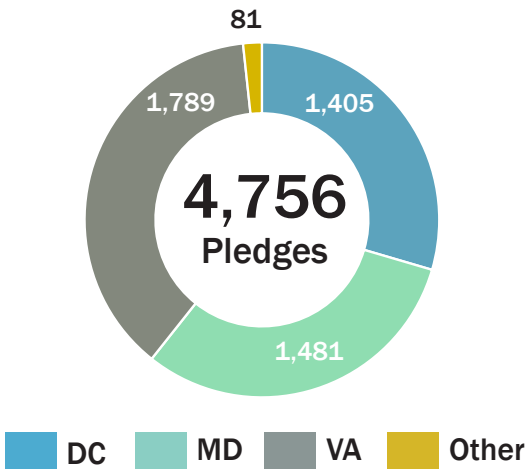
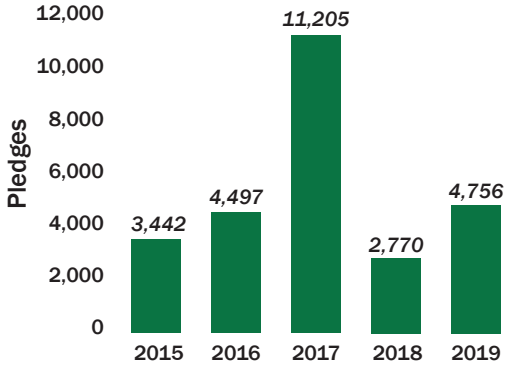
ITEM #6

2019 Pledge Summary

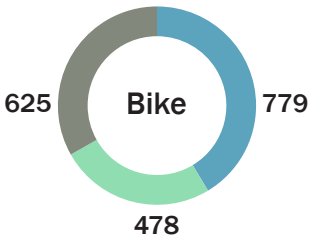
CAR FREE DAYS METRO DC 2019 SEPT 21-23

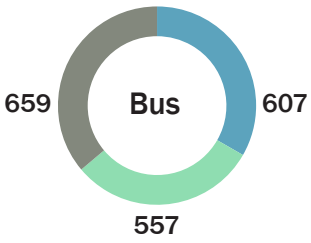


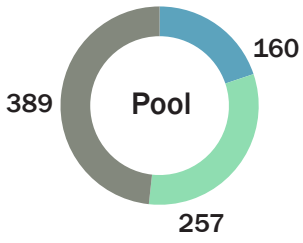


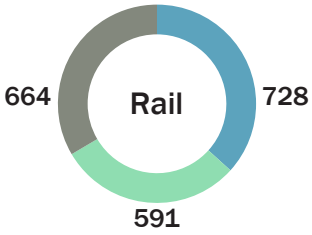
Modal Pledge Count

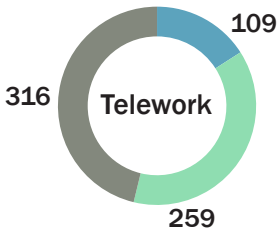
DC
MD
VA

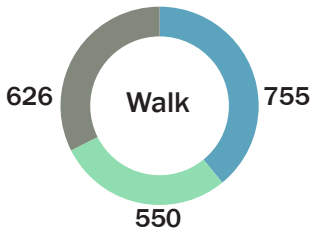






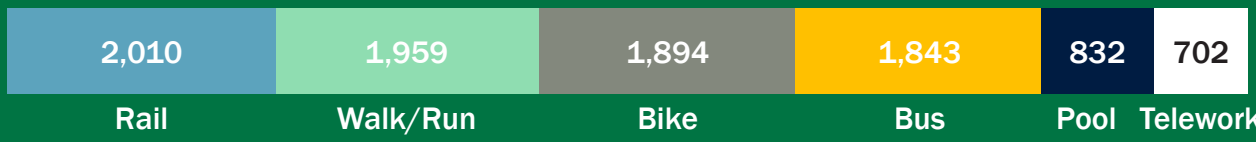




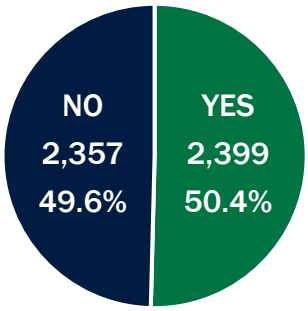


Pledges by Transportation Mode

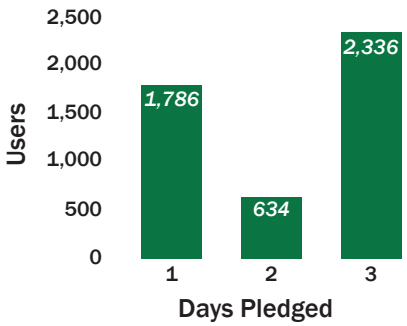
Participants could check multiple modes



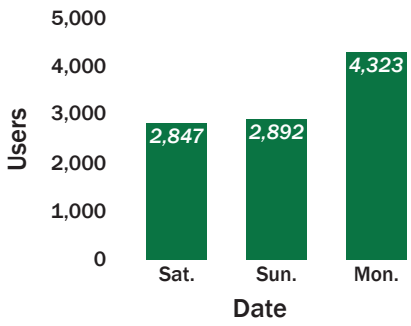
Normally Car Free?



of Days Pledged (by user)

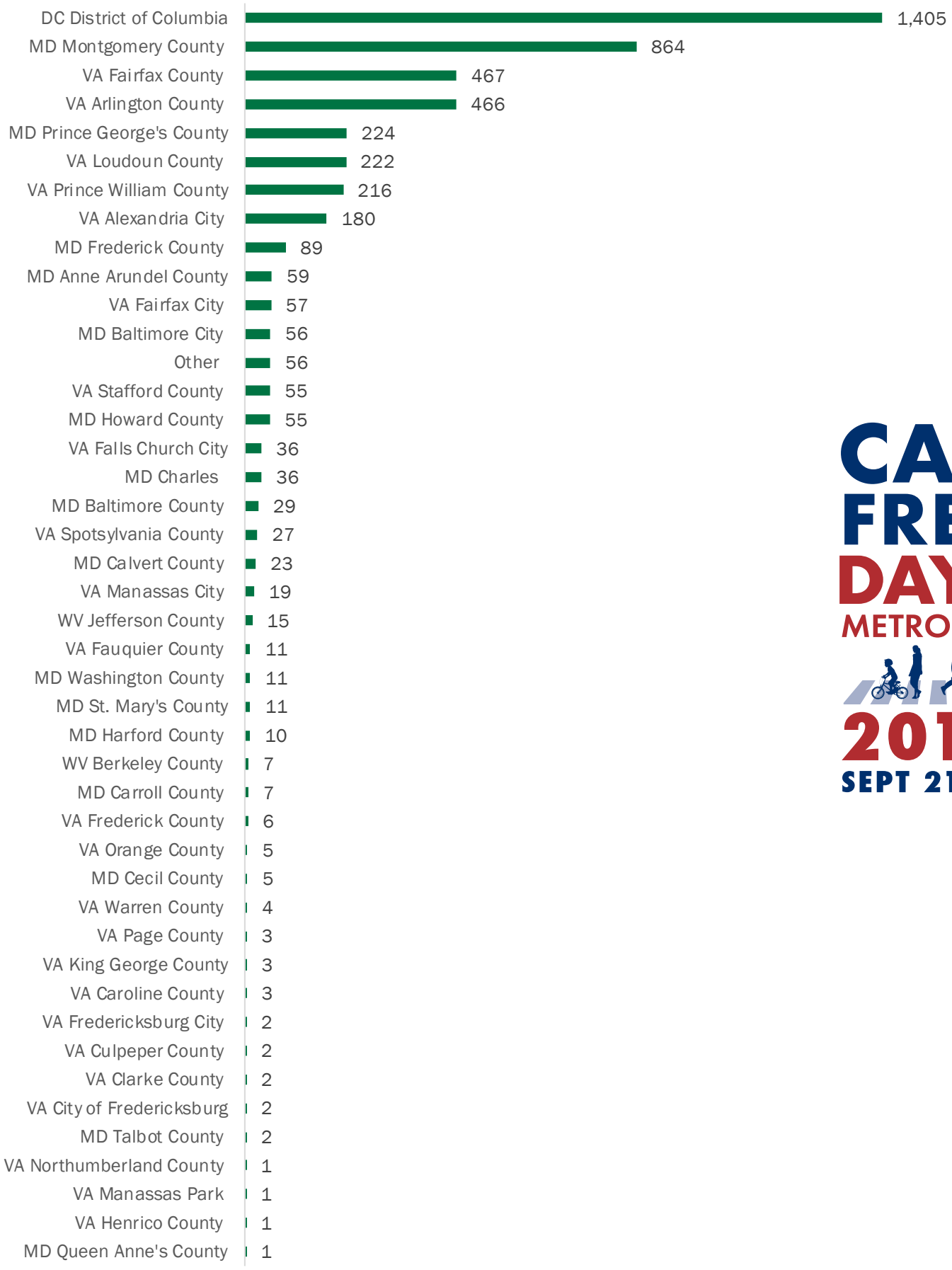


Dates Pledged (by user)



2019 Pledge Summary

Pledges by Jurisdiction



CAR FREE DAYS METRO DC 2019 SEPT 21-23

MEMORANDUM

TO: Nick Ramfos, Director, Transportation Operations Programs
FROM: Erin Morrow, Transportation Engineer
SUBJECT: Emissions Savings from Car Free Day 2019
DATE: October 24, 2019
CC: Mark Moran, Dusan Vuksan, Jinchul (JC) Park

This memorandum documents the method used to estimate mobile/on-road emissions that were saved on Car Free Day 2019. Car Free Day was observed in the region over three days - Saturday, September 21, 2019 through Monday, September 23, 2019. 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 seventh year that emissions rates developed by EPA's MOVES model were used to estimate the emissions savings attributed to Car Free Day participation.

DATA AND ASSUMPTIONS

To calculate the emissions reductions for Car Free Day 2019, 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 (NOx), were calculated as part of the Transportation Emissions Reduction Measures (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 (PM2.5) 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 PM2.5 were not developed for Visualize 2045 because the region is in attainment of the current 2012 PM2.5 standard and is no longer required to demonstrate conformity to that standard.

- Emissions rates for greenhouse gases (GHG), represented by carbon dioxide equivalent (CO_2e), 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 in calculations of NOx and VOC rates.

Pledged VMT data for Car Free Day were supplied by Commuter Connections via e-mail on October 7, 2019. 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 2019, Car Free Day was observed over three days. This analysis estimates the total emissions reductions combined from all three 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:

Emission Rate = [Emissions] / [VMT of passenger cars and passenger trucks]

Emissions savings are calculated as below:

Emissions Savings = [Emission rate] X [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 2019.

Table 1: Emissions Savings from Car Free Day (2013 – 2019)

Year	Car Free Day Pledged VMT*	Emissions Rate (grams/mile)				Emissions Savings (short tons)***				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
2019	190,863	0.245	0.272	384.166	0.01	0.052	0.057	80.82	0.00210	Visualize2045**	MOVES2014a

* Pledged VMT for 2019 were received from Nick Ramfos via e-mail on 10/7/2019. VMT for other years came from the "Emission Savings from Car Free Day 2018" memorandum dated 10/23/2018.
** PM2.5 rates are from the analysis of the 2016 CLRP
*** Short Ton = 2000 lbs