

House File 1140

Mileage-based Road User Charge



**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 could become so, here
- An excise tax on the Electricity going into EVs
 - At commercial charging stations (80%+ of EVS are charged at home)
 - At home (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 and VA

EV Registration Surcharges by State

- Punitive EV Registration Surcharges have been adopted in several states.
- A \$200 EV Registration surcharge would place MN among the three highest in the country.
- Source: [U of MN CTS](#)

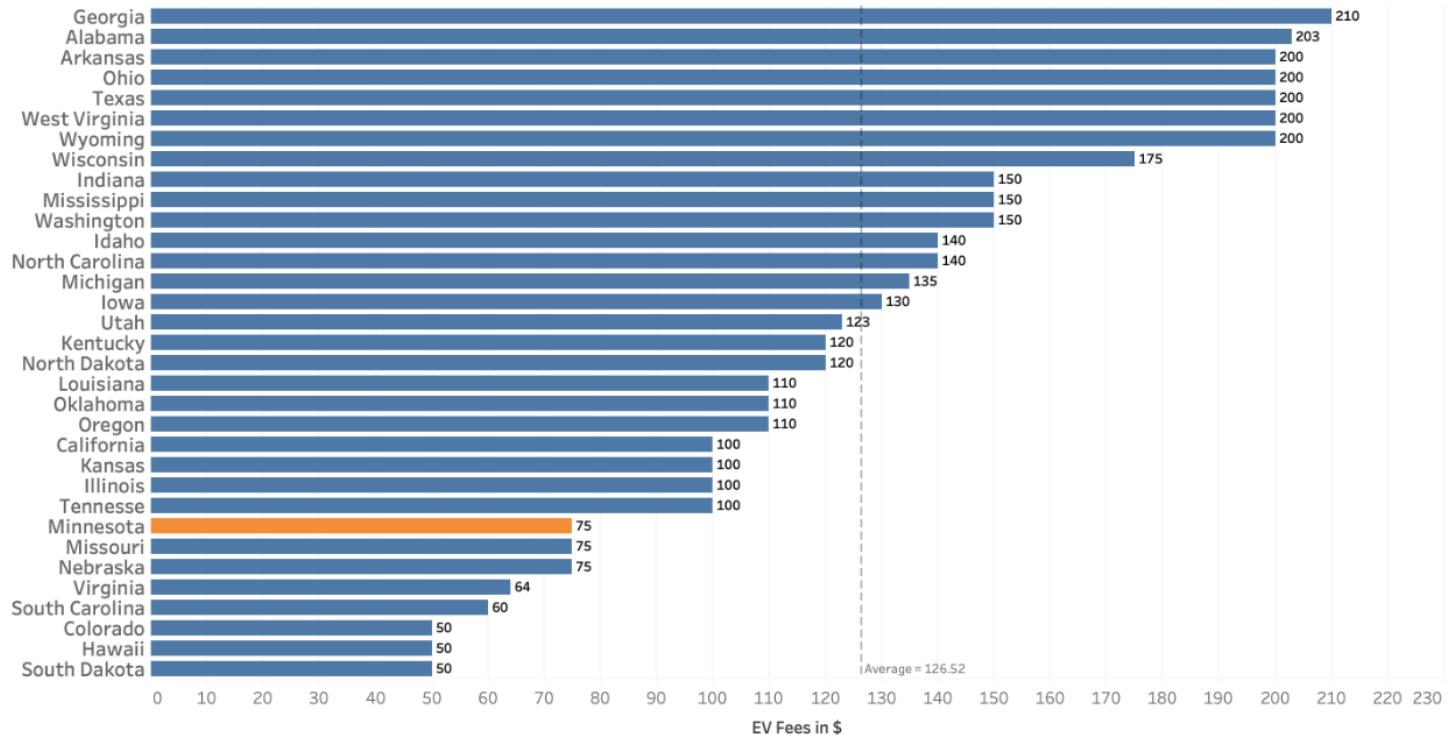


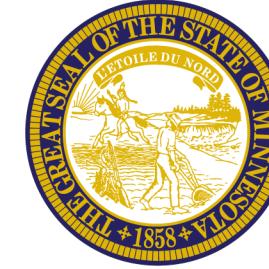
Figure 3: Special registration fees levied on EVs across the U.S.

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.

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



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How Would a Road User Charge Work?

The enabling technologies

Automated Collection of Odometer Readings V1

Getting Started

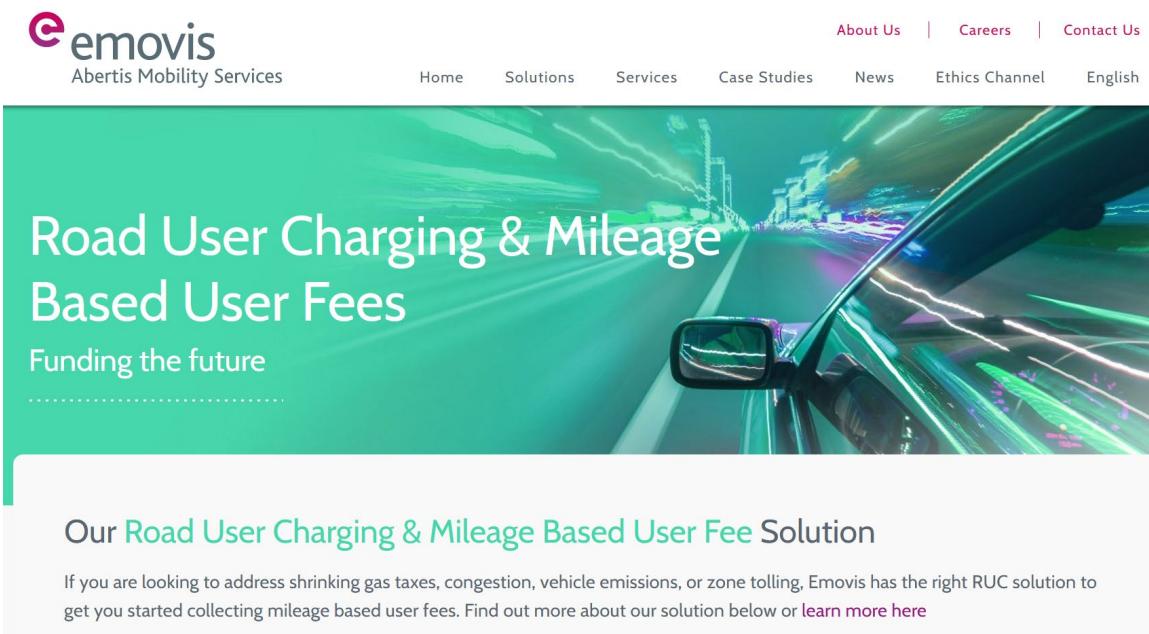
Introduction to Smartcar's API

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 3rd Party Administrators



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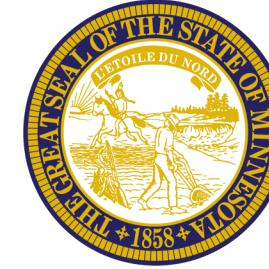
Road User Charging & Mileage Based User Fees

Funding the future

Our Road User Charging & Mileage Based User Fee Solution

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.
- In Utah, Emovis uses SmartCar to collect odometer readings from selected Tesla models.
- 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



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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 4889 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 0.899 ¢/mile
 - Car-based SUV 0.934 ¢/mile
 - Truck-based SUV 1.188 ¢/mile
 - Minivan/Van 1.088 ¢/mile
 - Pickup Truck 1.468 ¢/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

Because EV are generally driven fewer miles, they could pay less under this mileage formula

Introductory Rate

Mileage	6,500	7,500	8,500	9,500	10,500	11,500	12,500	13,500	Flat Rate
Sedan/wagon	\$ 33	\$ 38	\$ 43	\$ 48	\$ 53	\$ 58	\$ 63	\$ 68	\$ 72
Car-based SUV	\$ 30	\$ 35	\$ 39	\$ 44	\$ 49	\$ 53	\$ 58	\$ 62	\$ 68
Truck-based SUV	\$ 51	\$ 59	\$ 66	\$ 74	\$ 82	\$ 90	\$ 98	\$ 105	\$ 92
Minivan/van	\$ 42	\$ 48	\$ 55	\$ 61	\$ 67	\$ 74	\$ 80	\$ 87	\$ 88
Pickup truck	\$ 53	\$ 61	\$ 69	\$ 78	\$ 86	\$ 94	\$ 102	\$ 110	\$ 109

Intermediate Rate

Mileage	6,500	7,500	8,500	9,500	10,500	11,500	12,500	13,500	Flat Rate
Sedan/wagon	\$ 44	\$ 50	\$ 57	\$ 64	\$ 71	\$ 77	\$ 84	\$ 91	\$ 96
Car-based SUV	\$ 40	\$ 46	\$ 52	\$ 59	\$ 65	\$ 71	\$ 77	\$ 83	\$ 90
Truck-based SUV	\$ 68	\$ 78	\$ 88	\$ 99	\$ 109	\$ 120	\$ 130	\$ 140	\$ 122
Minivan/van	\$ 56	\$ 64	\$ 73	\$ 81	\$ 90	\$ 98	\$ 107	\$ 116	\$ 118
Pickup truck	\$ 71	\$ 82	\$ 92	\$ 103	\$ 114	\$ 125	\$ 136	\$ 147	\$ 145

Full Rate

Mileage	6,500	7,500	8,500	9,500	10,500	11,500	12,500	13,500	Flat Rate
Sedan/wagon	\$ 55	\$ 63	\$ 71	\$ 80	\$ 88	\$ 97	\$ 105	\$ 113	\$ 120
Car-based SUV	\$ 50	\$ 58	\$ 65	\$ 73	\$ 81	\$ 89	\$ 96	\$ 104	\$ 113
Truck-based SUV	\$ 85	\$ 98	\$ 111	\$ 124	\$ 137	\$ 150	\$ 163	\$ 176	\$ 153
Minivan/van	\$ 70	\$ 80	\$ 91	\$ 102	\$ 112	\$ 123	\$ 134	\$ 144	\$ 147
Pickup truck	\$ 88	\$ 102	\$ 116	\$ 129	\$ 143	\$ 156	\$ 170	\$ 184	\$ 181

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 (4th 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:

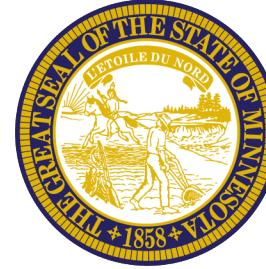
Calculation examples [\[edit\]](#)

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

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

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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