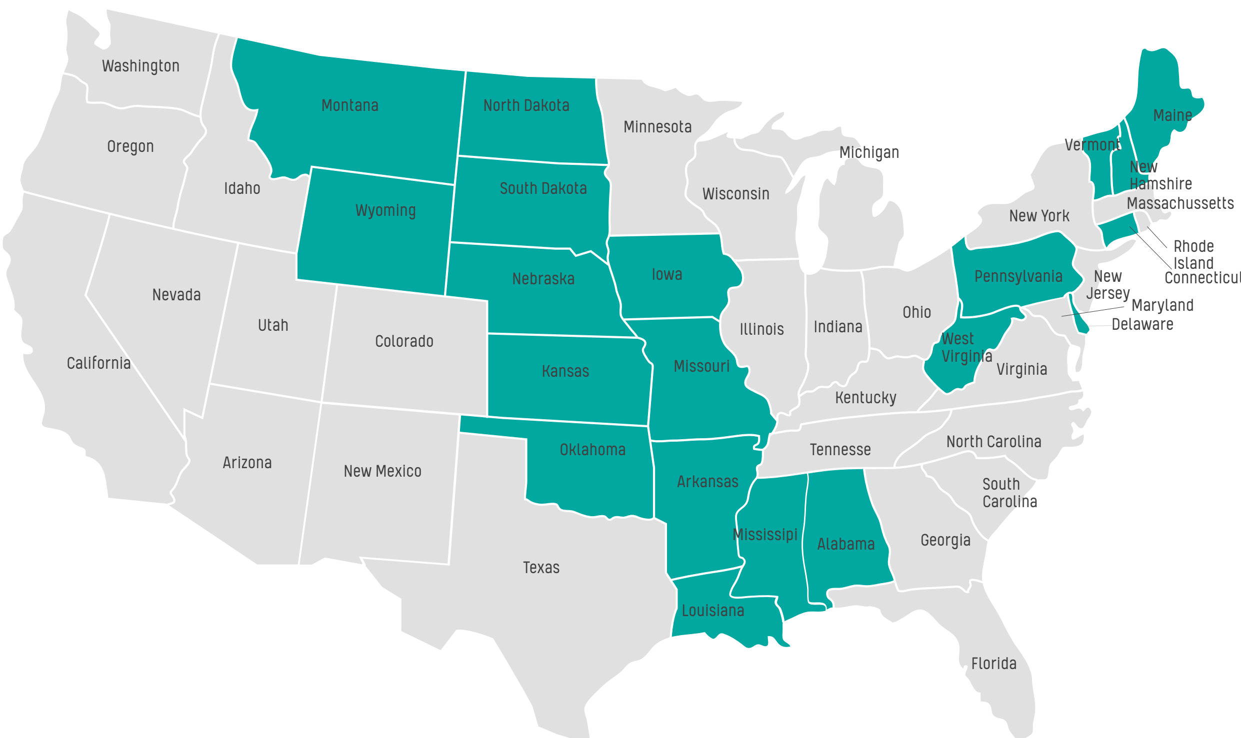
Currently, the states with the highest percentage of Superusers are predominantly rural and have the lowest share of EVs, as can be seen in the maps below.

Superusers by State



Maps of US states by Superuser share (left) and ZEV share (right). Source: Coltura Census-Level Gasoline Model.

Top 20 States in Terms of Superuser Share of Gasoline Consumed



State	Superuser Share of State Drivers	Superuser Share of State Gasoline Use
North Dakota	17%	56%
Wyoming	14%	52%
South Dakota	15%	50%
Montana	13%	47%
Arkansas	15%	44%
West Virginia	15%	44%
Delaware	14%	44%
New Hampshire	16%	43%
Mississippi	15%	43%
Oklahoma	14%	43%

State	Superuser Share of State Drivers	Superuser Share of State Gasoline Use
Nebraska	12%	42%
Vermont	14%	41%
Maine	14%	41%
Iowa	13%	41%
Pennsylvania	13%	41%
Alabama	13%	40%
Missouri	13%	40%
Kansas	12%	40%
Connecticut	13%	39%
Louisiana	12%	39%

C. Why do Superusers use so much gasoline?

Two main factors determine a person's gasoline consumption: how many miles they drive – often called vehicle miles traveled (VMT) – and the fuel efficiency of their vehicle (the miles per gallon, or MPG).

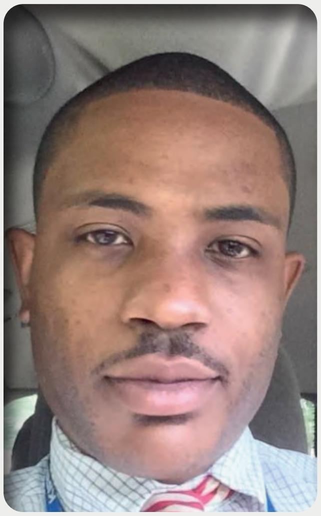
1. Vehicle Miles Traveled: Superusers tend to be people who drive many miles, often by necessity. Someone who drives a vehicle 40,000 miles a year uses twice as much gasoline as someone driving the same vehicle 20,000 miles a year.

For people like Pedro Jimenez, who drives 100 to 150 miles to reach handyman job sites across North Georgia, the distances between jobs are long. For others, it's the combination of trips that really adds up. Danielle Fury drives dozens of times a week to housecleaning, music and art gigs, and to take her son to band practice an hour away. Many Superusers live where housing is more affordable, and further from their destinations.

Kadeem Fils lives in St. Cloud, FL, about 30 miles outside Orlando. He drives about 100 miles a day.

"Saint Cloud [is] a good amount cheaper [than Orlando]. But you do have that commute to get to everything."

a. Higher annual mileage: Superusers drive significantly more miles than non-Superusers – 40,242 miles/year on average, as opposed to non-Superusers at 8,598 miles.

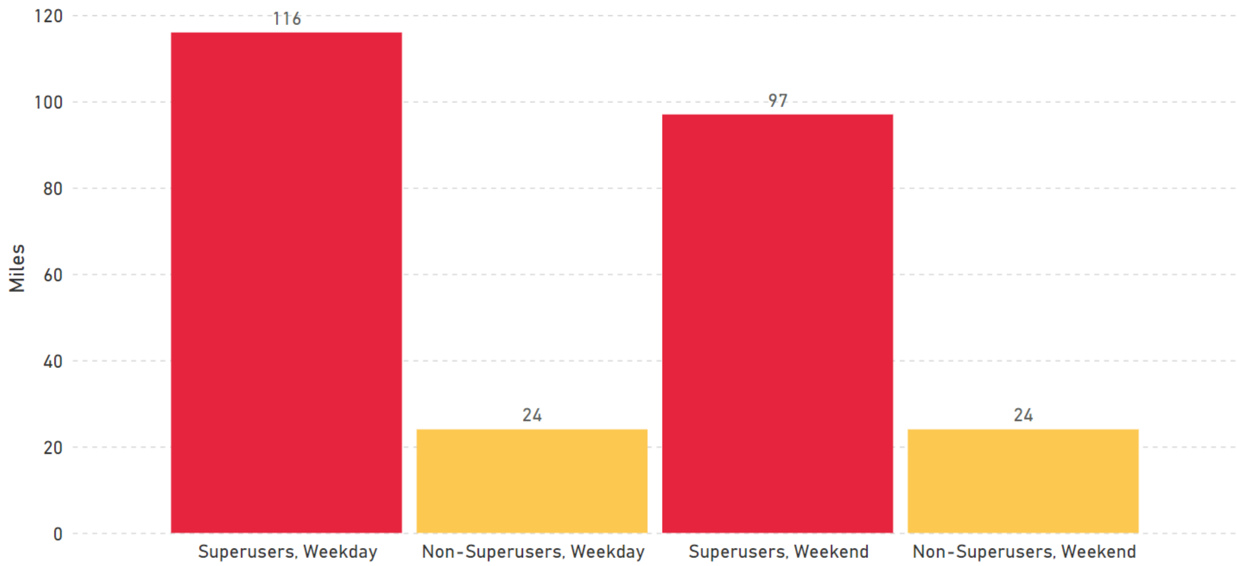


Dallas Schubert of Stone Mountain, GA is a freelance restaurant worker and runs a housecleaning business. He drives his 2017 Hyundai Sonata 150 to 200 miles a day through multiple Atlanta suburbs (Cumming, Roswell, and Suwanni) to drop his son off at school, take his son's mother and her daughter to work, and go to his own work.

"When I first moved out here, I think I had 140,000 miles on my car, and now I have 152,000 miles, and I've only been out here no more than three months."

b. Higher daily mileage: Superuser daily driving is longer too. On weekdays, Superusers drive on average 116 miles a day, compared to non-Superusers at 24 miles. On weekends, Superusers drive on average 97 miles a day, compared to non-Superusers at 24 miles.[26]

Superusers Have Higher Daily Mileage



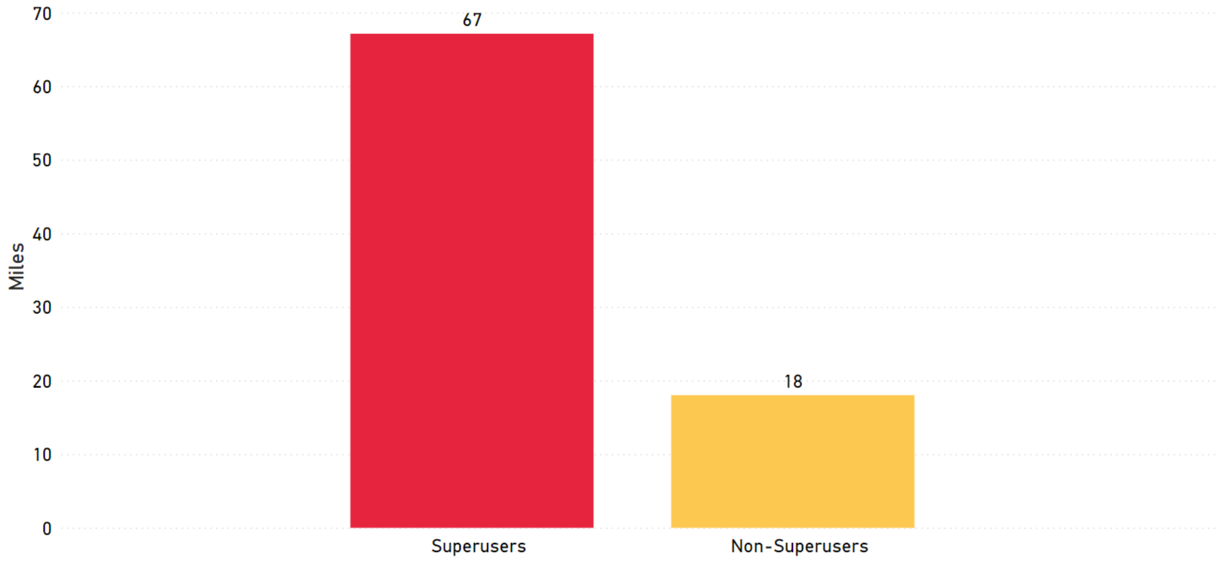
Average daily mileage on weekdays and weekends for Superusers and non-Superusers. Source: Coltura Census-Level Gasoline Model.

c. Longer commutes: Superusers have substantially longer commutes between home and work than non-Superusers, and a greater share of their mileage is dedicated toward commuting.

Pedro Jimenez, a handyman in Dalton, GA, often drives his Ford F-150 truck 100 to 150 miles between jobs.

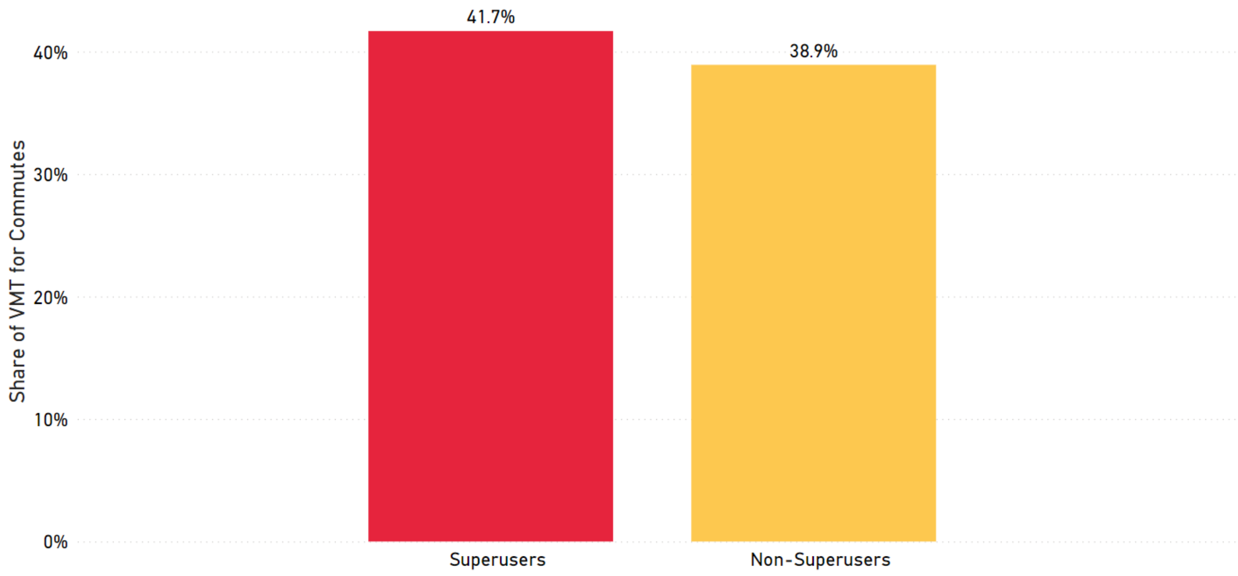
"Pretty much about 60% to 70% of my day is spent either driving to or from a job site."

Superusers Drive Longer Distances Commuting



Average miles driven on a weekday commute for employed Superusers and non-Superusers. Source: Coltura Census-Level Gasoline Model.

Superusers Spend a Higher Share of Miles on Commuting



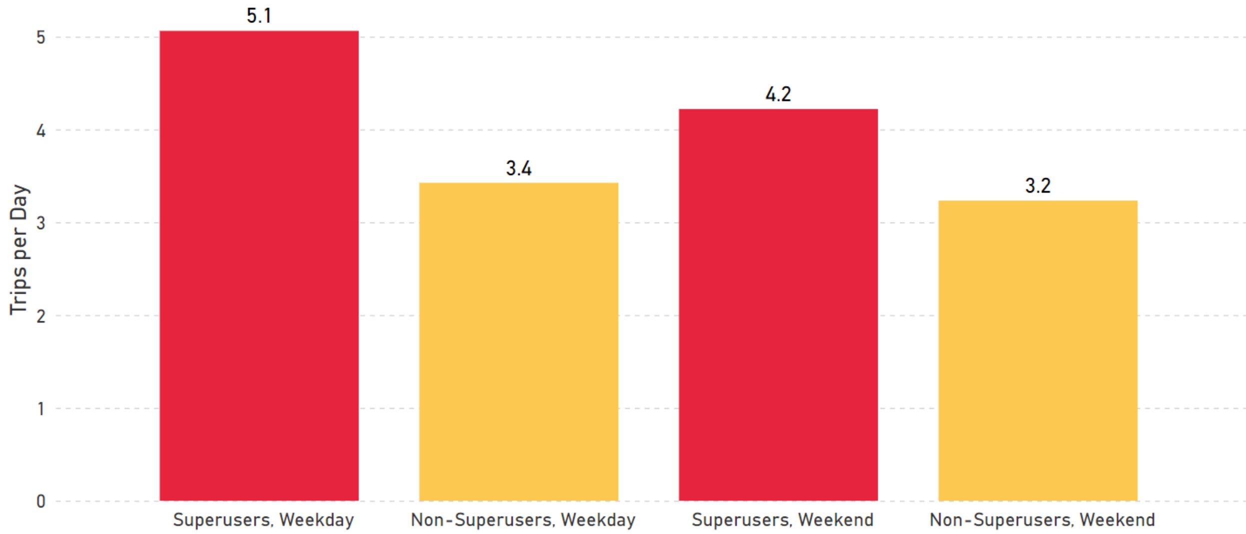
Share of VMT spent on commuting amongst employed Superusers and non-Superusers. Source: Coltura Census-Level Gasoline Model.

d. **More daily trips:** Additionally, Superusers make more trips per day than non-Superusers – on average 5.1 trips on weekdays and 4.2 trips on weekends, versus non-Superusers at 3.4 trips per weekday and 3.2 trips per weekend.

Danielle Fury of Bloomsberg, PA is an art teacher and musician who also cleans houses. Her husband Rick is a sound technician getting his bachelor's degree and also works at McDonald's. They have one vehicle between them: a 2010 Honda Odyssey. They have a dizzying driving schedule, often making six trips a day.

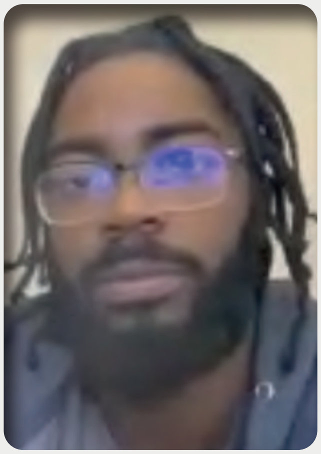
"Thursday I clean [a home in] Weatherly, which is an hour drive… And then after that, I go in the opposite direction to Northumberland to clean for Diane. When I'm done … I babysit my friend's grandson while she works. So I'll be going to Elysburg, picking up her grandson then driving to pick up Rick at five. Then he will drop me off at the house to watch the boy. And then he will take Peyton, our son, to Schuylkill for his band practice, which is an hour to an hour and a half away."

Superusers Make More Daily Trips



Average trips per day for Superusers and non-Superusers on weekdays and weekends. Source: Coltura Census-Level Gasoline Model.

Additionally, as discussed above, Superusers disproportionately live in rural areas or small towns, where distances to work, school, shopping, and services are far apart and there are few if any transit options.

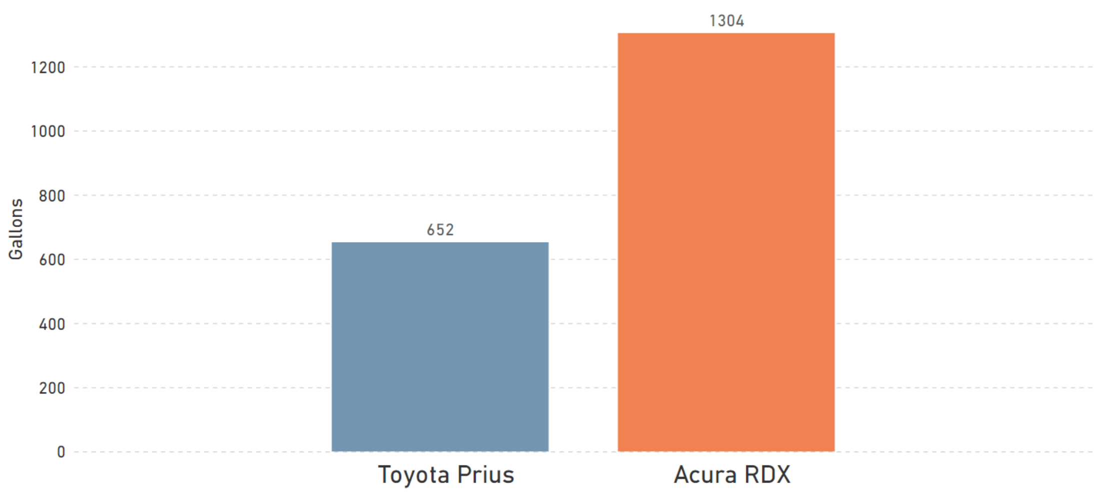


Kadeem Fils works at SeaWorld, about 23 miles from his home in St. Cloud, FL. The nearest bus stop from his home is a fifteen-minute drive.

"The distance for me driving from here to SeaWorld is 45 minutes. If I were to do the same trip using public transportation from that bus stop, it's like an hour and twenty minutes – even more sometimes."

2. Miles per gallon: The miles per gallon of the driver's vehicle also helps explain why some drivers are Superusers. For instance, consider two drivers who each drive 30,000 miles a year, but one has a vehicle that gets 23 MPG and the other's vehicle gets 46 MPG. The driver of the 23 MPG vehicle uses 1,304 gallons a year and qualifies as a Superuser. However, the person in the 46 MPG vehicle only uses 652 gallons a year and thus would not be a Superuser.

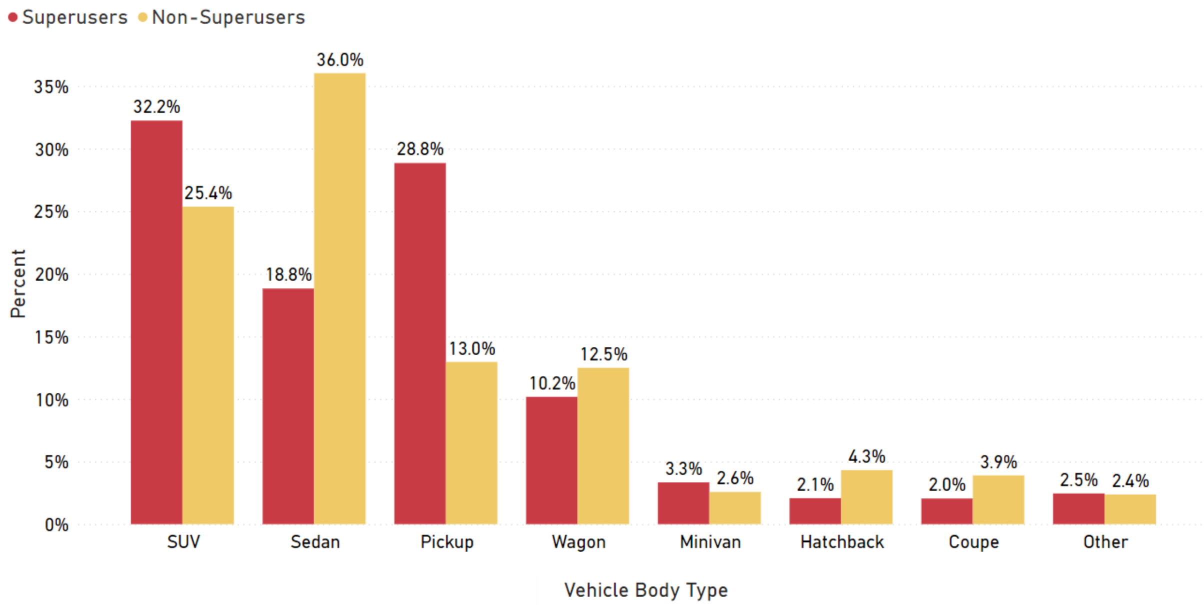
MPG's Strong Influence on Gasoline Consumption



Comparison of the annual gasoline consumption of two vehicles, each driving 30,000 miles a year: a Toyota Prius that gets 46 MPG and an Acura RDX that gets 23 MPG. Source: Coltura analysis.

Superusers tend to drive larger, fuel-inefficient vehicles. Thirty-two percent of Superusers drive SUVs and 29% drive pickup trucks, versus 25% and 13% for non-Superusers, respectively. Just 19% of Superusers drive smaller vehicles (sedans), compared to 36% of non-Superusers.

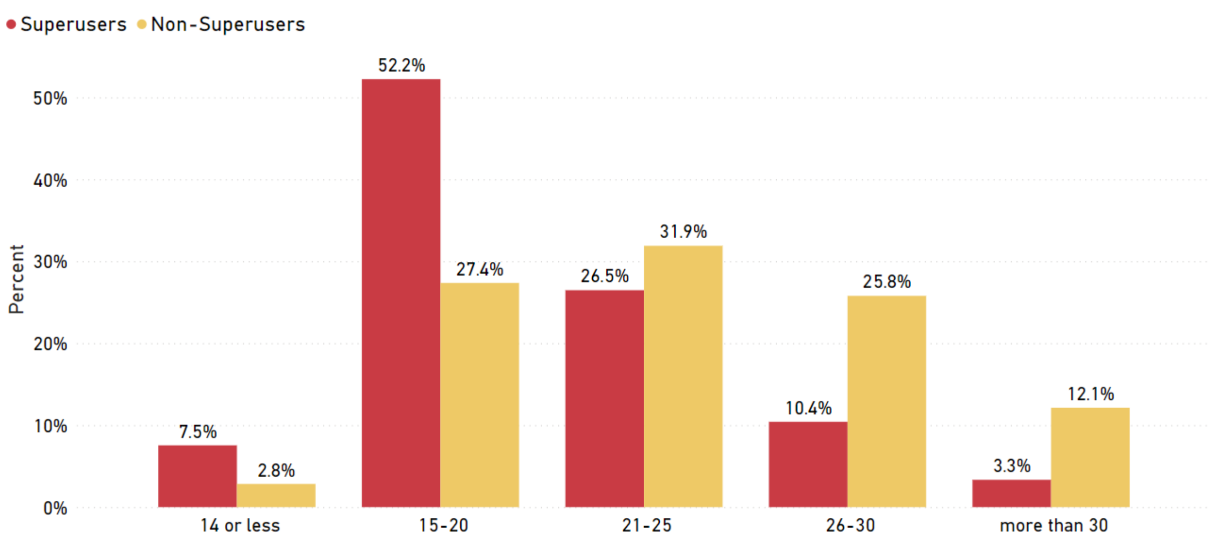
Share of Superuser and Non-Superuser Vehicles by Vehicle Body Type



Distribution of Superusers and non-Superusers by vehicle body type. Source: Coltura Representative Sample.

The MPG of Superuser vehicles tends to be lower than that of non-Superuser vehicles.

Share of Superuser and Non-Superuser Vehicles by MPG



Distribution of Superusers and non-Superusers by MPG category. Source: Coltura Representative Sample.

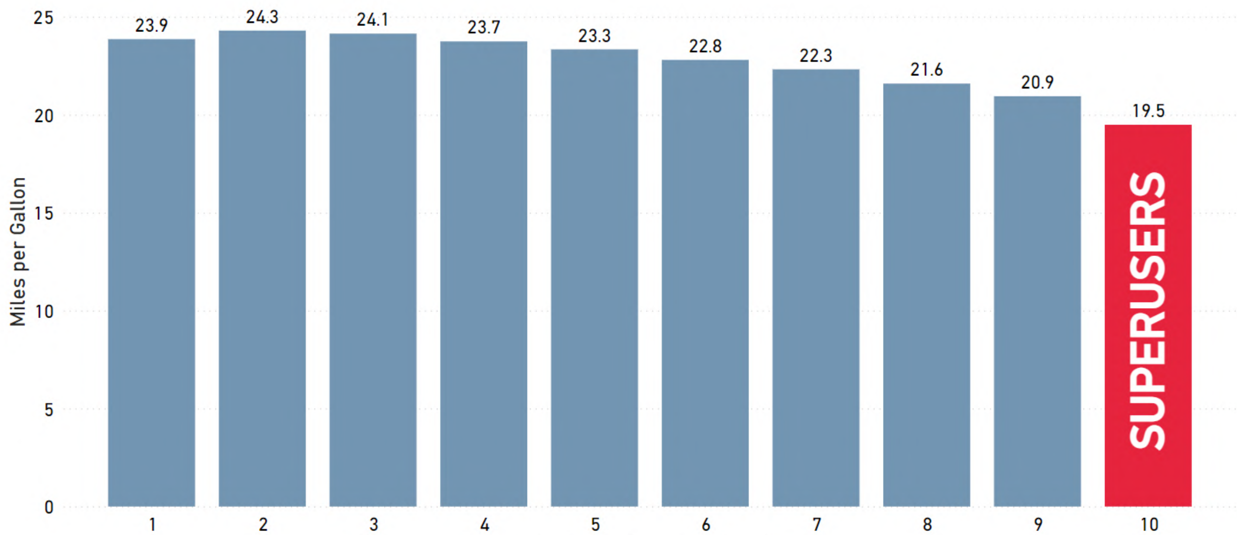
The most popular Superuser vehicles tend to be low-MPG trucks.

Top 20 Most Popular Superuser Vehicle Models			
Make/Model	Percent of All Superusers Driving the Vehicle	Percent of People Driving the Vehicle Who Are Superusers	MPG[27]
Chevrolet Silverado	7.4%	22.6%	20
Ford F150	6.4%	20.9%	20
GMC Sierra	2.6%	20.8%	19
Ram 1500	2.6%	28.0%	19
Ford Explorer	2.5%	15.8%	18
Jeep Grand Cherokee	2.5%	15.5%	19
GMC Yukon	2.5%	29.2%	18
Dodge Ram	2.4%	22.0%	19
Chevrolet Tahoe	2.3%	22.4%	18
Chevrolet Suburban	2.2%	34.1%	18
Toyota Tundra	2.1%	25.6%	16
Honda Accord	1.7%	5.3%	27
Toyota Tacoma	1.5%	12.4%	19
Toyota 4Runner	1.5%	17.3%	18
Ford Expedition	1.5%	26.4%	18
Chevrolet Traverse	1.4%	17.5%	19
Dodge Durango	1.3%	22.4%	19
Honda Pilot	1.2%	10.3%	20
Toyota Camry	1.1%	4.9%	28
Ford Escape	1.1%	6.3%	25

Top 20 US vehicles ranked by popularity among Superusers. Source: Coltura Representative Sample.

Superuser vehicles get on average 19.5 MPG, versus non-Superuser vehicles at 23 MPG. The more gasoline a US driver uses, typically the lower the MPG of their vehicle.

Biggest Gasoline Users Have the Lowest MPG



Average MPG of vehicles owned by US drivers sorted by gasoline consumption deciles. Source: Coltura Representative Sample.

In sum, Superusers tend to drive long distances in less efficient vehicles. For many, there is no good alternative to driving. The distances they drive are generally too long for a bicycle and the trips too many, lengthy, and varied for transit, if it were available.[28]

D. What are the unique financial burdens of Superusers?

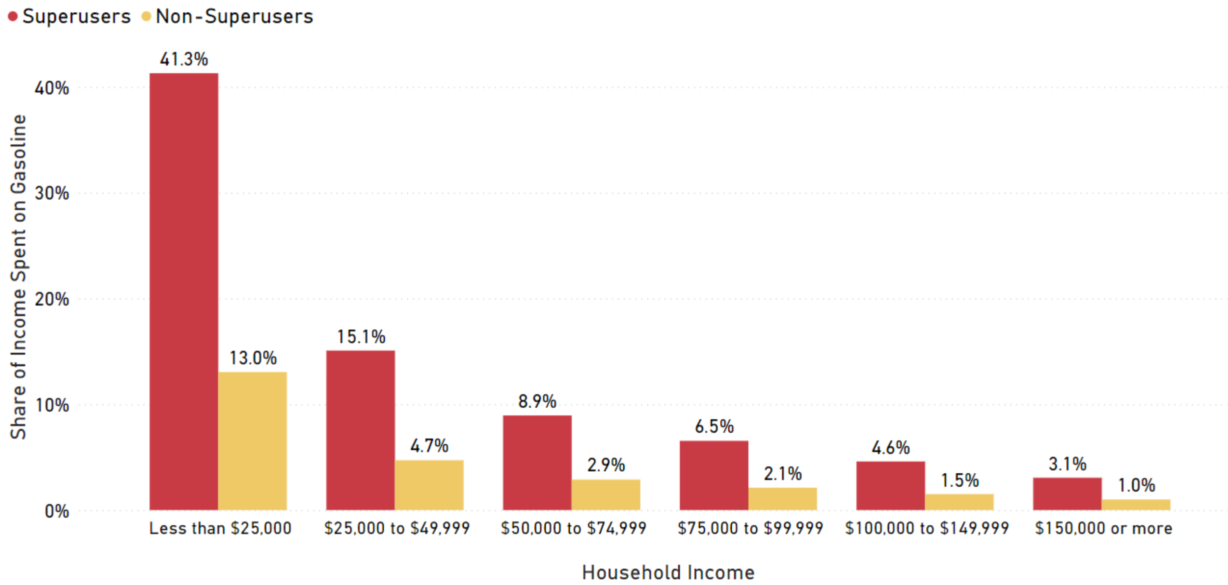
Because they spend so much more than other drivers on gasoline and maintenance, Superusers have distinctive financial burdens.

1. **Gasoline Burden:** Superusers spend on average $530 a month on gasoline, versus non-Superusers at $110 a month. Across all income levels, Superusers spend on average 10.2% of household income on gasoline, versus non-Superusers at 3.5%. The difference is particularly striking at lower income levels. Among about 1.7 million Superusers (8.26%) making less than $25,000 per year, the share of household income spent on gasoline averages 41.3%.

Pedro Jimenez frequently drives 300 miles a day. He earns $30,000 to $40,000 a year as a handyman, and spends around 30% of his income on gasoline.

"Sometimes I have to ask for an upfront deposit for certain jobs, just because I know I'm not going to have enough money to pay for gas."

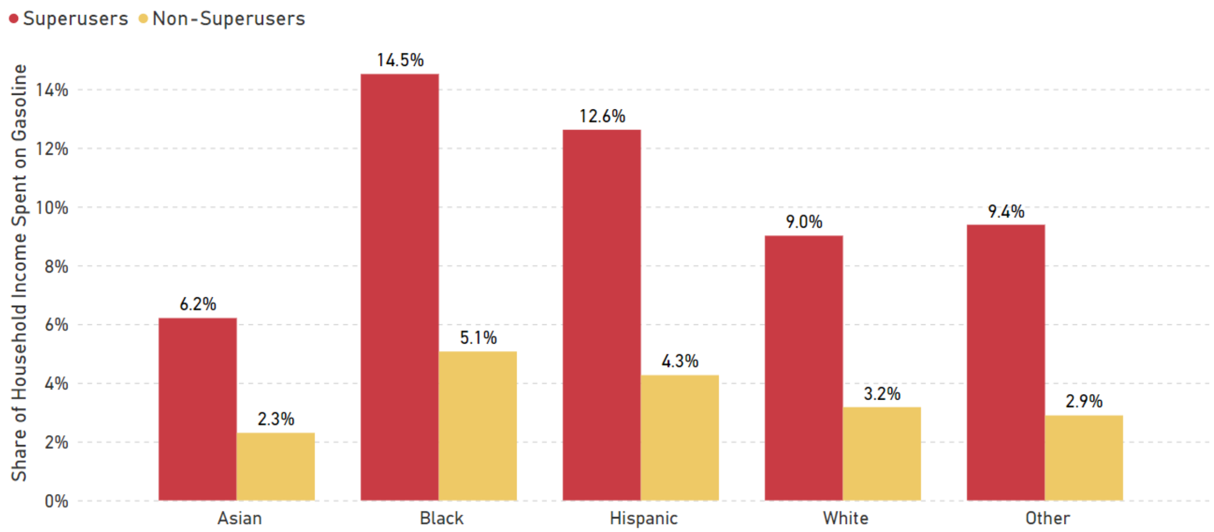
Superusers Spend Disproportionate Share of Income on Gasoline



Average share of household income spent on gasoline for Superusers and non-Superusers by income bracket. Source: Coltura Representative Sample.

The economic burden of being a Superuser falls more heavily on people of color. Black Superusers spend on average 14.5% of income on gasoline, followed by Hispanic Superusers at 12.6%, White Superusers at 9%, and Asian Superusers at 6.2%.

Black and Hispanic Superusers Most Burdened by Gasoline Expenditures



Average share of household income spent on gasoline for Superusers and non-Superusers by race. Source: Coltura Representative Sample.

Danielle Fury sometimes drives as much as 400 miles a day and spends about 35% of her income on gasoline each year.

"When our money is low, there are days that I've had to put $10 in [the tank] so I can use my other $30 to get cleaning supplies so I could go make $200, upload my check, and then fill the tank... Then, by the middle of the next day, I have to fill another tank into it."

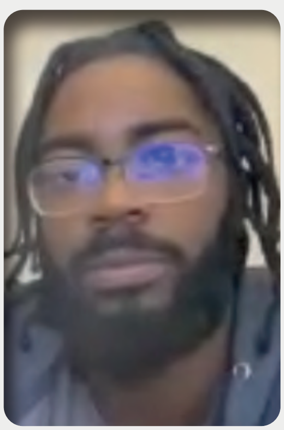
Pedro Jimenez depends on his vehicle to carry lumber, drywall, and his clients' property.

"If I want to be able to live at least a little bit stress-free or be able to do things I want to do, I have to take jobs from everywhere, even if it is 100 or 150 miles away."

2. Maintenance/Repair Burden: Superusers' vehicle maintenance and repair costs are higher than those of non-Superusers because Superusers drive so many more miles. Maintenance costs increase sharply for vehicles that have been driven more than 75,000 miles and/or are more than five years old.[29] The average Superuser vehicle is 11.7 years old and has 156,000 miles on it. The average cost of maintenance and repairs for a vehicle with more than 100,000 miles is estimated at 20 cents a mile.[30] An average Superuser drives about 3,350 miles per month; maintenance and repair costs for a vehicle with over 100,000 miles on it would therefore be roughly $670/month. In contrast, an average non-Superuser drives just 717 miles and would incur maintenance/repair costs of only $143/month for a similar vehicle.

Pedro Jimenez estimates he spent at least $2,000 in the past year on maintenance and repairs for his vehicle. Even so, there are times when sudden failures make him unable to work.

"I was on my way to a job site… and then I go to start the truck and it just clicks, and I'm sitting there like, 'Oh, my God!' I needed to get to Nashville by the next morning to be able to have money for the next week for my little girl's birthday, and it was just like, truck wouldn't start. I had a new alternator, and it didn't do anything. And it's one of those moments where you're just like, I'm just done."



Kadeem Fils drives a 2009 Acura RDX with 204,000 miles on it.

"I had to get a new starter the other day, a new radiator a couple of weeks ago. Within the past two months it's probably been close to $2,000 that I've spent preparing stuff on my vehicle because I had to get a new timing chain and component kit. And then I also had to get my transmission thoroughly flushed."

In sum, the financial burdens of driving a gasoline-powered car are amplified for Superusers, and for many these burdens are a major pain point.

E. Impact of Superusers on the electrical grid

To accelerate Superusers' switch to EVs, utilities will have to prepare for the additional load on the grid. Superusers switching to EVs who charge at home will require 368% more electricity than non-Superusers – on average 14,085 kWh per year, versus the average non-Superuser driver switching to an EV, who will use 3,009 kWh.[31] All Superusers switching to EVs would require about 252,000 GWh per year. Superusers switching to an EV can add a significant load on the local grid, and will often require distribution system upgrades.

Utilities should know the number and distribution of Superusers throughout their service territory and the amount of gasoline they are using to prepare for added loads on the grid and the number and types of chargers needed when those Superusers switch to EVs. Some rural utilities may need policy and financial support to prepare for large numbers of Superuser-driven EVs needing power from their grids.

Increased demand from EVs can create significant challenges for rural utilities meeting load demand and addressing system losses and voltage drops.[32]

V. Leveraging Data to Propel Superuser Transition to EVs

Data can guide policies and programs to accelerate the transition of Superusers to EVs. Data can:

- Identify the biggest gasoline users who could save the most by switching to an EV immediately.
- Pinpoint areas where Superusers' gasoline expenditures most acutely impact family finances.
- Enable EV outreach, education, and marketing specifically targeted to Superusers.
- Identify Superusers who likely have the fewest practical barriers to making the switch.
- Guide utility preparation for the additional load on the grid from Superusers transitioning to EVs.

A. Quantifying savings from switching to an EV

Superusers would save on average $4,318 a year in fuel costs (the difference between gasoline costs and equivalent electricity costs where they live) by switching to an EV. Superusers spend so much on gasoline and maintenance that in many cases they will save on monthly costs by trading in their gas car for an EV – even with a higher monthly EV car payment. The following examples show how a Superuser can save hundreds of dollars a month by trading in their gas car for an EV:

Superuser Monthly Cost Comparison

	2015 Ford F-150	Ford 2023 F-150 Lightning
Monthly Fuel	$781	$285
Monthly Maint. and Repair	$667	$200
Payment on Loan		$775
Total Monthly Cost	**$1,448**	**$1,260**

Assumptions: 40,000 miles/year, Gas $3.70/gallon, Electricity 17/KwH, Interest Rate 6.6396, F-150 Lightning Cost $54,000, F-150 Mileage 200,000, F-150 Trade-In $7,000, Federal credit of $7,500, F-150 Maintenance 20 cents/mi. F-150 Lightning Maintenance = 6 cents/mi.

	2015 Ford Explorer	2023 Tesla Model Y AWD
Monthly Fuel	$650	$146
Monthly Maint. and Repair	$667	$200
Payment on Loan		$793
Total Monthly Cost	**$1,316**	**$1,139**

Assumptions: 40,000 miles/year, Gas $3.70/gallon, Electricity .17/KwH, Interest Rate 6.63%, Model Y Cost $52,909, Explorer Mileage 200,000, Explorer Trade-In Value $5,000, Federal credit of $7,500, Explorer Maintenance = 20 cents/mi. Model Y Maintenance = 6 cents/mi.

	2017 Chevy Trax	2023 Chevy Bolt EUV
Monthly Fuel	$457	$163
Monthly Maint. and Repair	$667	$200
Payment on Loan		$442
Total Monthly Cost	$1,124	$785

Assumptions: 40,000 miles/year, Gas $3.70/gallon, Electricity 17/KwH, Interest Rate 6.63%, Bolt EUV Cost $33,000, Trax Mileage 200,000, Trax Trade-In $4,000, Federal credit of $7,500, Trax Maintenance = 20 cents/mi. Bolt Maintenance = 6 cents/mi.

The cost-savings calculator at https://data.coltura.org/tools/calculator combines information provided by the Superuser about their vehicle, driving habits, and other relevant information with data on electricity, gasoline prices where they live, and other cost factors to calculate their monthly savings or costs to switch to an EV.

Maleek Griffith, a Los Angeles electrician, drives about 130 miles a day. When he replaced his gas car with a 2021 electric Ford Mach-E, his fuel expenditures went from around $300/month to less than $100/month, even though he often uses public charging.

"I love the fact that you know you save money... Whenever you compare what you spend on gas versus what you're spending at just using the electric station, it's a huge benefit."

Gabe Lustman is a loan officer who also owns a recording studio. He lives in Tucker, GA, about 20 miles outside Atlanta and drives 150 miles a day on average. When he traded in his Dodge Challenger for a Tesla Model 3, his fuel bill went from $500/week to $100/week. He says the cost savings were...

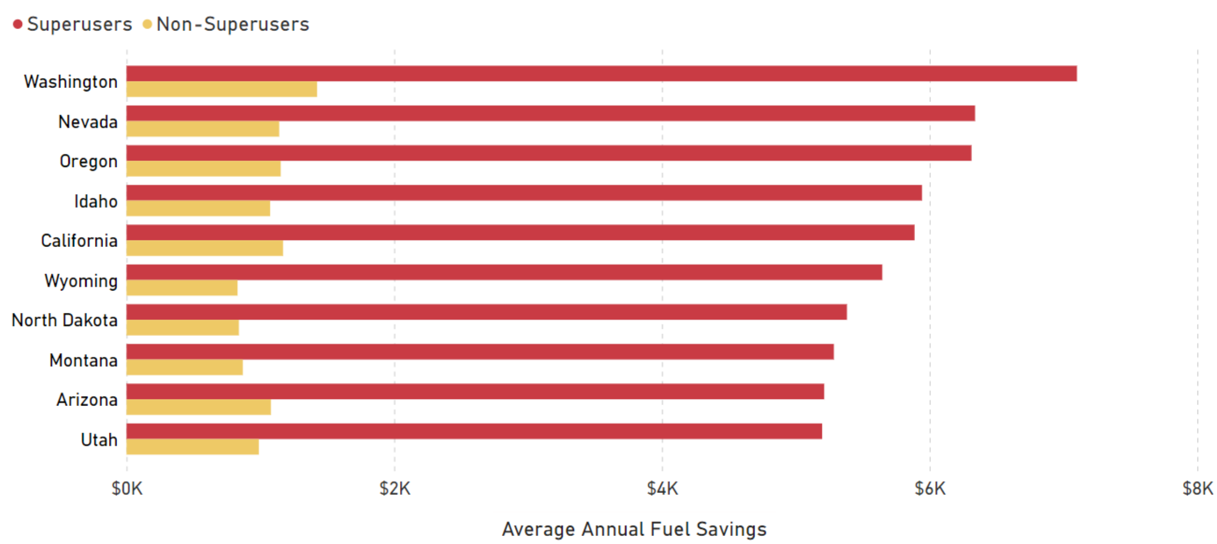
"really one of the main things that led me to get an electric car, because [paying for gasoline] was hell, man!"

B. Identifying areas with the greatest financial benefits from switching to EVs

Switching to an EV has a bigger financial benefit to Superusers in areas with the biggest per-mile cost differential between gasoline prices and electricity prices, and areas where Superusers have the highest gasoline consumption.

1. Biggest gasoline/electricity price difference: The economics of Superusers switching to EVs are most advantageous where the fueling cost differential between gasoline prices and electricity prices is the greatest. At the state level, the differential is biggest in Washington, Nevada, Oregon, Idaho, California, and the other states shown in the graph below.

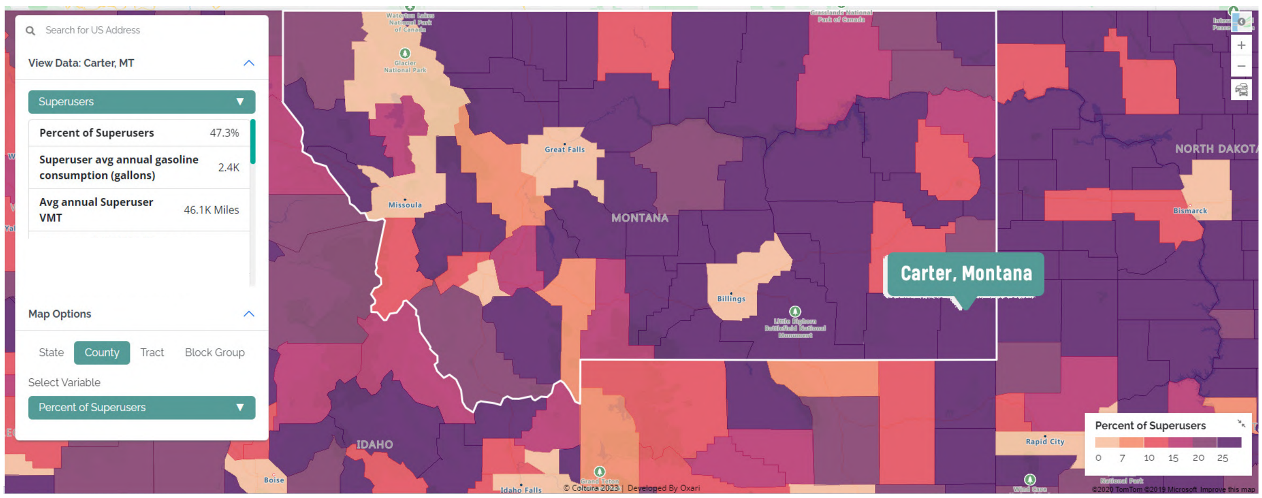
Top 10 States for Superuser EV Switch Fuel Savings



Average Superuser and non-Superuser annual savings for switching to a comparable EV (current annual gasoline cost minus expected electricity cost) for the top 10 Superuser fuel savings states. Source: Coltura Census-Level Gasoline Model.

2. Highest gasoline use: Second, Superusers who are using the most gasoline would benefit the most from the switch to an EV. Superusers use 1,278 gallons or more per year, and on average 1,895 gallons. However, in areas such as Carter County, Montana, Superuser gasoline consumption is much higher, at 2,400 gallons/year on average.

Carter County, Montana on the Coltura Superuser Map



Coltura gasoline consumption map highlighting the county of Carter, Montana. Source: Coltura Census-Level Gasoline Model.

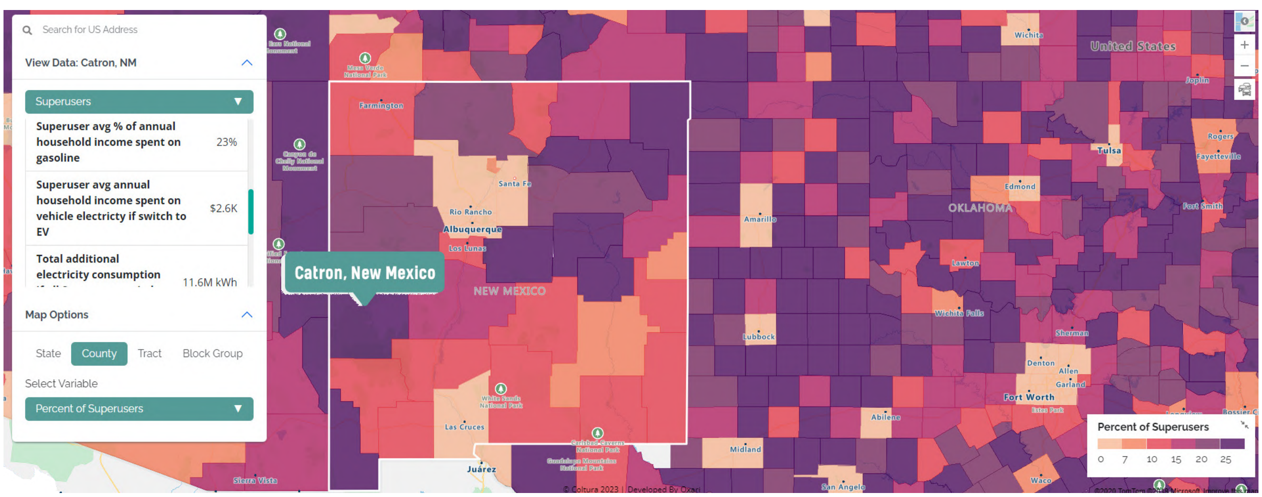
In this county, on average, Superusers would save more than other US Superusers by switching to an EV because they buy more gasoline that would be replaced with cheaper electricity.

C. Locating the most gasoline-burdened Superusers

On average, Superusers spend 10.2% of household income on gasoline, but in certain locations, the average is much higher, particularly where Superusers have lower incomes and use large amounts of gasoline. In these areas, Superusers are more likely to experience the expenses of driving a gasoline-powered vehicle as a heavy burden and thus may be more open to considering the switch to an EV.

For instance, in Catron County, New Mexico, Superusers use an average of 2,200 gallons per year and spend on average 23% of household income on gasoline.

Catron County, New Mexico on the Coltura Superuser Map



Coltura gasoline consumption map highlighting Catron County, New Mexico. Source: Coltura Census-Level Gasoline Model.

In contrast, Superusers in Norfolk County, Massachusetts, near Boston, are spending an average of just 8% of household income on gasoline.

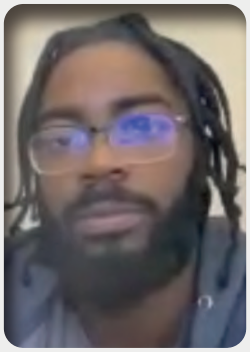
D. Identifying the most transition-ready Superusers

Some Superusers have lower barriers to an immediate switch to EVs than others. "Transition-ready" Superusers are those for whom there are few or no practical barriers to switching. Factors that lend to a Superuser being transition-ready include:

1. **Having convenient access to EV charging.** Being able to charge at home enables the driver to take advantage of the convenience and time savings of a home plug, along with the cheaper price of residential electricity.[33] 86% of Superusers live in single-family homes where there are typically fewer barriers to installing Level 2 EV charging.[34] Workplace charging is often offered to employees at no cost as a perk of employment, bringing the cost of fuel down to zero. Public charging that is readily accessible also can enable a smooth transition to an EV and result in significant savings over driving a gas car.

Maleek Griffith, a Los Angeles electrician, typically drives 140 miles a day. He traded in his Nissan Altima for an electric Ford Mach-E. He doesn't have home charging but finds public fast chargers near where he lives and shops to be convenient and cheaper than gasoline. He typically spends $12 to $23 for a charge, while it was costing him $85 to fill his gas car.

"My go-to (charging station) is at Sprouts, so I can always go shop there while it's charging, and feel like I'm getting something done."



Kadeem Fils of St. Cloud, FL drives 22 miles to school, another 24 to his work at Sea World, and another 26 to get home. On weekend days, he typically drives 50 to 150 miles. He spends $60 filling his gas tank at least weekly. He has noticed EV charging stations at Wawa gas stations and in some parking lots, and, most importantly, at his workplace.

"They have [EV chargers] at Sea World.... The ones there are free for employees."

2. Driving fewer than 150 miles a day - a distance within the range of most EVs on the market today. This makes it possible for the driver to charge overnight at home, without having to take time out of the day to use public EV charging. 86.3% of Superusers drive on average fewer than 150 miles/day – a distance well within the range of modern EVs.

Jeffery Robinson lives in the suburb of Odenville, AL, 30 miles outside Birmingham. He commutes 45 miles to his job as a FedEx driver in Bessemer, AL.

"Right off the bat, it's 90 miles going to and from work. If I pick up the kids 10 miles from the house, that's a hundred. For errands, Walmart is about 15 miles away, and if I go to Sam's, that's another 20 miles."

3. Driving a gas-powered vehicle model for which there are already multiple similar electric models available. Whereas before 2022, there were no widely available EVs in the pickup and large SUV categories, at the end of 2023, there are multiple offerings in each of these categories and more on the way. Currently, there are fully electric models available for all popular vehicle types except mini-vans.

Approximately 17.4 million Superusers (82.8%) live in a single-family home, drive less than 150 miles a day, and drive a vehicle for which there are similar electric models available.

For these drivers, there are few if any practical barriers to switching to an EV.

Superusers and Vehicle Choice

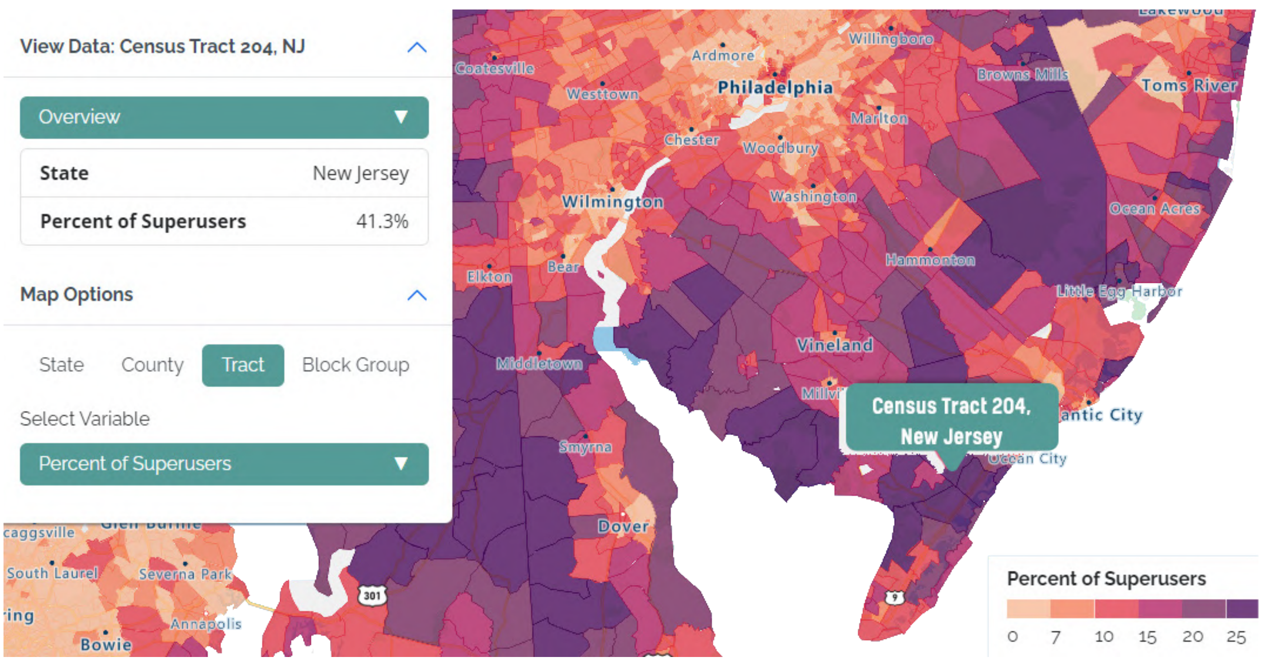
Twenty-three percent of Superusers drive sedans, hatchbacks, crossovers, and small SUVs for which there are already many similar electric models available. 28.8% of Superusers drive pickup trucks and another 32.2% drive large SUVs. Electric models of these larger vehicle types are just starting to arrive on the market.

Many drivers of pickup trucks and large SUVs may be content to switch to an electric vehicle that is not a truck, as indicated by the fact that the Toyota Tacoma pickup truck is the second most common trade-in for a Tesla Model 3.[35] *Those who do drive a truck out of necessity, for its capacity for towing or carrying large loads, such as construction workers, drywallers, gardeners, and delivery drivers, will likely need an electric truck if they are to make the switch to an EV.*

Four electric pickup truck models are available as of this writing, and at least ten are planned for release in the next few years, giving these drivers ample choice of vehicles, likely in a wider range of prices.

In the following example of Weymouth Township in New Jersey, there is a high concentration of Superusers at 41.3%. Trip data indicates that many Superusers here commute between this area and Philadelphia, 50 miles away. The roundtrip of 100 miles is well within the range of a typical EV. Also in this area, 98.1% of residences are single-family homes, suggesting Superusers are likely to be able to install home EV charging. If the state of New Jersey wanted to focus EV education and outreach in areas with transition-ready Superusers, Weymouth Township would be an excellent place to start.

Census Tract of Weymouth Township, New Jersey on the Coltura Superuser Map



Coltura gasoline consumption map highlighting Census Tract 204, Weymouth Township, New Jersey. Source: Coltura Census-Level Gasoline Model.

VI. Impacts of switching Superusers to EVs

A. Economic savings

The economic savings realized by Superuser households are much greater than those of non-Superuser households. Superusers spend on average $530 per month or 10.2% of household income on gasoline versus non-Superusers, who spend $110 per month or 3.5% of income.

Annually, Superusers would save on average $4,318 in fuel costs (the difference between gasoline costs and equivalent electricity costs where they live) by switching to an EV. Instead of going to distant oil companies, this money would likely remain and multiply in the local community, being spent on locally generated goods and services and, increasingly, renewable electricity.

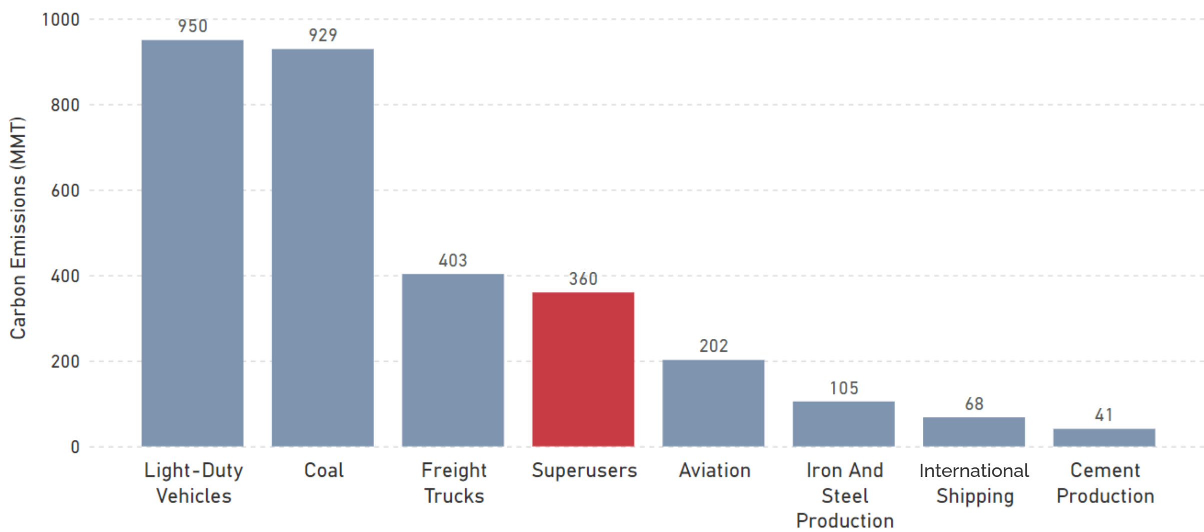
Collectively, all Superusers switching to EVs would redirect $149 billion annually away from gasoline and the oil industry, and toward EVs, clean electricity, and local businesses.

B. Greenhouse gas savings

An average Superuser burning 1,895 gallons a year emits 16.8 metric tons of CO2, six times the volume of the average non-Superuser who burns 387 gallons and emits 3.2 metric tons.[36]

An average Superuser switching to an EV achieves a net CO2 reduction of roughly five times as much as the average non-Superuser switching (11.3 metric tons per year, versus a non-Superuser at 2.3 metric tons per year).[37] If all Superusers switched to EVs, US carbon emissions would drop by 243 million metric tons a year (360 MMT minus 117 MMT of carbon emissions from their EVs) or 3.8% of total US carbon emissions – more than the emissions from all aviation (202 MT).

Carbon Emissions from Various Sources, Including Superusers



Carbon emissions from multiple sources, with a bar included for US Superusers. Source: EIA, EPA, Coltura analysis.

C. Air pollution reduction

Burning gasoline is the source of many toxic air pollutants including nitrogen oxides (NOx), and ultra-fine particulate matter (PM 2.5) that are associated with asthma, heart disease, increased cancer rates, and other diseases.[38] The amount of pollution a vehicle creates is proportional to the mileage it travels, the volume of gasoline it uses, and the frequency and conditions of vehicle starts.[39] Because Superusers take more trips and burn much more gasoline than non-Superusers, they also cause substantially more air pollution.[40]

Among all Superusers, 12.9% drive vehicles of model year 2003 or older. Vehicles of this age produce more tailpipe air pollution per mile than do newer passenger cars and trucks.[41] Older Superuser vehicles are a particular public health concern because when they burn gasoline they release more air pollutants, and they burn roughly five times more gasoline on average than similar vehicles driven by non-Superusers. Accelerating the conversion of these older Superuser vehicles to EVs would achieve faster reductions in air pollution from smog-forming nitrogen oxides and reactive organic gasses.

New directions for gasoline data

While this report focuses on using gasoline consumption data to accelerate the transition of Superusers to EVs, granular gasoline use data opens many other opportunities to reduce gasoline consumption. For example, the total volumes of gasoline consumption caused by a vehicle model could factor into federal vehicle fuel efficiency standards, or governments could contract for shared mobility services based on gasoline avoided.

VII. Policy recommendations

Cutting gasoline use and vehicle emissions at the speed and scale needed to meet climate goals requires a sharper focus on gasoline reduction and prioritizing shifting the biggest users of gasoline to EVs. To achieve this, Coltura recommends that policymakers take the following actions:

A. Establish gasoline reduction as a primary climate goal and metric

Policymakers should set clear and explicit gasoline reduction goals based on gasoline consumption data. Their gasoline reduction goals should guide policy and investment decisions across EV incentives, EV charging, and transit planning. Careful measurement of gasoline use will enable the identification and promotion of policies and programs that are effective in reducing gasoline.

EV, transit,[42] and other programs should quantify their results in terms of gasoline reduction, and programs that achieve exceptional results should receive additional funding. If one area is making more progress on gasoline reduction than comparable areas, the successful area should be analyzed and effective policies and programs should be applied to the other areas.

B. Employ detailed gasoline use data to focus EV and transportation policies on the biggest opportunities to reduce gasoline consumption

Policymakers should base their climate-related policies and forecasts with reference to how EVs are actually driven by their owners. This will allow governments to forecast more accurately how much gasoline displacement will occur as a result of EV and other transportation-related policies. It will allow better targeting of programs to optimize gasoline reduction.

Policymakers should tailor messaging about EVs to the profiles of the people using them. A Superuser, for example, requires different messaging on cost savings, range issues, and charging availability as compared to a non-Superuser because of the way Superusers use their vehicles. In addition, there are differences among Superusers that messaging should take into account. For example, for the 57.7% of Superusers who live in rural areas or small towns, using narratives and outreach that align with rural and small-town values will be important to ensure EV messaging is successful.

C. Maximize the climate and equity impacts of every EV by prioritizing gasoline-burdened Superusers' switch to EVs

Meeting aggressive 2030 gasoline reduction goals will require much higher conversion rates of the biggest gasoline users to EVs. Policies should particularly focus on helping low and moderate-income Superusers, who are the most burdened by gasoline expenditures, switch to EVs. The goal should be to maximize the environmental, health, and equity impacts of EV incentives.

Verifying Superuser status

A driver seeking to obtain a Superuser EV incentive would only need to show two things to prove Superuser status: 1) the certificate of title for their gas-powered vehicle and 2) a photo or sworn statement of their gas vehicle's current odometer reading. The title shows the odometer reading on the date the vehicle was acquired and the make, year, and model of the vehicle. With the title plus the current odometer reading, the average miles driven per year can be calculated. That figure divided by the MPG rating of the vehicle gives the average annual gallons of gasoline used. These calculations can be made available via an app, online calculator and/or at the DMV.

1. **Focus incentives on Superusers.** Principal policies should include additional EV and EV charging incentives for Superusers and preferential financing for lower-income Superusers. Additional policies that may be effective include incentives for rural organizations, dealerships, auto finance companies, and EV outreach administrators who transition Superusers to EVs.

Policymakers should assure that quality public charging infrastructure is available on routes and in locations frequented by Superusers, particularly in areas where Superusers lack the ability to charge at home.

Additional Gasoline Reduction Strategies

Beyond EV incentives, policymakers should look for additional ways to reduce gasoline use. Transit routes and programs should seek to maximize gasoline reduction as part of their goals. Governments, utilities, and industry should launch joint initiatives to incubate new programs and business models to displace gasoline and make coordinated investments in those with the most promise. Collaborations could take the form of innovative financing models, multi-channel marketing tailored to specific groups of Superusers, and initiatives that compensate Superusers for services to the electrical grid. Leveraging the ability of EVs to displace Superusers' high gasoline and maintenance expenditures will be a partial source of financing for many of these initiatives.

2. **Focus EV outreach, education, and marketing on Superusers.** Not all states have EV incentives, but all states can make Superusers more aware of the economic benefits of switching to an EV. State governments and the federal government should focus on ensuring that Superusers know the financial impacts of continuing to drive a gas car and the potential savings of switching. They should also educate Superusers on how EVs can meet their daily driving needs, the convenience and cost savings of charging, and the EV models available in their area. Granular gasoline consumption data can inform social media outreach to people likely to be Superusers, and to address concerns typical to their demographic. Direct mailers can be sent to Superusers in specific zip codes, with information tailored to their vehicle type and driving habits, including comparisons of their current vehicle's fuel consumption with potential EV alternatives.

3. Promote the "Neighborhood Effect" among Superusers. People who buy EVs are likely to live close to existing EV owners, and peer influence among EV owners is a major driver of EV adoption.[43] Superusers tend to be concentrated in areas where EV ownership is very low. They are therefore less likely to be exposed to pro-EV attitudes from neighbors and peers and to hear about the savings from driving an EV. Policies and programs can play an important role in creating buzz in high-gasoline-using communities about potential gasoline savings and in seeding those communities with future advocates. For instance, local governments electrifying vehicles in their public fleet can add wraps with educational messages about EVs on the vehicles themselves and train the staff who drive them to communicate to the public about the cost savings of EVs for Superusers. Word of mouth about gasoline savings in communities with high numbers of Superusers can accelerate Superuser conversion to EVs.

D. Spur utilities to prepare for the added electric demand required by the conversion of the biggest gasoline users to EVs

Electric utilities provide the energy that fuels EVs. Superusers provide unique challenges and opportunities to utilities because a Superuser can require up to eight times more electricity than an average EV driver. A Superuser driving a Ford F-150 40,000 miles a year and doing all of its charging at home will consume approximately 16,400 kWh, nearly twice what an average household consumes in a year.

Policymakers should require utilities to consider Superusers in their vehicle electrification planning, with a particular focus on the demands Superusers place on the grid. Neighborhoods with high concentrations of Superusers will often require more and higher performance distribution transformers, for example. Utilities should also consider that Superusers may contribute less power to the grid in times of power shortage than other EV drivers.

Superusers are potentially exceptionally valuable customers for utilities because, if they convert to an EV, they will purchase nearly four times as much electricity as the average EV driver to charge their vehicle. Many utilities provide incentives to their customers for EV purchases and charging installations. Utilities should be permitted or encouraged to provide special incentives for Superusers because of the substantial climate benefits that converting a Superuser provides to the public and the economic benefits it provides to the utility. Vermont, for example, passed a law in 2023 allowing Burlington Electric, a municipal utility, to offer additional EV incentives for Superusers.

VIII. Conclusion

To achieve US and state emission reduction goals, we must cause gasoline use to decline faster than our present trajectory. To cut gasoline use faster, governments should set ambitious gasoline reduction goals and deploy data-driven programs to achieve them. Gasoline consumption data should guide transportation policy, outreach, and education initiatives to accelerate the transition away from gasoline. Converting Gasoline Superusers to EVs must be a cornerstone of efforts to reduce gasoline consumption.

About COLTURA

Founded in 2014, Coltura is a 501(c)(3) nonprofit with a mission to improve climate, health, and equity by accelerating the switch from gasoline to cleaner alternatives. Our vision is a gasoline-free America by 2040 or sooner. We work to cut gasoline use quickly, efficiently, and equitably by:

- Developing policies and data to open new pathways for moving beyond gasoline;
- Prioritizing policies that ease the financial burden on lower-income families who use the most gasoline;
- Leading coalitions and arming leaders and advocates with policy and data tools to advance gasoline reduction policies; and
- Challenging the acceptability of gasoline through social media, art, music, and other cultural means.

Learn more at www.coltura.org.

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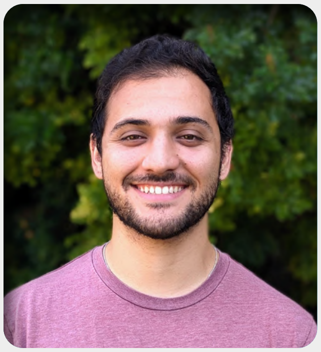

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IX. Endnotes

[1] U.S. Energy Information Administration, "Frequently Asked Questions (FAQs): How much gasoline does the United States consume?", EIA, last updated October 12, 2023, https://www.eia.gov/tools/faqs/faq.php?id=23&t=10#:~:text=In%202022%2C%20about%20135.06%20billion,8.81%20million%20barrels%20per%20day).

[2] U.S. Energy Information Administration, "Gasoline explained: Use of gasoline," EIA, last updated August 22, 2023, https://www.eia.gov/energyexplained/gasoline/use-of-gasoline.php. Ninety-one percent of U.S. gasoline is used by light-duty vehicles.

[3] U.S. Census Bureau, *Income in the United States: 2022, Current Population Reports,* P60-279, (Washington, D.C.: U.S. Department of Commerce, 2023), https://www.census.gov/library/publications/2023/demo/p60-279.html.

[4] Assuming 6,340.2 million metric tons of carbon dioxide in the US. See: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021*, EPA 430-R-23-002, (Washington, D.C.: EPA, 2023), https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021.

[5] Ibid. Gasoline accounts for 96.5% of light-duty vehicle emissions, and diesel accounts for 3.5% of light-duty vehicle emissions. Burning gasoline in light-duty vehicles (cars, trucks, and SUVs) accounts for 91% of all US gasoline use.

[6] U.S. Energy Information Administration, "Annual Energy Outlook 2023: Table 37, Reference Case: Transportation Energy Use: Light-Duty Vehicles: Conventional: Gasoline," distributed by EIA, accessed December 3, 2023, https://www.eia.gov/outlooks/aeo/data/browser/#/?id=47-AEO2023&cases=ref2023&sourcekey=0.

[7] International Energy Agency, *CO2 Emissions in 2022,* (Paris, France: IEA, March 2023), https://www.iea.org/reports/co2-emissions-in-2022; Op. cit. (n. 4).

[8] U.S. Energy Information Administration, "Annual Energy Outlook 2023: Table 37, Reference Case: Transportation Energy Use: Light-Duty Vehicles: Conventional: Gasoline," distributed by EIA, accessed December 3, 2023, https://www.eia.gov/outlooks/aeo/data/browser/#/?id=47-AEO2023&cases=ref2023&sourcekey=0.

[9] U.S. Energy Information Administration, "U.S. retail gasoline prices rose in summer but ended 2022 lower than start of 2022," EIA, January 5, 2023, https://www.eia.gov/todayinenergy/detail.php?id=55099.

[10] U.S. Department of Energy, "Key Federal Legislation," DOE, accessed December 3, 2023, https://afdc.energy.gov/laws/key_legislation#epact05; Ellen Sirull, "Electric car tax credits: What's available?," EnergySage, last updated January 1, 2023, https://www.energysage.com/electric-vehicles/ev-tax-credits/.

[11] Cox Automotive, "Another Quarter, Another Record: EV Sales in the U.S. Surpass 300,000 in Q3, as Tesla Share of EV Segment Tumbles to 50%," October 12, 2023, https://www.coxautoinc.com/market-insights/q3-2023-ev-sales/.

[12] Antuan Goodwin, "Every EV Available in 2023, Ranked by Range," CNET, July 11, 2023, https://www.cnet.com/roadshow/news/every-ev-available-in-2023-ranked-by-range/.

[13] Subhaditya Shom, Kevin James, and Mahmoud Alahmad, "Understanding the Correlation of Demographic Features with BEV Uptake at the Local Level in the United States," *Sustainability* 14, no. 9 (2022), https://doi.org/10.3390/su14095016.

[14] Luzin Zhao et al., "Quantifying electric vehicle mileage in the United States," *Joule* 7, no. 11 (2023), https://doi.org/10.1016/j.joule.2023.09.015.

[15] Ibid.

[16] Drew Veysey, Molly Freed, and Hannah Thonet, "Closing the Transportation Climate Pollution Gap," RMI, July 11, 2023, https://rmi.org/closing-the-transportation-climate-pollution-gap/.

[17] Coltura analysis.

[18] Coltura analysis.

[19] High-mileage drivers in the UK are similarly vulnerable to severe financial burdens. New Automotive, "Switch first, save fast: helping high mileage drivers change to EVs," January 16, 2024. See: www.newautomotive.org/research/switch-first-save-fast.

[20] The company providing the odometer data required as a condition of its data license that it remain anonymous, and the data source is therefore referred to as National Car and Truck Data Service, or NCTDS, throughout this report rather than the true company name.

[21] "Glossary, Block Group," U.S. Census Bureau, last updated April 11, 2022, https://www.census.gov/programs-surveys/geography/about/glossary.html#:~:text=Block%20Groups%20(BGs)%20are%20statistical,data%20and%20control%20block%20numbering.
There are approximately 240,000 census block groups in the US. They generally have a population of about 600 to 3,000 people each.

[22] Federal Highway Administration, "Highway Statistics Series: Highway Statistics 2021, Table MV-1: State Motor-Vehicle Registrations," U.S. Department of Transportation, last modified October 31, 2023, https://www.fhwa.dot.gov/policyinformation/statistics/2021/mv1.cfm. In 2021, the US had 278 million private registered vehicles and 232 million licensed drivers.

[23] In Coltura's previous two reports regarding gasoline consumption, we calculated a driver's gasoline consumption by dividing the annual miles traveled of a car (taken from odometer readings) by the MPG of the car. That methodology assumed that every driver has one car, and that every car has one driver. We have now updated that methodology using Replica data to calculate a synthetic person's gasoline consumption based on all vehicles that the person drives. For a vehicle shared by multiple drivers, the new methodology assigns the mileage to each of the drivers based on their actual mileage driven, rather than to the vehicle's owner. This change has resulted in higher gasoline consumption totals in the top consumption decile, and lower consumption totals in the middle and lower deciles.

[24] The Rural Democracy Initiative defines population density by census tracts. Major City tracts touch or are within cities with a population greater than 300,000. Medium City tracts touch or are within cities of 100,000 to 300,000 people. Suburban tracts have a Daily Yonder County Code of Major Metro Core, Major Metro Suburb, or Medium Metro and have a population density of more than 300 people per square mile, excluding Major/Medium City tracts. Midsize City tracts touch or are within cities with 50,000 to 100,000 people, excluding Suburban Tracts. Tracts classified as Small City/Town have a population density greater than 300 people per square mile, excluding the already defined tracts. Rural tracts are all remaining census tracts. See: "Rural Map and Dashboard," Rural Democracy Initiative, June 26, 2023, https://ruraldemocracyinitiative.org/rural-map-and-dashboard.

[25] A recent study of the jobs and housing in the Los Angeles Metropolitan Area found that "lack of affordable housing contributes to longer-distance commutes, potentially with adverse consequences for lower-wage workers." See: Evelyn Blumenberg and Fariba Saddiq, "Commute distance and jobs-housing fit", *Transportation* 50, No. 3 (2023), https://doi.org/10.1007/s11116-022-10264-1.

[26] Superusers on average spend 186 minutes driving on weekdays and 138 minutes on weekends, as opposed to the average non-Superuser at 53 and 50 minutes, respectively.

[27] The U.S. Department of Energy and the U.S. Environmental Protection Agency, "Fueleconomy.gov," last modified November 12, 2023, https://www.fueleconomy.gov. Based on EPA rating of combined city and highway driving of 2015 models with standard powertrains.

[28] In some areas, clusters of Superusers both live and work near each other and travel on similar schedules. These clusters could be prioritized for carpools or other customized collective transit solutions.

[29] Argonne National Laboratory, Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains, ANL/ESD-21/4, (Chicago, IL: UChicago Argonne, 2021), https://publications.anl.gov/anlpubs/2021/05/167399.pdf.

[30] Ibid.
Estimates of the cost of vehicle maintenance are highly dependent on the period in a vehicle's life when it requires maintenance, as well as the make and model of the vehicle. Argonne National Laboratory (ANL) did an extensive review of the literature on maintenance costs of high mileage vehicles and found significant variation. This report's use of 20 cents a mile for a vehicle with more than 100,000 miles on it is generally consistent with the midpoint of the studies cited in ANL's research, adjusted for inflation.

[31] The calculation assumes 35 kWh per 100 miles on an average electric vehicle. Source: Nic Lutsey and Michael Nicholas, "Update on electric vehicle costs," (working paper, The International Council on Clean Transportation, 2019), https://theicct.org/sites/default/files/publications/EV_cost_2020_2030_20190401.pdf.

[32] S. Mukherjee, "Challenges to Rural Service Transformers on Increased Electric Vehicle Charging Infrastructure," *in 2023 IEEE Rural Electric Power Conference (REPC)* (Cleveland, OH: IEEE, 2023), 74-77, https://doi.org/10.1109/repc49397.2023.00021.

[33] Spencer Hart, "5 benefits of having an EV charger at home," T3.com, June 3, 2022, https://www.t3.com/news/5-benefits-of-having-an-ev-charger-at-home.

[34] Representative sample.

[35] Fred Lambert, "The two most common cars traded for Tesla Model 3 might surprise you," Electrek, September 25, 2023, https://electrek.co/2023/09/25/most-common-cars-traded-tesla-model-3-surprise/.

[36] U.S. Environmental Protection Agency, "Greenhouse Gas Emissions from a Typical Passenger Vehicle," EPA, last modified August 28, 2023, https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle.

[37] The calculation assumes a) 8,887 grams CO2/gallon of gasoline, b) 35 kWh per 100 miles on an average electric vehicle, and c) 0.86 pounds (390 grams) of CO2/kWh of electricity.

a) Op. cit. (n. 36);

b) Op. cit. (n. 31);

c) U.S. Energy Information Administration, "Frequently Asked Questions (FAQs): How much carbon dioxide is produced per kilowatt hour of U.S. electricity generation?", EIA, last updated November 7, 2023, https://www.eia.gov/tools/faqs/faq.php?id=74&t=11.

[38] Philip J. Landrigan, "Air pollution and health," *The Lancet*, open access article, November 25, 2016, https://doi.org/10.1016/S2468-2667(16)30023-8; Ernani F. Choma et al., "Assessing the health impacts of electric vehicles through air pollution in the United States," *Environmental International* 144 (2020), https://doi.org/10.1016/j.envint.2020.106015.

[39] California Air Resources Board, *Volume III Technical Document*, EMFAC2021, (Sacramento, CA: CARB, 2021), https://ww2.arb.ca.gov/sites/default/files/2021-03/emfac2021_volume_3_technical_document.pdf.

[40] Calculation of the relative volumes of criteria pollution emissions is beyond the scope of this report.

[41] Matthew Beyer et al., *Cleaner Cars, Cleaner Air: Replacing California's Oldest and Dirtiest Cars Will Save Money and Lives,* (Oakland, CA: The Greenlining Institute, June 2023), 4, https://greenlining.org/wp-content/uploads/2023/06/Cleaner-Cars-Cleaner-Air_report.pdf.

[42] Transit provides many public benefits beyond GHG reduction, including congestion reduction and providing mobility for people without cars. That being said, it is worthwhile for transit agencies to understand the impact of their routes on gasoline consumption.

[43] Generation180, "Your Influence Matters: Peer Influence and EV Adoption," (Charlottesville, VA: Generation180, October 2023), https://generation180.org/wp-content/uploads/YourInfluenceMatters-PeerInfluenceandEVAdoptionOctober-2023.pdf.

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