



Pledge Summary

Transportation Mode	# Pledges	% Pledges
Bike (bicycles)	753	27%
Rail (Metrorail, MARC, VRE)	721	26%
Bus (Metro, local bus, and commuter)	580	21%
Walk/Run	264	10%
Telework	223	8%
Pool (carpools and vanpools)	229	8%
	2,770	100%

Usual Travel Status	# of Pledges	% of Pledges	Miles Saved on CFD	% of Miles
Normally Car Free	1587	57%	42,213	48%
Normally SOV	1183	43%	45,734	52%
	2,770	100%	87,947	100%

State	# Pledges	% Pledges
Virginia	1071	38.7%
District	670	24.2%
Maryland	986	35.6%
Other	43	1.6%
	2,770	100.0%

Jurisdiction	# Pledges	% Pledges
DC District of Columbia	670	24.2%
MD Montgomery County	589	21.3%
VA Arlington County	290	10.5%
VA Fairfax County	257	9.3%
VA Prince William County	159	5.7%
MD Prince George's County	142	5.1%
VA Loudoun County	123	4.4%
VA Alexandria City	91	3.3%
MD Frederick County	77	2.8%
MD Howard County	41	1.5%
MD Anne Arundel County	39	1.4%
VA Stafford County	37	1.3%
VA Fairfax City	33	1.2%
MD Baltimore City	23	0.8%
VA Falls Church City	20	0.7%
VA Spotsylvania County	19	0.7%
MD Baltimore County	17	0.6%
MD Calvert County	17	0.6%
MD Charles	17	0.6%
WV Jefferson County	10	0.4%
VA Fauquier County	8	0.3%
MD St. Mary's County	7	0.3%
MD Washington County	6	0.2%
WV Berkeley County	5	0.2%
Other	73	2.6%
Total	2770	100.0%

Mode	DC Pledge Count	DC %	MD Pledge Count	MD %	VA Pledge Count	VA %	Other Pledge Count	Other %	Total Pledge Count	Total Pledge %
Bike	258	39%	235	24%	251	23%	9	21%	753	27%
Bus	100	15%	217	22%	257	24%	6	14%	580	21%
Pool	25	4%	73	7%	126	12%	5	12%	229	8%
Rail	178	27%	281	28%	252	24%	10	23%	721	26%
Telework	10	1%	110	11%	96	9%	7	16%	223	8%
Walk/Run	99	15%	70	7%	89	8%	6	14%	264	10%
	670	100%	986	100%	1,071	100%	43	100%	2,770	100%



MEMORANDUM

TO: Nick Ramfos, Director, Transportation Operations Programs
FROM: Erin Morrow, Transportation Engineer
SUBJECT: Emissions Savings from Car Free Day 2018
DATE: October 23, 2018
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 2018. Car Free Day was observed in the region on both Friday, September 21 and Saturday, September 22, 2018. 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 those days. This is the sixth 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 2018, 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.

- Emissions rates for volatile organic compounds (VOCs) and oxides of nitrogen (NO_x), were calculated as part of the TERMS analysis that is included in the air quality conformity analysis of Visualize 2045, which was adopted by the TPB on October 17, 2018. The rates were developed for analysis year 2019.
- Emissions rates for 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. The rates were developed for analysis year 2017. Emissions rates for PM_{2.5} were not developed for Visualize 2045 because the region is in attainment of the current 2012 PM_{2.5} standard and is no longer required to demonstrate conformity to that standard.
- Emissions rates for greenhouse gases (GHG, represented by CO₂ equivalent) were calculated for use in this analysis based on the GHG forecasts developed for the

performance analysis of Visualize 2045. The rates were developed for analysis year 2019. There is no federal requirement to report GHG emissions; however, the TPB has estimated GHG emissions as part of the long-range plan performance assessment since 2010.

Emissions rates and savings for PM2.5 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 calculations of NOx and VOC rates.

Pledged VMT data for Car Free Day were supplied by Commuter Connections via e-mail on 9/27/2018. VMT data required for this calculation ('pledged' VMT) reflect VMT savings generated through use of non-SOV modes on Car Free Day. As previously noted, in 2018 Car Free Day was observed over two days. This analysis estimates the total emissions reductions combined from both days.

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 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 from 2013 to 2018.

Table 1. Emissions Savings from 2013 to 2018 Car Free Day Program

Year	Car Free Day Pledged VMT*	Emissions Rate (grams/mile)				Emissions (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	0.01	0.064	0.064	85.06	0.00211	2016	MOVES2014a
2018	87,947	0.245	0.272	384.166	0.01	0.024	0.026	37.24	0.00097	Visualize2045**	MOVES2014a

* Pledged VMT for 2018 were received from Nick Ramfos via e-mail on 9/27/2018. VMT for other years came from the "Emission Savings from Car Free Day 2017" memorandum dated 10/20/2017.

** PM2.5 rates for 2018 are from the 2016 CLRP

The emissions savings are driven by the amount of the ‘pledged’ VMT. Figure 1 shows the trend in pledged VMT from 2013 to 2018 and Figure 2 shows the resulting emissions savings, which follow the trend of VMT change.

Figure 1. Car Free Day: Pledged VMT by Year

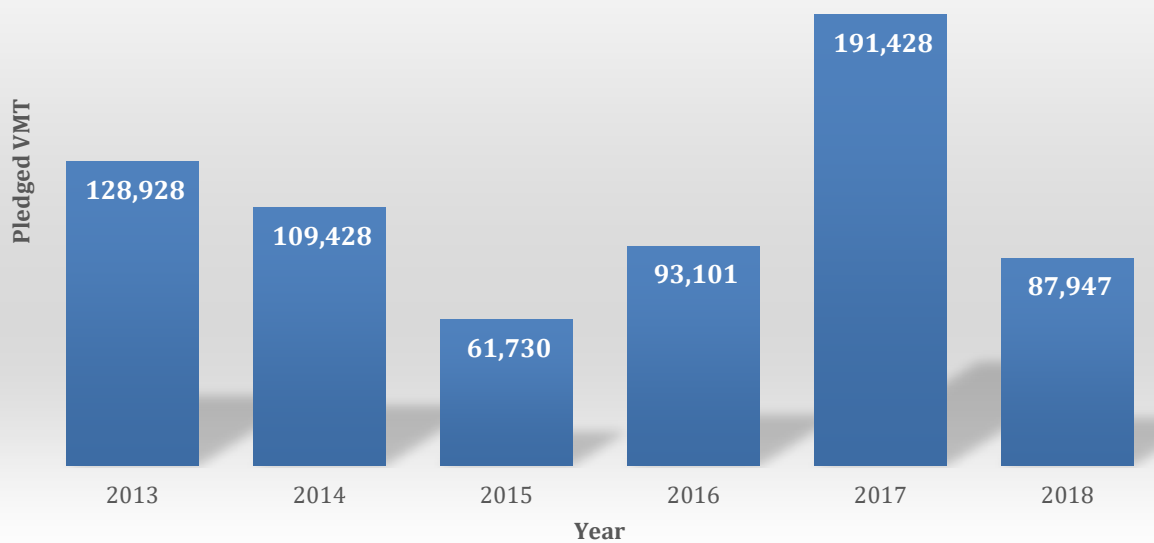


Figure 2. Car Free Day: Emissions Savings by Year

