Calculating why $135 is not the right amount for an EV Registration fee

Florida's Transportation Tax Sources: A Primer 2021

On page 21, the Primer provides a FAQ with the following:

> **How much fuel tax does the typical Florida driver pay each year?**
> The typical Florida driver annually pays $299 in motor fuel tax ($102 in Federal fuel tax, $122 in State fuel tax, and $75 in Local fuel tax) for transportation related projects.
> These amounts equate to approximately 2.3 cents per mile.

It is incorrect to compare the proposed $135 EV Registration fee with the estimated average annual state and local tax of $196. EVs have a much higher equivalent MPGe than the average ICE vehicle. This EV Registration fee would penalize them for their higher efficiency.

==To illustrate our point, suppose an ICE vehicle gets 105 MPG. They would pay $45.40 annually under the gas tax with a tax rate of 36.7 cents per gallon. This proposal would have an electric vehicle with the same efficiency, 105 MPGe, pay about three times that amount.==

From Assessing Alternatives to California's Electric Vehicle Registration Fee

*A2.3. **Energy equivalent (MPGe) average per-vehicle revenue***

If electric vehicles were to pay the equivalent of gasoline vehicles under the current system as measured by the energy equivalent fuel efficiency, the average annual fees can be calculated as follows:

$$\left(\frac{v p_e}{m^{MPGe}} + \frac{v(1 - p_e)}{m^{MPG}} \right) \cdot g$$

Where:

v represents the annual per-car vehicle miles traveled

g represents the nominal gasoline tax rate in $/gal

m^{MPG} represents the average fuel efficiency

m^{MPGe} is the sales-weighted miles-per gallon equivalent25 when operating on an alternative fuel vehicle drivetrain

pe represents the proportion of time that the vehicle spends in electric operation

Assumed values

m^{MPG} = Average Fuel Economy of Light-Duty Vehicles = **24.2 MPG**

Source: https://afdc.energy.gov/data/

The values presented in the Primer also support an Average Fuel Economy in Florida of 24.2 mpg. See note below.

m^{MPGe} = Average Fuel Economy of Electric Vehicles = **105 MPGe**

Source: https://afdc.energy.gov/vehicles/electric_emissions_sources.html

EV kWh/mi	0.32	Weighted average of 2016 model year vehicle sales in 2015 from U.S. Plug-in Electric Vehicle Sales by Model and mpg values from the 2016 Fuel Economy Guide.

MPGe = mi/kWh × 33.705 = 1/.32 x 33.705 =   **105 MPGEe**

Florida Tax rate, state and local =   **.367 $/gal**

Source: The Road Ahead - Why Florida Should Shift from Per-Gallon Gas Taxes to Per-Mile Charges— and How to Do It

Note: Derivation of Average Fuel Economy in Florida inferred from Primer values

Annual Tax ($) = Annual Average Mileage (mi) / Average Fuel Economy (mpg) x State Gas Tax Rate ($/gal)

Annual Tax ($) = Annual Average Mileage (mi) x State Mileage Rate ($/mi)

Equating the two above equations:

Annual Average Mileage / Average Fuel Economy x State Gas Tax Rate = Annual Average Mileage x State Mileage Rate

State Gas Rate / Average Fuel Economy = State Mileage Rate

Average Fuel Economy = State Gas Rate / State Mileage Rate6

State Mileage Rate = State & Local Taxes / Total Taxes X Total Mileage Rate = 196/299 x .023 = **.01517 $/mi**

Average Fuel Economy for Florida = .367/.01517 **= 24.2 mpg**

Calculation of Fair EV Registration Fee

Considering equivalent fuel efficiency, we have calculated the revenue if a typical EV (a BEV with 105 MPGe) traveled the equivalent average Annual Mileage as represented in the Primer's response.

From the Primer, total State and Local annual motor fuel taxes equals **$196**.

To calculate the average annual per vehicle mileage that would generate that dollar amount in taxes, we calculate the Annual Gallons and multiply that by the Average Fuel Economy.

Annual Gallons = Total State & Local Annual Taxes (in $) divided by Gas Tax Rate (in $/gal)

Or 196/.367 = 534 gallons

Annual Mileage = Annual Gallons x Average Fuel Economy = 534 x 24.2 = **12,924 miles**

To calculate what an electric vehicle (BEV) should pay in annual taxes for the same Annual Mileage at the same equivalent gas tax rate =

Annual Mileage divided by MPGe times gas tax rate =

Or 12,990/105 x .367 = **$45.17**

Only in the unlikely scenario, where an electric vehicle has an MPGe the same as the average fuel economy of 24.2 mpg, would the $135 EV Registration fee be equivalent to the gas tax for that vehicle.

EVs with MPGe higher than 105 should pay even less than $45.17.

Of course, we can tweak the variable assumptions slightly, but the bottom line is that $135 is not close to being the correct number.

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