

# Development of a Fuel Economy Based Vehicle Excise Tax in the District of Columbia

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# Overview

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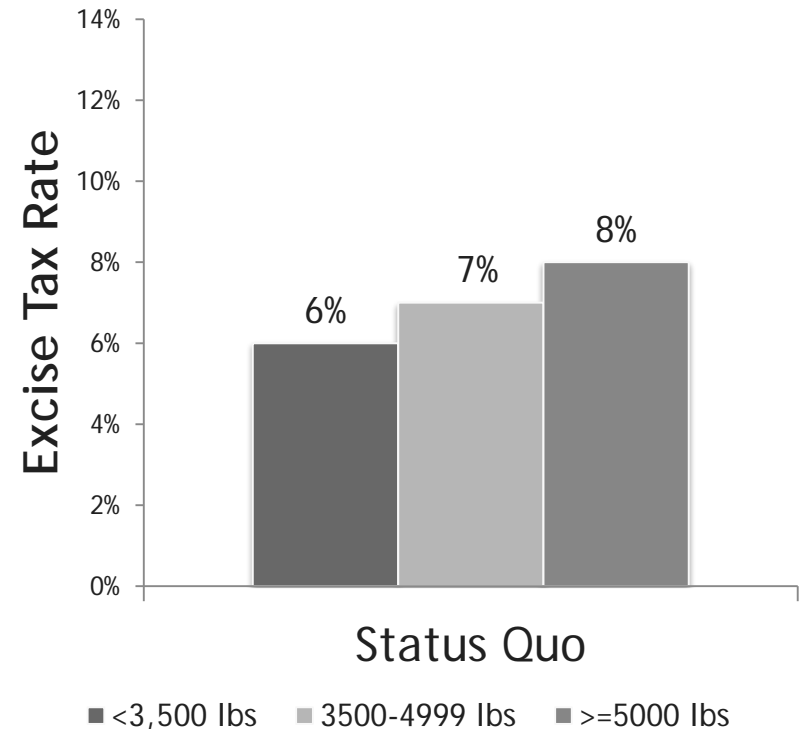
- History
- Data Analysis
- Final Tax Rates
- Conclusions



# Background: Previous Excise Tax

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- DMV assessed an excise tax on the issuance of every certificate of title for a motor vehicle or trailer in DC in the case of sale, resale, or gift
- Excise Tax Rate:
  - Determined by the vehicle weight class
  - Multiplied by the fair market value to determine the excise tax
- High efficiency vehicles ( $\geq 40$  MPG city) exempted



# Background - Legislation

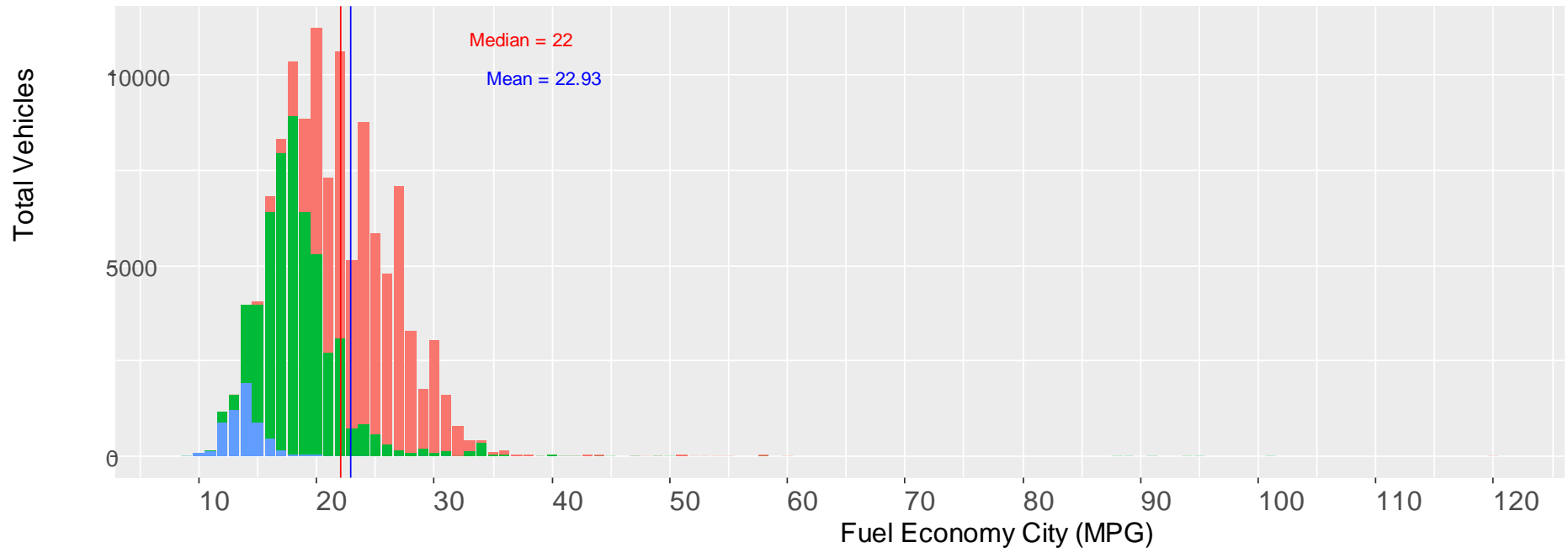
- Dec 2018: District Council passed the Clean Energy Omnibus Act of 2018 (D.C. Law 22-257)
- Jan 2019: Signed into law by Mayor Bowser
- Mar 2019: Congressional review period completed
- Legislation later amended with technical corrections
- January 2021: Final Rulemaking
- Title V included new requirements for vehicle excise taxes:
  - Rates adjusted based on fuel economy
  - Adjustments to be revenue neutral (*later amended to allow positive revenue*)
  - Hybrids no longer exempted from excise tax
  - Persons eligible for EITC exempt from excise tax



# District Fleet Data

Vehicle Count by MPG and Weight Class (2018-2020) Excluding Vehicles Without Valid MPG

Weight Bin ■ < 3,500 ■ 3,500 - 4,999 ■  $\geq$  5,000



Fuel Economy not yet maintained in DMV dataset so VINs decoded using: [searchquarry.com](http://searchquarry.com)

# Excise Tax Formula: Continuous Linear & Continuous Squared

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- Tested two continuous formulas for fuel economy tax rate
  - Linear:** Excise Tax = (FMV)\*(Coefficient)/(MPG)
  - Squared:** Excise Tax = (FMV)\*(Coefficient)/(MPG)<sup>2</sup>
- Example:
  - Car gets 30 mpg, FMV of \$10,000
  - Formula 1: \$10,000 \* 1.32 / 30 = \$440
  - Formula 2: \$10,000 \* 25.38 / (30\*30) = \$282
- Rates are divided by Fuel Economy since Fuel/Distance is what is related directly to fuel usage and thus carbon emissions
- Also tested:
  - Binning fuel economies into five groupings
  - Maintaining weight class differentials from original schedule

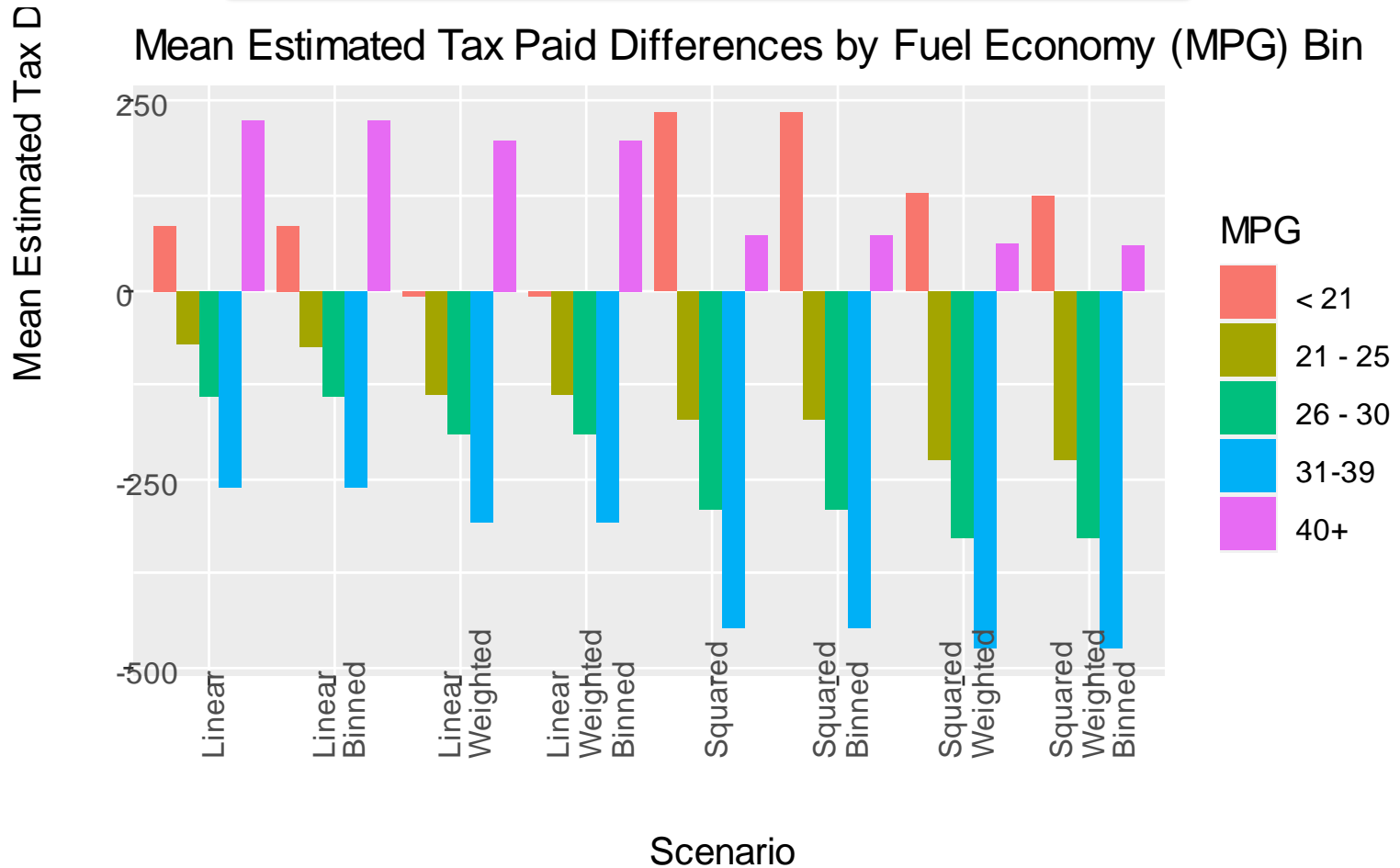
# Excise Tax Methodologies – Pros and Cons

	Pros	Cons
<b>Linear Non-Binned</b>	<ul style="list-style-type: none"> <li>• Simpler equation</li> <li>• Smoother tax rate gradation</li> </ul>	<ul style="list-style-type: none"> <li>• Equation-based tax difficult for consumers to use to inform purchase decision</li> </ul>
<b>Squared Non-Binned</b>	<ul style="list-style-type: none"> <li>• Higher penalties for least fuel-efficient vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• Equation more complex</li> <li>• Equation-based tax difficult for consumers to use to inform purchase decision</li> </ul>
<b>Linear Binned</b>	<ul style="list-style-type: none"> <li>• Clear tax rate schedule</li> <li>• Smoother tax rate gradation</li> </ul>	<ul style="list-style-type: none"> <li>• Bin selection is somewhat arbitrary</li> </ul>
<b>Squared Binned</b>	<ul style="list-style-type: none"> <li>• Clear tax rate schedule</li> <li>• Higher tax rates for least fuel-efficient vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• Bin selection is somewhat arbitrary</li> </ul>

Need to balance legislative intent, ease of implementation, and desired policy outcomes, while adhering to the direct requirements of the legislation

# Results for Excise Tax Methodologies (1/3)

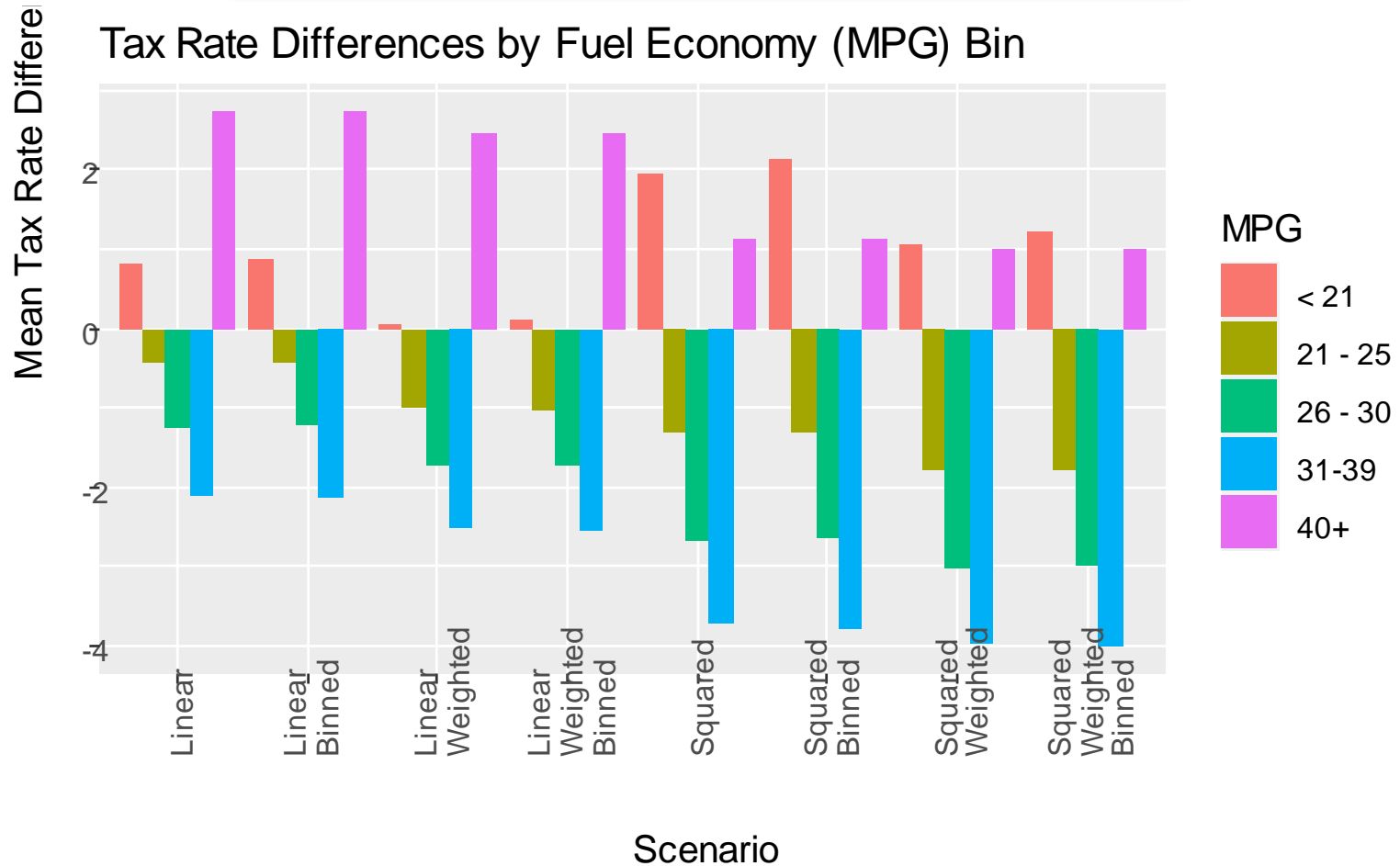
Results based on "revenue neutral" scenarios





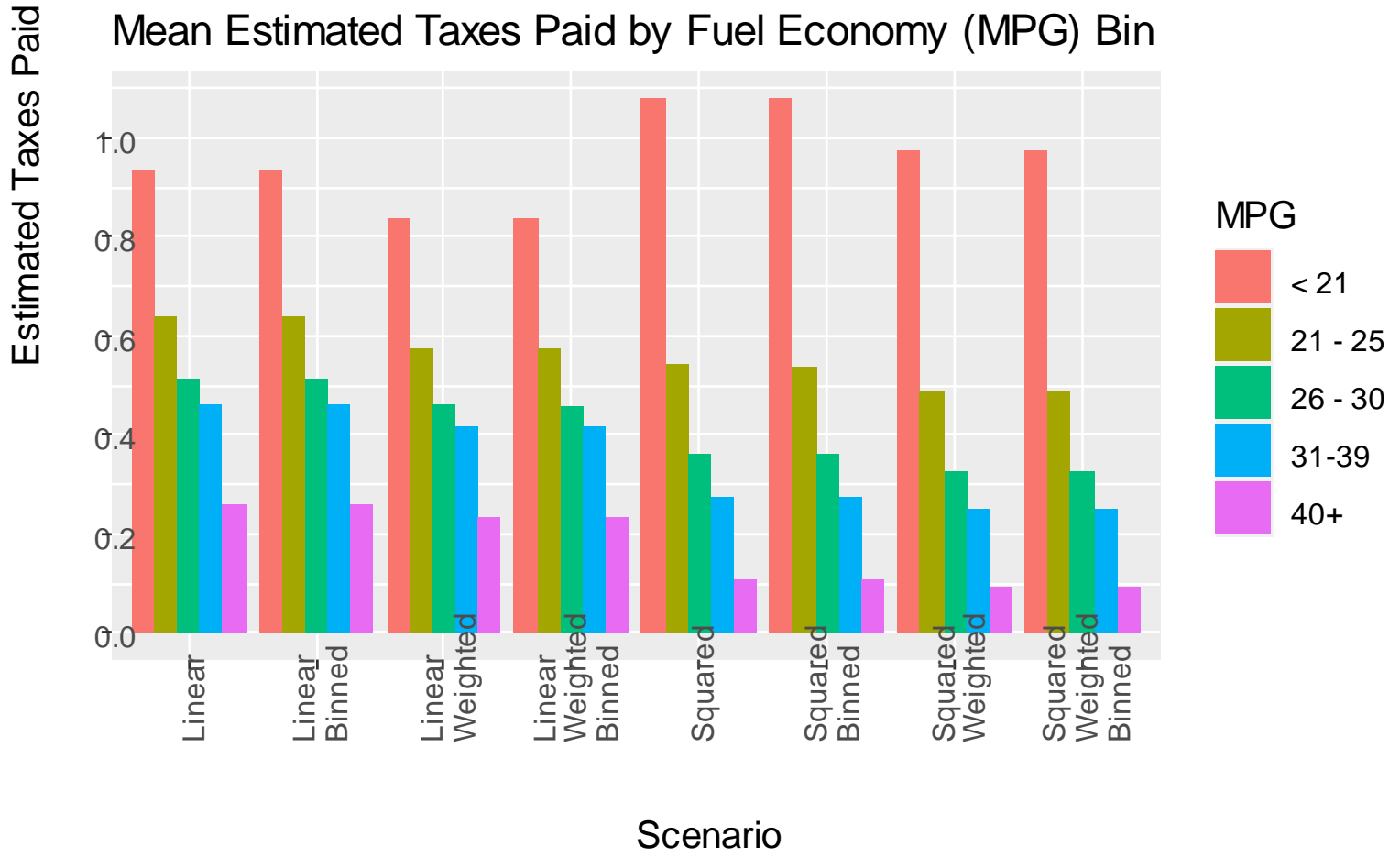
# Results for Excise Tax Methodologies (2/3)

Results based on "revenue neutral" scenarios



# Results for Excise Tax Methodologies (3/3)

Results based on "revenue neutral" scenarios



# Challenges

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- Fuel economy data could not be ascertained for about a half of registered vehicles
- Few studies to assess what affect our policy change would have on the goal of increasing fleet fuel efficiency
- Initial constraint of revenue neutrality:
  - Limited the level that rates could be raised, especially for vehicles close to the median
  - Was challenging to approach without economic modeling
- New issue: how to assess tax based for plug-in hybrids (MPG or MPGe), especially since EPA doesn't separate out city and highway for plug-ins

# Final Excise Tax Schedule

Excise Tax Rate Schedule

Weight Class	Previous	Squared Binned Weight Adjusted, Binned by MPG City					EVs
		20 or less	21 - 25	26 - 30	31-39	40 or more	
3,499 lbs or less	6%	8.1%	4.4%	3.1%	2.2%	1.0%	0.0%
3,500 lbs – 4,999 lbs	7%	9.1%	5.4%	4.1%	3.2%	2.0%	0.0%
5,000 lbs or more	8%	10.1%	6.4%	5.1%	4.2%	3.0%	0.0%

- Tax schedule fitted to CY17-CY19 excise tax data
- Existing differential for weight bins maintained (implied by legislation)
- Tax increase in lowest MPG bin ( $\leq 20$  MPG)
- Tax decrease in middle MPG bins (21 to 39 MPG)
- Non-electric high MPG vehicles ( $\geq 40$  MPG) no longer exempted
- Tax rate model predicts +10% revenue to reduce risk of going revenue-negative
  - Current excise tax of \$49.88m/year \* 110% = \$54.87m/year

# Summary

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- District governmental agencies were able to produce a reasonable, reproducible excise tax rate schedule based on fuel economy
- The most reasonable excise rate was:
  - Based on a formula using the square of fuel economy
  - One that maintained weight differentials
  - Binned
- More research into the effects of the policy would be interesting after a few years of data is collected

# Wrap Up

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## Thanks

Thomas Bartholomew, DOEE

Alex Lopez, DOEE

Dr. Rama Tangirala, DOEE

Darnell Fountain, DC DMV

## Questions

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