



Pledge Summary

Transportation Mode	# Pledges	% Pledges
Bike (bicycles)	3,247	29%
Rail (Metrorail, MARC, VRE)	2,440	22%
Bus (Metrobus, local bus systems, and commuter buses)	1,930	17%
Walk	1,784	16%
Telework	869	8%
Pool (carpools and vanpools)	923	8%
No Mode Selected	12	0%
	11,205	100%

Usual Travel Status	# of Pledges	% of Pledges	Miles Saved on CFD	% of Miles
Alternative Travel Modes	7,127	64%	113,442	59%
Normally SOV	4,015	36%	76,959	40%
No response given	63	1%	1,028	1%
	11,205	100%	191,428	100%

State	# Pledges	% Pledges
Virginia	3,467	30.9%
District	3,249	29.0%
Maryland	3,502	31.3%
No State Selected	826	7.4%
Other States	161	1.4%
	11,205	100.0%

Mode	DC Pledge Count	DC %	MD Pledge Count	MD %	VA Pledge Count	VA %
Bike	1,103	34%	847	24%	935	27%
Bus	488	15%	700	20%	561	16%
Pool	66	2%	325	9%	396	11%
Rail	668	21%	815	23%	737	21%
Telework	66	2%	398	11%	316	9%
Walk	805	25%	356	10%	329	9%
No mode and/or state selected	53	2%	61	2%	193	6%
	3,249	100%	3,502	100%	3,467	100%

Jurisdiction	# Pledges	% Pledges
DC District of Columbia	3,249	29.0%
MD Anne Arundel County	106	0.9%
MD Baltimore City	112	1.0%
MD Baltimore County	100	0.9%
MD Calvert County	29	0.3%
MD Charles County	83	0.7%
MD Frederick County	220	2.0%
MD Howard County	146	1.3%
MD Montgomery County	1,922	17.2%
MD Prince George's County	667	6.0%
MD St. Mary's County	17	0.2%
MD Washington County	19	0.2%
MD Other Counties	81	0.7%
VA Alexandria City	327	2.9%
VA Arlington County	1,069	9.5%
VA Fairfax County	1,022	9.1%
VA Loudoun County	268	2.4%

VA Prince William County	369	3.3%
VA Spotsylvania County	54	0.5%
VA Stafford County	87	0.8%
VA Other Counties	271	2.4%
WV Berkley County	12	0.1%
WV Jefferson County	18	0.2%
Other states or undisclosed	957	8.5%
	11,205	100.0%

MEMORANDUM

TO: Nick Ramfos, Director, Transportation Operations Programs
FROM: Erin Morrow, Transportation Engineer
SUBJECT: Emissions Savings from Car Free Day 2017
DATE: October 20, 2017
CC: Ron Milone, Dusan Vuksan, Jinchul (JC) Park

This memorandum documents the method used to estimate mobile/on-road emissions that were saved on Car Free Day 2017. Car Free Day was observed on Friday, September 22, 2017. The emissions savings are based on “pledged” vehicle miles traveled (VMT) savings as reported by participants planning to use non-single occupant vehicle modes of travel on that day. This is the fifth year MOVES rates were used to estimate the emissions attributed to Car Free Day participation.

DATA AND ASSUMPTIONS

To calculate the emissions reductions for Car Free Day 2017, two pieces of data are necessary – emissions rates and ‘pledged’ VMT reductions.

Emissions rates are reported in grams/mile and are calculated using output (emissions and VMT) from the MOVES model. The emissions rates are calculated only for passenger cars and passenger trucks, as those who pledged are assumed to use either passenger cars or passenger trucks.

The emissions rates for volatile organic compounds (VOCs), oxides of nitrogen (NO_x), and fine particles (PM_{2.5}) were calculated as part of the TERMS analysis that is included in the air quality conformity analysis of the 2016 CLRP, which was adopted by the TPB on November 16, 2016. Emission rates for greenhouse gases (GHG, represented by CO₂ equivalent) were calculated for use in this analysis using the same method as the other pollutants.

Emissions rates and savings for PM_{2.5} and GHG are calculated for the TPB Planning Area (without the urbanized portion of Fauquier County). Calvert County is part of the Ozone non-attainment area and is included in NO_x and VOC calculations. As with prior analysis years, the MOVES emissions used to arrive at per-mile rates for this analysis were developed using the most currently adopted planning assumptions and methods.

With respect to the particulate matter pollutants, the region is in attainment of the current 2012 PM2.5 standard and is no longer required to demonstrate conformity for it. Nonetheless, the emissions reductions for PM2.5 are included in Table 1 for comparative analysis. Also, there is no federal requirement to report GHG emissions; however, the TPB has estimated GHG emissions as part of the CLRP performance assessment for several years.

VMT data for Car Free Day were supplied by the Commuter Connections unit. VMT data required for this calculation ('pledged' VMT) reflect VMT savings generated through use of non-SOV modes on Car Free Day.

METHOD

The method for estimating the emissions is straightforward. First emissions rates are calculated using MOVES output. Then the emissions savings are calculated. Emissions rates for VOC, NOx, PM2.5 (previously calculated for the TERMS analysis) and GHG (calculated for this analysis) are calculated for the respective planning areas using output from the MOVES model, as described below:

$$\text{Emission Rate} = [\text{Emissions}] / [\text{VMT of passenger cars and passenger trucks}]$$

Emissions savings are calculated as below:

$$\text{Emissions Savings} = [\text{Emission rate}] \times [\text{Pledged VMT}]$$

ANALYSIS & SUMMARY:

The method has been applied to estimate emissions savings from the Car Free Day program since 2013. Table 1 shows the comparisons of the pledged VMT, emission rates and emissions savings for those years.

Table 1. Emissions Savings from 2013 to 2017 Car Free Day Program

Year	Pledged VMT	Rates (in gr/mile)				Emissions Savings (in short tons/day)				CLRP	AQ Model
		NOX	VOC	GHG	PM2.5	NOX	VOC	GHG	PM2.5		
2013	128,928	0.513	0.351	427.990	0.021	0.073	0.050	60.83	0.00298	2013	MOVES2010a
2014	109,428	0.501	0.344	452.100	0.022	0.060	0.041	54.53	0.00265	2014	MOVES2010a
2015	61,730	0.472	0.372	425.963	0.017	0.032	0.025	28.98	0.00116	2015	MOVES2014
2016	93,101	0.407	0.337	417.199	0.016	0.042	0.035	42.82	0.00164	2016	MOVES2014a
2017	191,428	0.301	0.301	403.082	0.010	0.064	0.064	85.056	0.00211	2016	MOVES2014a

The emissions savings are driven by the amount of the 'pledged' VMT. As shown in Figure 1, the VMT savings pledged generated through use of other modes decreased from 2013 through 2015. In 2016, the pledged VMT increased, and then increased dramatically in 2017. The emissions savings estimated for each Car Free Day, shown in Figure 2, follows the trend of VMT change.

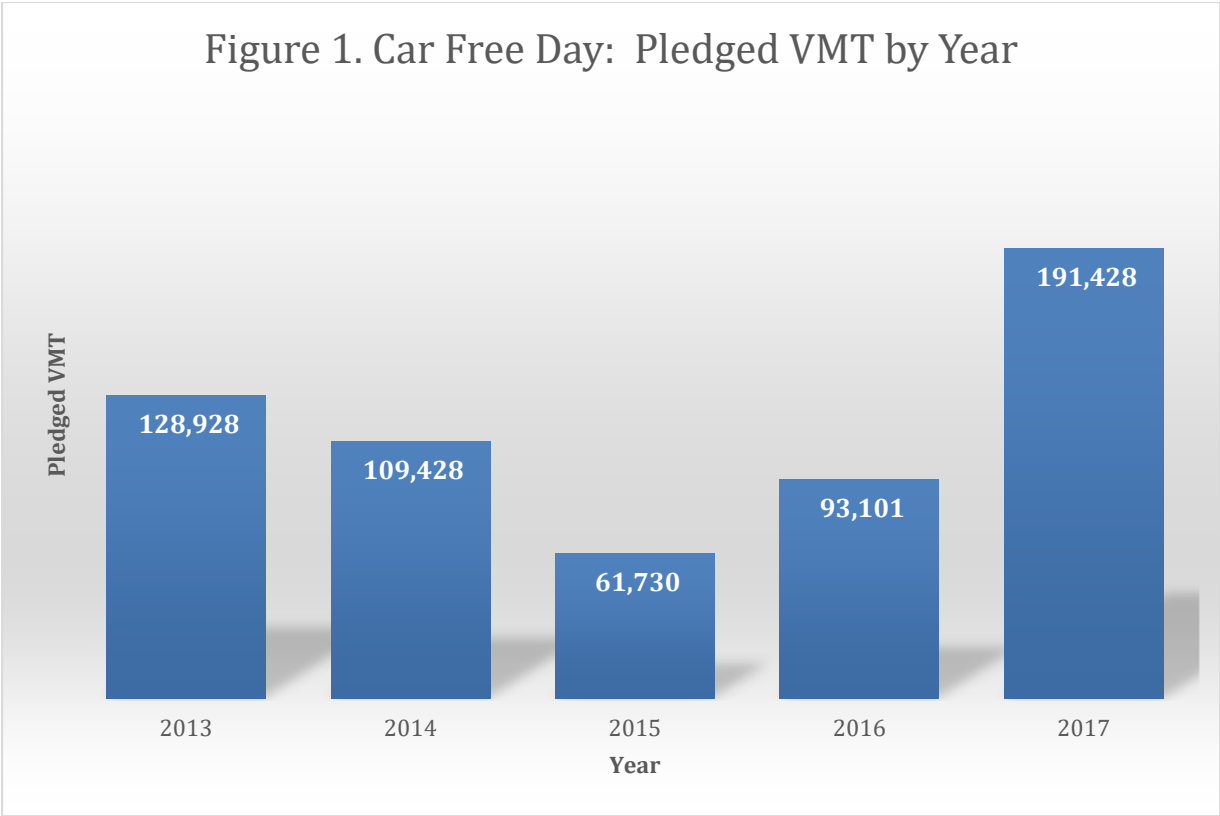


Figure 2. Car Free Day: Emissions Savings by Year

