

# Alternative Road User Charges for Electric Vehicles

Presentation to Electricity as Vehicle Fuel Working Group  
October 27, 2025



**Minnesota  
House of  
Representatives**

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# Guiding Principals

- EVs should pay their fair share of road user charges, but no more.
- All drivers should be incentivized to drive less by paying in proportion to the distance they drive.
- Vehicle energy efficiency should be reflected in the rate structure.
- Driver data privacy must be protected.
- Collection costs should be minimized.
- Program participation should be voluntary

# What are the Alternatives?

## Alternatives to the Gas tax for EVs fall into 3 Categories

- Registration Surcharges (e.g., the current \$75 EV surcharge)
  - Provides no incentive to minimize driving
  - Has become punitive in many state and is also becoming so, here
- An excise tax on the Electricity going into EVs
  - At commercial charging stations (20% of Evs)
  - At home (80% of EVs - requires expensive dedicated EV meters in every home) *or*
  - Collected from the vehicle (e.g., Xcel “Optimize Your Charge” (WeaveGrid))
- A mileage tax on EVs (or all vehicles)
  - Provides an incentive to minimize driving
  - Has been implemented in OR, UT, VA, HI

# Alternative 1: Registration Surcharges

- EV Registration Surcharges have been enacted in many states
- Pros:
  - They are relatively simple and inexpensive to administer
- Cons:
  - They do not fairly respect the “User Pays” principle because everyone pays the same amount regardless of how many miles they drive.
  - They do not incentivize economic use of infrastructure
    - What would happen if we charged a flat amount for all the water or electricity we used?

# Electric Vehicles are driven fewer miles than ICE vehicles

- In a [2023 study](#) iSeeCars found:
- The average electric car is driven 9,059 miles a year, compared to 12,758 miles for gas-powered vehicles.
- *Q: Why should the owner of a Nissan Leaf driven 6,395 miles pay a flat registration surcharge based on the gas taxes paid by a large ICE vehicle driven twice as many miles?*

Rank	Model	Avg. Miles Driven Per Year	Avg. EPA Battery Range (miles)	Avg. Price
1	<a href="#">Tesla Model X</a>	10,378	341	\$76,193
2	<a href="#">Tesla Model Y</a>	10,199	316	\$49,406
3	<a href="#">Tesla Model 3</a>	9,960	279	\$37,909
4	<a href="#">Tesla Model S</a>	9,340	378	\$66,105
	<i>3-year-old EV average</i>	<i>9,059</i>	<i>279</i>	<i>\$45,147</i>
5	<a href="#">Hyundai Kona Electric</a>	8,260	258	\$29,961
6	<a href="#">Chevrolet Bolt EV</a>	7,753	259	\$25,928
7	<a href="#">Audi e-tron Sportback</a>	7,210	218	\$53,602
8	<a href="#">Jaguar I-PACE</a>	6,910	240	\$51,090
9	<a href="#">Hyundai Ioniq Electric</a>	6,803	170	\$24,748
10	<a href="#">Kia Niro EV</a>	6,630	239	\$32,301
11	<a href="#">Nissan LEAF</a>	6,395	190	\$25,917
12	<a href="#">Porsche Taycan</a>	4,846	226	\$117,484

# EV Registration Surcharges by State

- Punitive EV Registration Surcharges have been adopted in several states.
- A \$150 minimum EV Registration surcharge will place MN among the highest in the country.
- Source: [U of MN CTS](#)

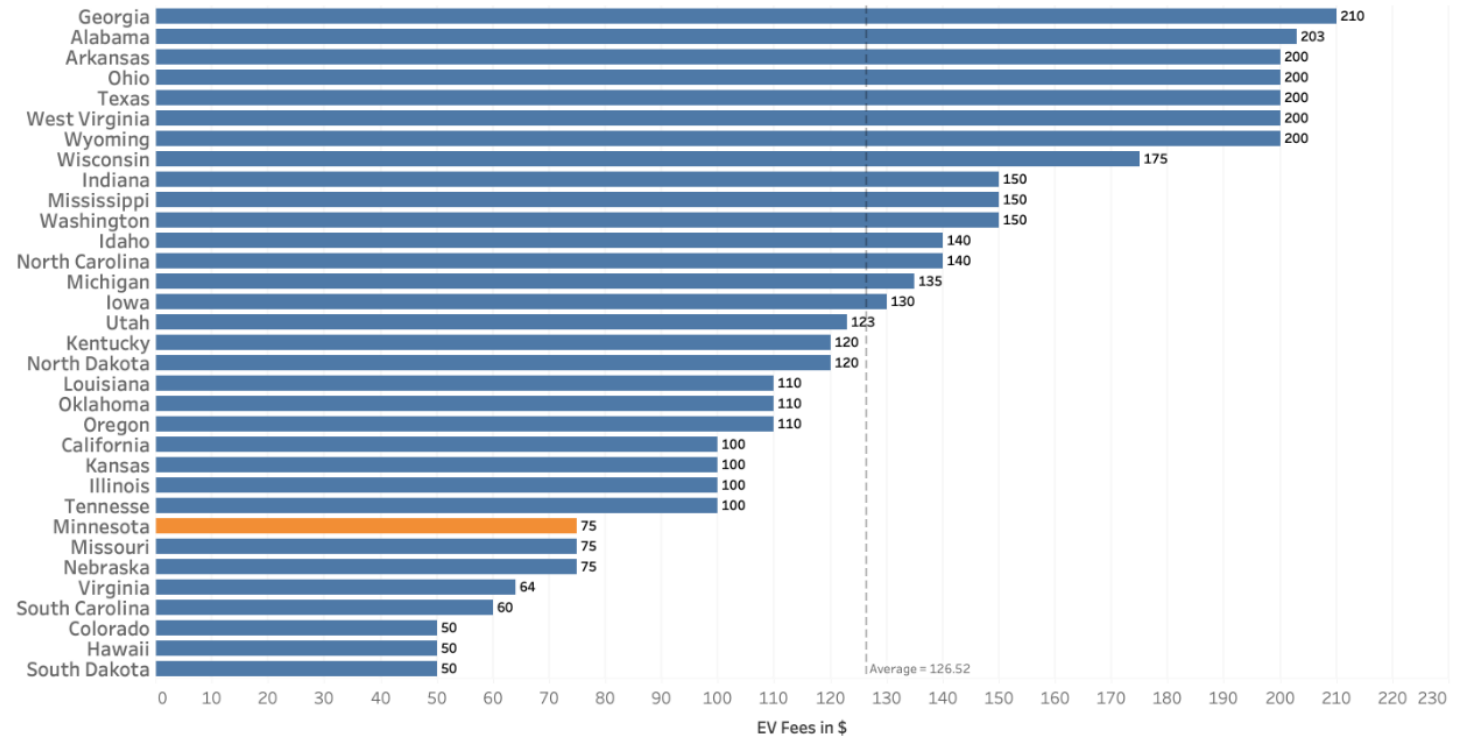


Figure 3: Special registration fees levied on EVs across the U.S.

*Notes: Annual fee rate in dollars, amount effective in 2023. In South Carolina, the fee is divided by 2 to reflect that it is biannual.*

# Alternative 2: Taxes on Electricity as a Vehicle Fuel

- 20% of EV Charging occurs at Public Charging Stations
  - The Commerce Dept will be monitoring the accuracy of the meters used in public charging stations.
  - Taxing the electricity consumed at public charging stations will be relatively straightforward.
- 80% of EV Charging occurs at home.
  - Utilities are responsible for the accuracy of home electric meters, however...
  - Utility meters measure the electricity used throughout the home.
    - Few EV owners have home chargers with dedicated meters monitored by the utility because they are expensive and unnecessary.

# My Home Charging Setup

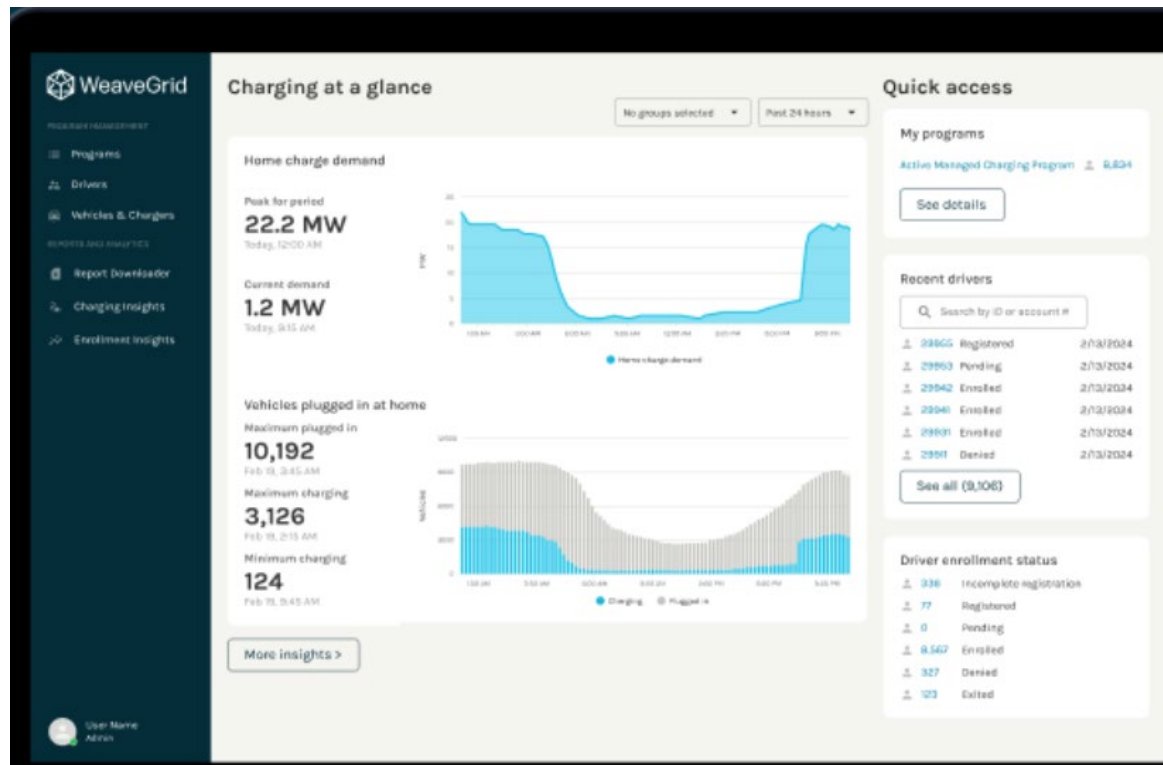
- My car is charged from an ordinary 240V outlet next to the fuse box in my garage, just like the ones your washer, dryer and range are plugged into.
- One end of the power chord supplied by the manufacturer is plugged into this outlet; the other end is plugged into the car.
- There is no separate meter on this outlet. For all Xcel knows this electricity could be going into my clothes dryer.
- Excel would charge me \$16.63 per month for a separate meter for the car, which is about what I spend on the electricity going into the car.

*However, there is another way for Xcel to estimate the amount of electricity going into my car!*



# Collection of EV Charging Data from the Vehicle

WeaveGrid collects EV charging data *from vehicles* to support utility programs such as Xcel's "Optimize Your Charge" program.



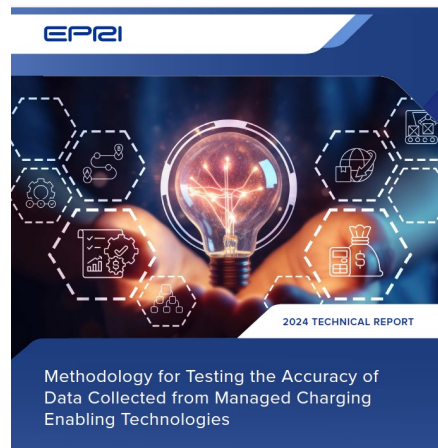
- Participants receive an annual \$50 rebate for off-peak charging
- Data is collected from dedicated chargers or from Vehicle Manufacturers' "Cloud databases" (mostly the latter).
- ***WeaveGrid reports that the accuracy of in-vehicle meters varies widely.***

# Studies of In-vehicle Meter Accuracy

- Industry Studies of in-vehicle meter accuracy have all come to the same conclusion: These meters are not accurate enough to support billing or taxation.

## National Study

Electric Power Research Institute



Tom Cooke, EPRI

## Minnesota Study

NRECA

Business & Technology Advisory  
January 2025

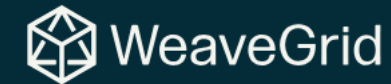


### Electric Vehicle Telematics Measurement and Verification Through a Pilot Program with Minnesota Valley Electric Co-op

#### Overview

- Minnesota Valley Electric Cooperative (MVEC) offers a 24-hour, Time-of-Use (TOU) Electric Vehicle (EV) charging program. Customers can charge their vehicles whenever needed, and electricity rates fluctuate by the time of day.
- Currently, EV usage is recorded through a dedicated electric submeter, which tracks charging usage separately from home electricity use.
- MVEC conducted a study to explore the feasibility of using EV telematics usage data as a proxy for EV submeter charging usage.
- EV telematics is the integrated data and communications associated with each EV manufacturer's transportation product.<sup>1</sup>
- This advisory reviews the research and findings.

Michael Hinde, GRE



Mathias Bell



Dan Bowerson

# Conclusion:

It will not be feasible to collect accurate vehicle charging data suitable for billing or taxation from the vast majority of Electric Vehicles that are charged from home for the foreseeable future.

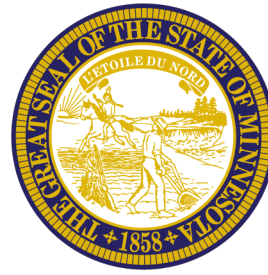
# The Cost of Electricity: Public vs Home Charging

- Public Charging
  - AAA estimates the average cost of electricity at public charging stations in Minnesota at 35.4 cents per kWh
- Home Charging (overnight)
  - Residential Time of Day Rate Plan (whole home):
    - No dedicated charger
    - 5 cents kWh (9 PM to 9 AM)
  - EV Accelerate at Home:
    - Dedicated Charger \$16.63 month
    - 3.8 cents kWh (12 M to 6 AM)

***Note: the state sales tax of 6.75 percent is collected on all electricity going into EVs***

# Alternative 3: Mileage-based Road User Charge

- Reflects the “User Pays” Principle – the more you drive, the more you pay.
- Requires only odometer readings, which are readily available
- Has already been implemented in four states (OR, UT, VA, HI)



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# How Would a Road User Charge Work?

The enabling technologies

# Automated Collection of Odometer Readings V1

## Getting Started

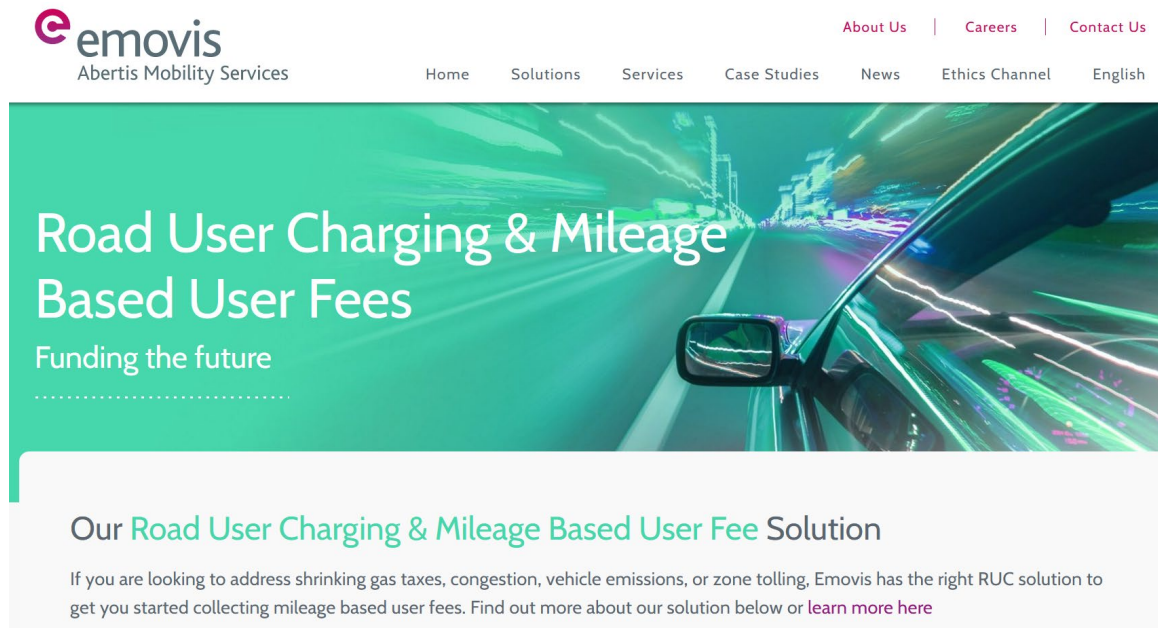
### Introduction to Smartcar's API

Learn about how to build applications that connect to millions of vehicles around the world.



- All late model cars come equipped with:
  - An accurate GPS Unit
  - A cellular Modem
- Vehicle Manufacturers continuously collect all manner of data from their cars to their data hubs, including odometer readings
- Odometer readings can be read from the manufacturer data hubs via their Application Programming Interfaces (with the owner's app credentials).
- Companies like SmartCar can use the APIs to transfer this data to RUC administrators (e.g., Emovis) at low cost.

# RUCs are Managed by 3<sup>rd</sup> Party Administrators



The screenshot shows the Emovis website header with the logo 'emovis Abertis Mobility Services' and navigation links: 'Home', 'Solutions', 'Services', 'Case Studies', 'News', 'Ethics Channel', and 'English'. On the right, there are links for 'About Us', 'Careers', and 'Contact Us'. The main content area features a green background with a car's perspective and the text: 'Road User Charging & Mileage Based User Fees' and 'Funding the future'. Below this, a white box contains the heading 'Our Road User Charging & Mileage Based User Fee Solution' and a paragraph: 'If you are looking to address shrinking gas taxes, congestion, vehicle emissions, or zone tolling, Emovis has the right RUC solution to get you started collecting mileage based user fees. Find out more about our solution below or [learn more here](#)'.

- [Emovis](#) currently administers the Road User Charge Programs in Oregon, ~~Utah~~ and Virginia.
- Utah uses SmartCar to collect odometer readings
- No trip data is required.
- No detailed data is held by DVS or MNDOT.
- Data Privacy will be governed by MN Consumer Data Privacy Act

# Automated Collection of Odometer Readings V2

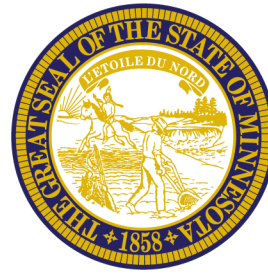
**Multiple Solutions with One System**

GeoToll offers an all-in-one solution for Tolling, Road Usage Charge (RUC), HOT/HOV lanes, Safety, and Audit.

Download our app

Download on the App Store GET IT ON Google Play

- GeoToll collects mileage data from your smart phone, calculates the mileage charge, generates the invoice, collects the fees and remits them to the Dept of Revenue.
- You take a picture of your car's odometer, periodically, to “true up” their calculated mileage reading.



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How would the charge be calculated?

An EV would pay an amount equal to the amount paid in gas taxes by an equivalent ICE vehicle driven the same number of miles

# Calculation of RUC: Ford F150 Pickup Truck

## Ford F150 3.5L V6



**19.4 MPG (avg for pickups)**  
**11,500 miles**  
**Gas Tax: ~~28.5~~ 31.8 ¢/gallon**  
**Total: ~~\$169~~ \$189**

## Ford F150 Lightning



**68 MPGe**  
**11,500 miles**  
**MBUF Rate: ~~1.47~~ 1.64 ¢/mile**  
**Total: ~~\$169~~ \$189**

# HF 1140 Bill Summary

- The Mileage-based user fee would be an ***optional*** alternative to paying the current Electric Vehicle Registration Surcharge that applies to electric vehicles.
- There would be five rates, one for each EPA vehicle type:
  - Sedan/Wagon 1.003 ¢/mile
  - Car-based SUV 1.042 ¢/mile
  - Truck-based SUV 1.325 ¢/mile
  - Minivan/Van 1.214 ¢/mile
  - Pickup Truck 1.638 ¢/mile
- These rates would be phased in over several years

***These fee levels would be tied to the gas tax and average vehicle mpg, and would adjust to keep HUTDF revenues level during the transition***

# Why not charge all vehicles by the mile?

## Ford F150 3.5L V6



**Total Gas Tax: \$189**  
**Collection Cost: \$0.38 (0.2%)**  
**Net Revenue: \$188.62**

## Ford F150 Lightning



**Total MBUF: \$189**  
**Collection Cost: \$16.90 (5%)**  
**Net Revenue: \$179.55**

**The difference in collection costs would reduce total net revenue from \$1,020 million to \$970 million, a loss of \$50 million/year to the HUTDF**

# Vehicle Weight vs Road Damage (4<sup>th</sup> Power Law)

- On a Minnesota “ten-ton road”, passenger vehicles as a class cause very little road damage within their range of weights (0.5 to 1.5 tons per axle) as compared to large trucks:

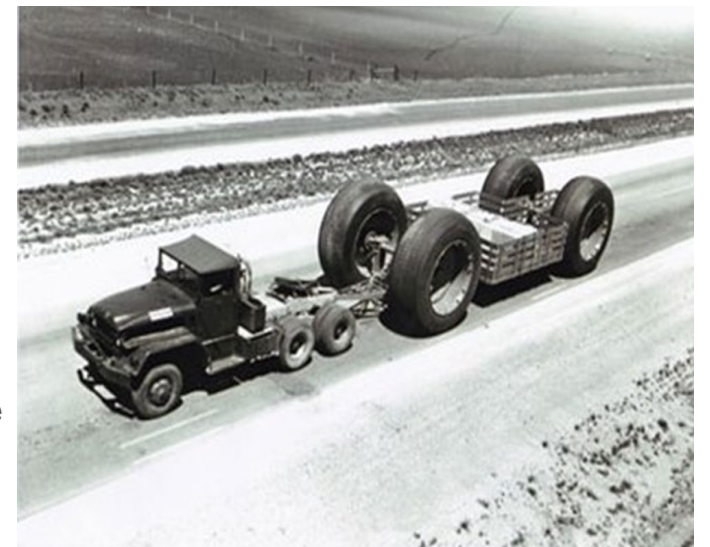
## Calculation examples [\[edit\]](#)

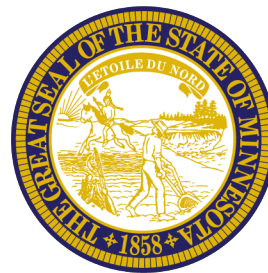
This example illustrates how a car and a truck affect the surface of a road differently according to the fourth power law.

- Car (total weight 2 tonnes, 2 axles): load per axle: 1 tonnes
- Truck (total weight 30 tonnes, 3 axles): load per axle: 10 tonnes

$10^4 = 10 \cdot 10 \cdot 10 \cdot 10 = 10,000$  times as large

The *load* on the road from one axle (2 wheels) is 10 times greater for a truck than for a car. However, the fourth power law says that the *stress* on (damage to) the road is this ratio raised to the fourth power. Since the truck has three axles, this value is tripled, but since the car has two axles, the comparison value is reduced by half. Therefore, the resulting stress difference between truck and car is 15,000 to 1.





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# Thank You

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