

Financing Highways

L. David Roper ROPERLD@VT.EDU

14 December 2019

A recent TRT editorial “There’s no good way to pay for roads” (tinyurl.com/TRTPayRoads) inspired me to write about what I think is the best way to pay for roads.

It is necessary that all cars become electric using renewable electric energy as soon as possible to reduce global warming (tinyurl.com/BEVs2019). Thankfully, electric cars (EVs) are on an exponential rise in the world (tinyurl.com/ElectricCarsWorld). Most people do not realize how fast exponentials grow; it is a curve that continually becomes steeper. It appears that by 2040 over half of the cars in the world will be electric (full battery electric or plug-in hybrids = EVs). The world EV-growth time constant is about 1 year and the world gasoline-car-growth time constant is about 40 years, so EVs will become dominant over the next few decades. Road planners worry about this with regard to gasoline taxes since full-electric cars (BEVs) use no gasoline and plug-in hybrids and hybrids, such as the Toyota Prius, use less gasoline than standard gasoline cars. Some states have added extra property taxes for hybrid and electric cars to help build roads they use.

Another possible fairness problem is that heavy vehicles do much greater damage to roads than do light vehicles (tinyurl.com/VehicleWeightDamage). For example, “where an 80,000-pound 18-wheeler full of cargo is compared to a 4,000-pound passenger car, the truck is 20 times heavier than the car. ...the semi would cause 160,000 times more road damage than the car.” and “overweight trucks are a major cause of highway deterioration.” The question is: do diesel taxes compared to gasoline taxes account for that damage difference; I doubt it.

Most states have a yearly inspection requirement for road vehicles. Those inspections could record the miles traveled since the previous inspection and report that number to taxing authorities. A states’ vehicle registration data set contains vehicle-weights. Using those two numbers for a vehicle a yearly, possibly prorated monthly, road tax could be calculated for each vehicle. The weight for heavy trucks should be the empty-vehicle weight plus half of the haul weight as a reasonable approximation.

The road-tax formula would be the miles traveled times a function of the weight. The document mentioned above claims that the function of the weight should be a factor times the fourth power of the ratio of the vehicle’s weight divided by a reference weight.. The factor and reference weight could be selected such that the yearly tax for an average sedan/truck is about the same as the yearly gasoline/diesel tax when the regulation was put into effect and could be updated as needed in the future.

This formula may greatly increase the road tax for heavy trucks, which could cause more freight to be hauled by trains which more efficiently use energy, which is needed to reduce global warming.

I urge Virginia state officials to study this approach to fund road building.