

# Commuter Connections TDM Evaluation FY 2018 – FY 2020 Interim Results

**Presentation to  
Commuter Connections  
Subcommittee  
July 21, 2020  
LDA Consulting  
with  
ESTC, CIC Research, CUTR**





Analysis  
Methodology



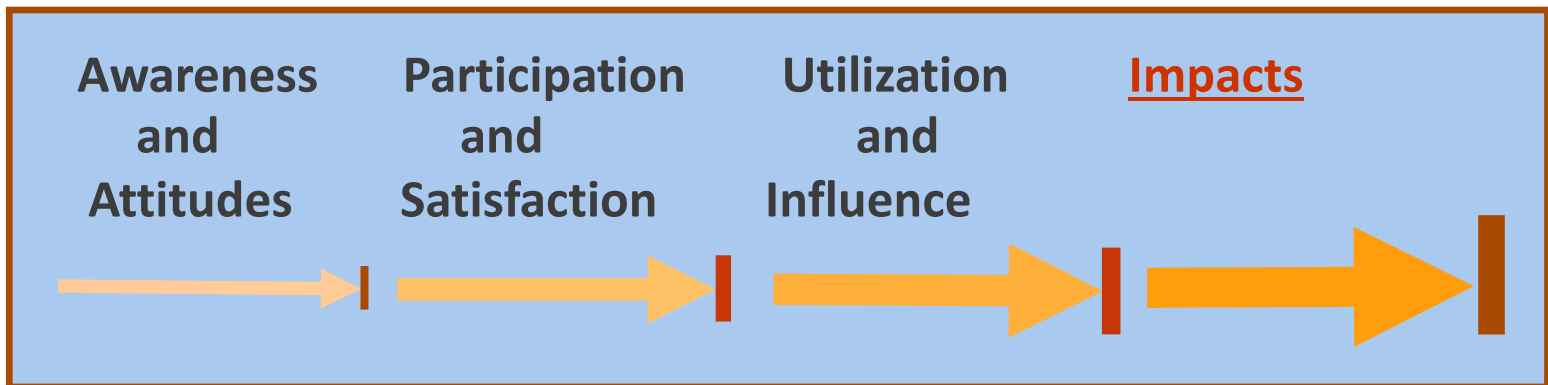
# Objective of Evaluation

- Apply methodology outlined in Evaluation Framework to:
- Estimate effectiveness of four Commuter Connections TDM program elements
  - Telework Assistance (MD/VA)
  - Guaranteed Ride Home
  - Employer Outreach
  - Mass Marketing
- Document results of Commuter Operations Center
- Adjust impacts for overlap among programs



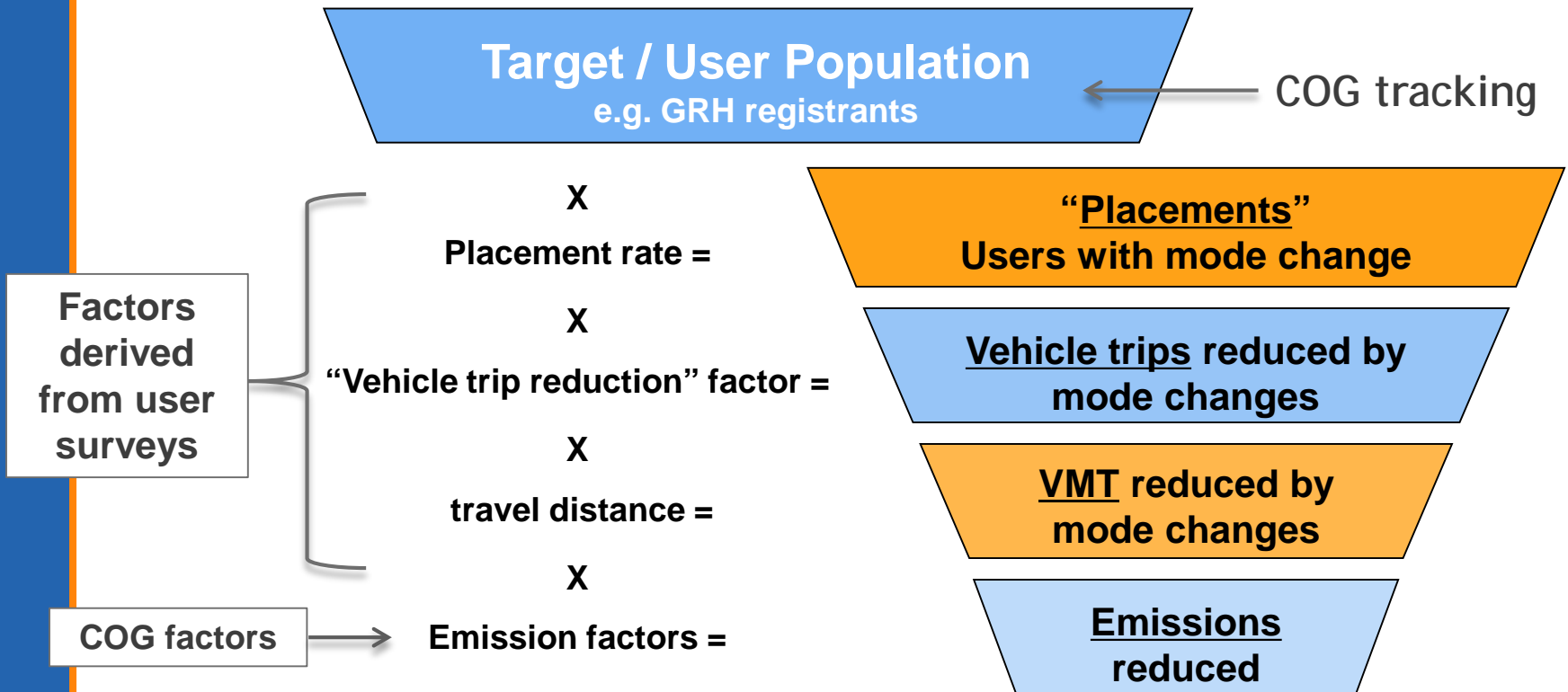
# Performance Continuum

- Awareness – modes/programs
- Attitudes – willing to try modes
  - Participation – services used
  - Satisfaction – with programs
  - Utilization – mode / travel changes
  - Influences – motivations for change
  - Impacts of change (travel / AQ / energy)



# Impact Calculation Approach

Impact calculation approach uses series of “multiplier” factors, applied to user population





# Impacts for Program Elements + COC (Jul 2017 – Dec 2019)

Comparison of collective goals against collective impacts, including  
Commuter Operations Center

	<u>Goal</u>	<u>Impact*</u>	<u>Net</u>	
<u>Trips reduced</u>	146,670	135,840	(10,830)	-7%
<u>VMT reduced</u>	2,715,497	2,625,085	(90,412)	-3%
NOx reduced	1.1848 T	0.5257 T	(0.6591) T	- 56%
VOC reduced	0.6574 T	0.3767 T	(0.2807) T	-43%

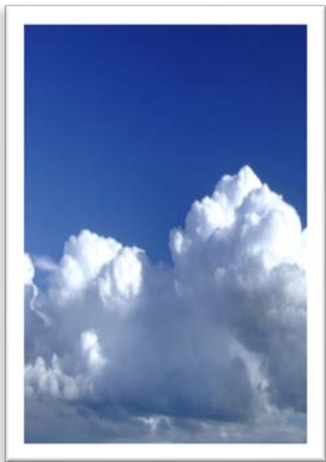
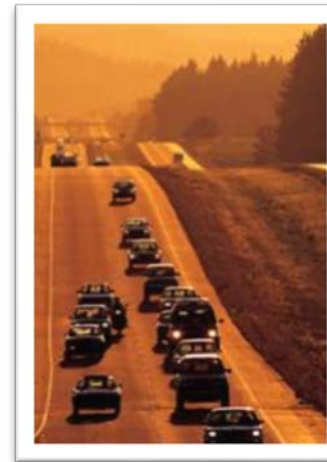
Impacts fell short of goals for vehicle trips (-7%) and VMT (-3%)

Shortfall in emission goals due to reduced emission factors for 2020 (cleaner cars)  
and shift to MOVES emission model since goals were assigned

\* Impacts represent only 30 months; Goals represent full 36-month evaluation period.

# TERM Societal Benefits

- TERM analysis primarily undertaken to Report TERM performance against regional air quality conformity goals
- TERM also are likely to offer societal benefits – e.g., congestion mitigation, climate change mitigation, improved health/safety
- 2020 TDM analysis also estimated regional cost savings for selected societal benefits:
  - Air pollution/emissions reduction (NO<sub>x</sub>, VOC, PM<sub>2.5</sub>)
  - Global climate change mitigation (reduced CO<sub>2</sub>)
  - Reduction in congestion (reduced hours of peak period delay)
  - Reduction in fuel consumption (gasoline cost saving)
  - Improved health/safety (accidents reduced per 1M VMT)
  - Noise pollution reduction (reduced motor vehicle noise)





# Societal Benefit Cost Savings = \$680,000 per Day

Generated by TDM Program Elements/COC VT/VMT Impacts

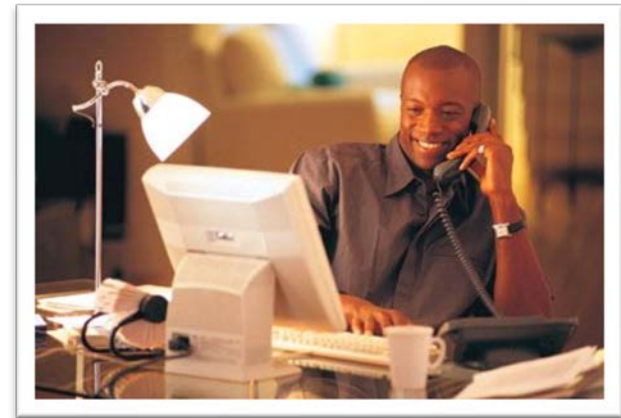
<b>Societal Benefit</b>	<b><u>Benefit Unit</u></b>	<b><u>Base Units</u></b>	<b><u>Cost per Unit</u></b>	<b><u>Daily Cost Saving</u></b>
– Air pollution	Tons pollutants	Varies	Varies	<b>\$2,647</b>
– Climate change	Tons CO2	1,026 T	\$36	<b>\$36,921</b>
– Noise pollution	VMT reduced	2.625 M VMT	\$0.0223	<b>\$58,539</b>
– Congestion	Hr. delay reduced	5,212 hr	\$27.08	<b>\$141,138</b>
– Fuel saving	Gallons fuel saved	145,838 gal	\$2.73	<b>\$398,138</b>
– Health/safety*	Accidents avoided	2.655 acc.	\$15,952	<b>\$42,354</b>
<b>All benefits</b>				<b>\$679,737</b>

\* Health/safety - Benefit unit is accidents avoided per 1M VMT;  
Benefit cost per unit is a weighted average of accident occurrence by severity



## Telework Assistance

# Telework Assistance (MD and VA)



- Direct assistance to MD commuters
  - 8.8% cited CC/COG as TW info source = 46,254 telecommuters
- Assistance to MD employers
  - 0.8% increase in telecommuting at assisted sites = 37 new TW
- MD CC/COG-influenced TW eliminated weekly 1.47 V Trips and 113 VMT = 13,647 daily vehicle trips and 308,250 VMT reduced
- TW!VA assistance to VA employers – 19.1% of employees at TW!VA sites started/increased TW = 2,347 TW
  - Daily impact = 657 vehicle trips and 12,000 VMT reduced
- Note also – small TW credit is counted in Employer Outreach

# Telework Assistance Impacts

	<u>Goal</u>	<u>Impact</u>	<u>Net</u>	
<u>Number of TCs</u>	31,854	46,291	<u>14,437</u>	+ 45%
<u>Trips reduced</u>	11,830	13,647	<u>1,817</u>	+ 15%
<u>VMT reduced</u>	241,208	308,251	<u>67,042</u>	+ 28%
NOx reduced	0.1220 T	0.0664 T	(0.0556) T	- 45%
VOC reduced	0.0720 T	0.0522 T	(0.0198) T	- 28%

Met participation, vehicle trip, and VMT. Did not meet emissions goals

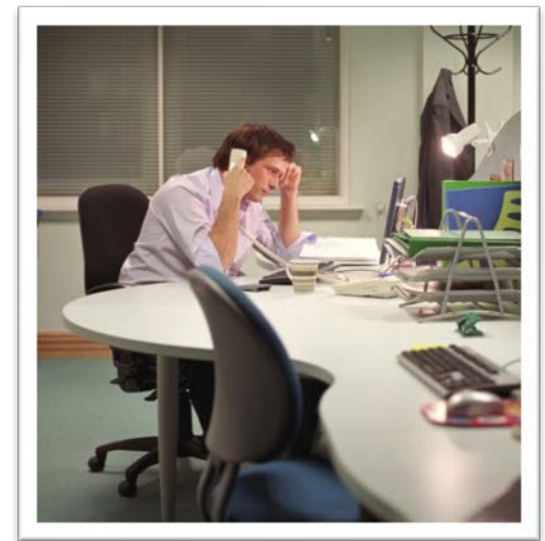
- TW continues to grow in the region and CC/COG continue to be source of information for telecommuters
- Impacts represent only CC contribution to regional TW (about 5% of regional TW trips reduced)



# Guaranteed Ride Home

# GRH Program Element

- 12,155 GRH registrants in Dec 2019
  - 6,640 new registrants in FY 2018-20
- 18,385 Pre-FY 2018 past registrants added to analysis for “retention” credit
  
- 46% of FY 2018-20 registrants started new alt mode (5,618)
- 12% of Pre-FY 2018 registrants were still using new alt mode (2,243)
- Some alt mode users shifted from another alt mode
  - FY 2018-20 users reduced 0.90 daily vehicle trips; Pre-FY 2018 users reduced 0.31 daily vehicle trips
  
- GRH results were discounted:
  - Counted only VMT within the MSA – registrants who live outside the MSA received only partial credit
  - Assigned 15% of credit to Mass Marketing TERM (portion of new applicants influenced by ads to register)



# GRH Impacts

	<u>Goal</u>	<u>Impact</u>	<u>Net</u>	
GRH participants	18,496	12,155	(6,341)	- 34%
Trips reduced	6,296	4,968	(1,328)	- 21%
VMT reduced	177,568	140,857	(36,711)	- 21%
NOx reduced	0.0890 T	0.0242 T	(0.0648 T)	- 73%
VOC reduced	0.0480 T	0.0146 T	(0.0334 T)	- 70%

Pre FY 2018 “Retained” placements accounted for 12% of trips/VMT reduced

GRH did not meet goals due to declining participation – likely related to lower regional GRH awareness – 16% in 2019 vs 59% in 2004

But GRH ads have an impact

- 31% of GRH applicants were influenced by ads to apply for GRH
- So 15% of total GRH impact was assigned to Mass Marketing, reducing GRH credit





# Employer Outreach





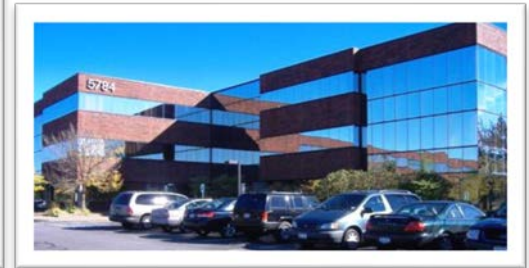
# Employer Outreach



- Three impact components
  - Overall program
  - New / expanded programs
  - Bike services
  
- Impacts calculated for:
  - Employers “maintained” in EO from June 2017
  - Employers with new / expanded programs since June 2017
  
- Employers deleted since June 2017 were removed from the impact calculation
  
- EO is evaluated using EPA’s COMMUTER Model v2.0 to estimate vehicle trip and VMT reductions from various packages of TDM strategies in various settings of transit accessibility.

# Employer Participation – 278 New/Expanded Employers

<u>Employer Group</u>	<u>Employers</u>	<u>Employees</u>
Counted in impacts		
■ Maintained (no change)	1,609	528,572
■ Expanded since June 2017	86	23,632
■ New in 2020 analysis	<u>192</u>	<u>49,566</u>
Total in impact	1,887	601,770
Not counted in impacts		
■ Deleted since June 2017*	290	111,550



\* Reflects CC effort to clean EO database; 20 large employers represented 73% of employees deleted

## EO – Employers by Jurisdiction\*

<u>Jurisdiction</u>	<u>Total Employers</u>	<u>Employees</u>	<u>New/Expand</u>
- Alexandria	139	26,878	15
- Arlington	361	74,990	78
- DC	602	170,895	21
- Fairfax	230	178,091	53
- Frederick	19	18,027	2
- Loudoun	19	14,198	7
- Montgomery	450	78,625	93
- Prince George's	28	22,433	3
- Prince William	26	10,909	2
- Tri-Co Council	13	6,724	4

\*Totals are official counts for impact calculations – totals will not match self-reported quarterly conformity statement

# EO – Analysis of Vehicle Trip Reduction

- Percentage vehicle trip reduction by program type
  - Overall EO program 9.4% reduction
  - Maintained (base) 9.4% reduction
  - Expanded (additional) 5.8% reduction
  - New 7.1% reduction



- EO – Bicycle
  - 597 employers offered bike services
  - 346,107 employees at bike worksites
  - 0.1% vehicle trip reduction from bike
  - Bike trips average 4.2 miles one-way

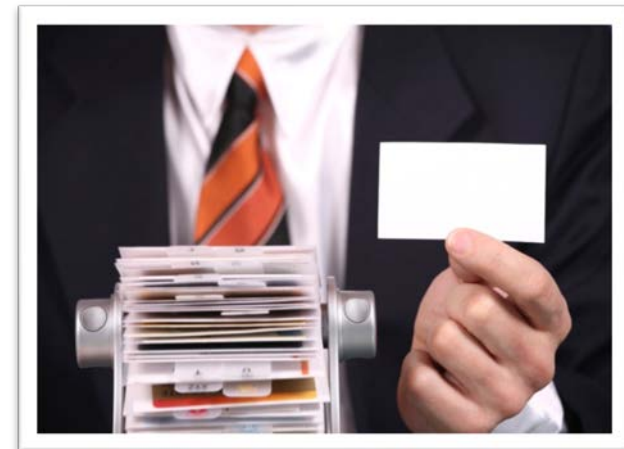
# EO Impacts – Overall

	<u>Goal</u>	<u>Impact</u>	<u>Net</u>	
<u>Employers</u>	2,031	1,887	(144)	- 7%
Trips reduced	90,776	87,287	(3,489)	- 4%
<u>VMT reduced</u>	1,533,161	1,542,757	<u>9,596</u>	+ 1%
NOx reduced	0.6170 T	0.3093 T	(0.3077) T	- 50%
VOC reduced	0.3850 T	0.2355 T	(0.1495) T	- 39%

Met VMT goal

Fell slightly short of participation and vehicle trip goals

Did not meet emission goals



# EO Impacts – New / Expanded Programs

	<u>Goal</u>	<u>Impact</u>	<u>Net</u>
Employers	NA	278	NA
Trips reduced	NA	7,430	NA
VMT reduced	NA	135,482	NA
NOx reduced	NA	0.0270 T	NA
VOC reduced	NA	0.0203 T	NA

No goals set specifically for new/Expanded

New/Expanded program category:

- 69% New employers
- 31% Expanded employers





# Mass Marketing



# Mass Marketing

## Six MM components

- Direct Influence – Commuter changed mode after hearing ad; no other CC contact
- “Referred” Influence – Heard ad, then contacted CC:
  - Share of GRH impact assigned to MM
  - Share of COC (rideshare app) assigned to MM

- ‘Pool Rewards carpool incentive



- Bike to Work Day

- Car Free Day





# Mass Marketing Results



- Direct Influence
  - 14% of commuters recalled CC commute messages (vs 21% in 2017)
  - 11.5% shifted to alt mode after ad (vs 3.3% in 2017)
  - 57% who shifted said ad influenced change = 0.92% of regional commuters = **27,940 placements**
  
- “Referred” Influence – MM ads generated:
  - 12.3% of new COC rideshare apps (3% of all app) = **759 placements**
  - 15% of new GRH apps = **843 placements**
  
- ‘Pool Rewards
  - **TBD**

## BTW Day – 2017, 2018, 2019

- 51,238 total riders in three events – 25,504 “unique” riders
- Increased bike days after BTWD
  - 87% biked to work before
  - 7.4% new riders in summer or fall
  - 19.3% increased riding in summer or fall
- New / increased riding added:
  - 1.7 bike dy/wk in summer
  - 1.7 bike dy/wk in fall/winter
  - Total new bike trips – 3,551 per day
- 43% DA to work on non-bike days
- Ave 9.0 miles one-way bike commute distance



# Car Free Day – 2017, 2018, 2019



- 18,731 total pledges in three events  
Estimate 14,302 “unique” participants
- Calculated impacts for event day and continued alt mode use after CFD
- Event-day participation:
  - 11% used new alt mode for work trip on CFD
  - 76% of switchers shifted from DA/CP/VP for that trip
  - CFD placements VTR factor of 1.43 and average distance of 14.9 mi
  - Event day impact was discounted VT and VMT to convert to estimated daily counts of 5 vehicle trips and 75 VMT
- Continued participation after CFD:
  - 11% of participants increased alt mode use after CFD vs before
  - VTR factor was 0.66; same travel distance of 14.9 miles
  - Daily impacts = 1,007 vehicle trips and 15,000 VMT reduced



# Mass Marketing Impacts

	<u>Goal</u>	<u>Impact</u>	<u>Net</u>	
<u>Placements</u>	23,168	37,877	<u>14,709</u>	+ 63%
<u>Trips reduced</u>	10,809	13,626	<u>2,817</u>	+ 26%
<u>VMT reduced</u>	181,932	263,929	<u>81,997</u>	+ 45%
NOx reduced	0.085 T	0.0533 T	(0.0317) T	- 37%
VOC reduced	0.025 T	0.0216 T	(0.0034) T	- 14%

MM greatly exceeded goals for placements and trips and VMT reduced.

Mode shifts from MM ads were 2x the rate of 2017 and MM received larger share of GRH than in 2017

- 73% of vehicle trip impact from “direct influence,”
- 8% from “referred” influence
- 19% from BTW Day and CF Day events (‘Pool Rewards not yet included)

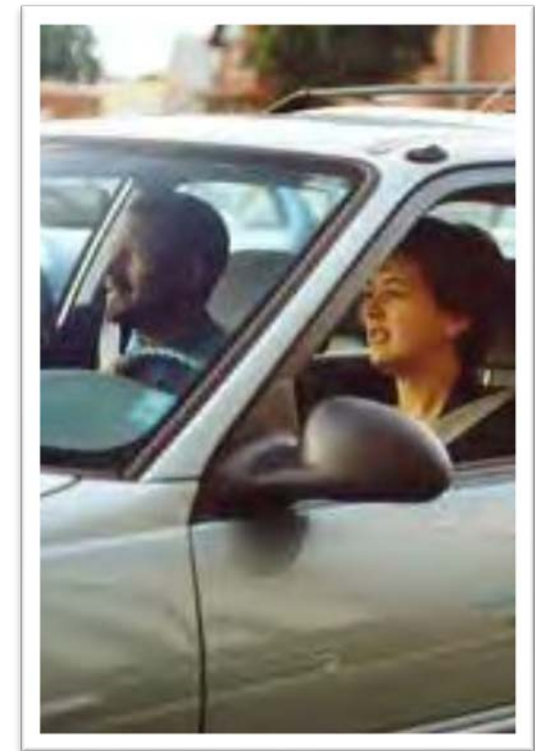


# COC and Software Upgrades



# Commuter Operations Center

- Three components: Commuter Operations Center “basic services,” “Integrated Rideshare–Software Upgrades,” and assisted telework for commuters not covered by Telework Assistance
- 62,988 commuters assisted by COC from July 2017-Dec 2019
  - 47% new/reapply, 53% follow-up
  - 41.6% placed into new alt modes  
= **26,182 new alt mode users**
- 3,267 Pre-FY 2018 past uses added to analysis for “retention” credit; 16.6% were still using new alt mode = **543 “retained” alt mode users**
- Direct assistance provided to **33,918 teleworkers** who live and work outside MD
  - 6.2% of non-MD telecommuters cited CC/COG as TW info source



# Software Upgrades

- Ridematch software upgrades
  - 43% of COC apps recalled receiving transit, P&R, TW, or bike info from CC
  - 11% used information – called transit agency, located P&R lot, tried telework, or tried bicycling
  - **4.7% used info to change modes (2,944 commuters)**
  - Ave daily reductions – 0.39 vehicle trips and 30 VMT
- VMT reduced discounted for apps who live outside the MSA
- Software upgrade impacts were deducted from COC base impacts to avoid double-counting



## COC Impacts – Basic Services (including non-MD TW)

	<u>Goal</u>	<u>Impact</u>	<u>Net</u>	
Total apps	N/A	N/A	N/A	
Trips reduced	24,425	14,517	(9,908)	- 41%
VMT reduced	512,637	323,417	(189,220)	- 37%
NOx reduced	0.2410 T	0.0638 T	(0.1772 T)	- 74%
VOC reduced	0.1150 T	0.0469 T	(0.0681) T	- 59%

Did not meet goals – largely because the non-MD telework component was much lower than in 2017

Non-MD telework accounted for

- 48% of COC veh trips reduced (vs 68% in 2017)
- 32% of COC VMT reduced (vs 53% in 2017)

Impact will increase when Jan-Jun 2020 participation is added





# Software Upgrades

	<u>Goal</u>	<u>Impact</u>	<u>Net</u>	
Placements	N/A	3,552	N/A	
Trips reduced	2,379	1,135	(1,244)	- 52%
VMT reduced	66,442	33,761	(32,681)	- 49%
NOx reduced	0.0280 T	0.0060 T	(0.0220) T	- 79%
VOC reduced	0.0110 T	0.0036 T	(0.0074) T	- 67%

Did not meet goals – participation was lower than anticipated and recall and use of SU services lower than in 2017

Impact will increase when Jan-Jun 2020 participation is added





# Impact Summary and Societal Benefits



# TDM Analysis Observations

- The four program elements met the overall goals for both vehicle trips (+0%) and VMT reduced (+6%)
- CC programs overall (TDM elements + COC) fell short of VT reduction goal (-7%) and VMT goal (-3%)
- Results reflect only 30 months of the 36-month evaluation period. The final impacts will be higher for some program elements
- Shortfalls in individual program elements were generally related to lower than expected participation, but also to reassignment of some credits to another program element
- Program elements did not meet emissions goals, but this was due to reductions in the 2020 emission factors, compared to the factors used when the goals were established



# Impact Comparison of 2018-20 (Interim) to 2015-17\*

TDM Program Elements + Commuter Operations Center Combined

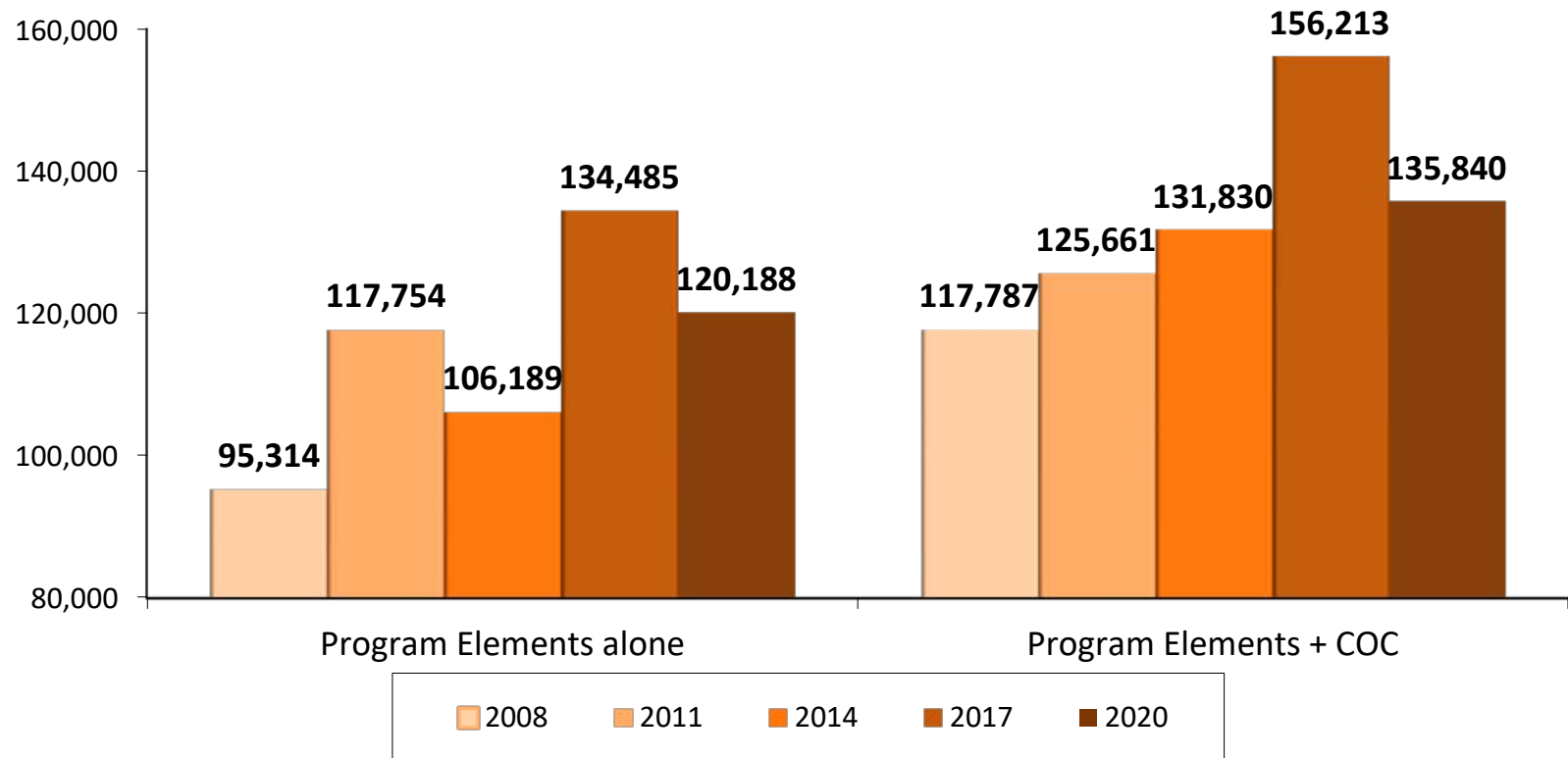
Impact Indicator	Impacts		
	Current <u>2018-20</u>	Previous <u>2015-17</u>	<u>Difference</u>
<b>Daily Trips/VMT Reduced</b>			
– Vehicle trips reduced (daily)	135,840	156,213	<b>-13%</b>
– VMT reduced (daily)	2,625,085	3,009,244	<b>-13%</b>
<b>Daily Emissions Reduced</b>			
– NOx (daily tons)	0.526	0.770	<b>-32%</b>
– VOC (daily tons)	0.377	0.550	<b>-4%</b>

\* Note that 2018-20 Interim results include only 30 months; Jan-Jun 2020 will be added in evaluation update. 2015-17 includes full 36-month evaluation period.

# Vehicle Trips – 2005-08, 2009-11, 2012-14, 2015-17, 2018-20\*

## Program Elements Alone; Program Elements + Commuter Operations Center

### Daily Vehicle Trips Reduced

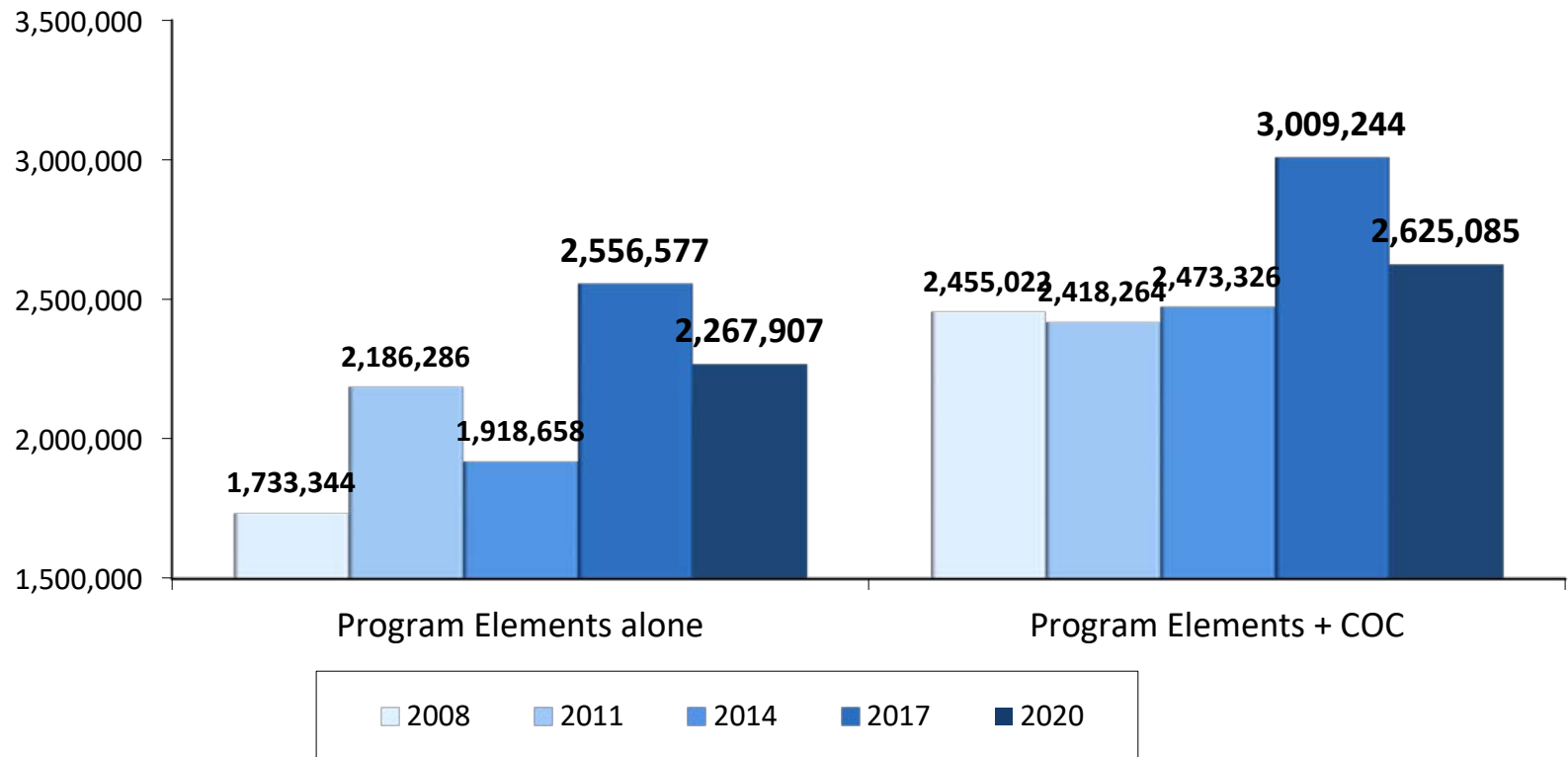


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# VMT – 2005-08, 2009-11, 2012-14, 2015-17, 2018-20\*

## Program Elements Alone; Program Elements + Commuter Operations Center

### Daily VMT Reduced



\* Note that 2018-20 includes only 30 months; Jan-Jun 2020 will be added in evaluation update. All other periods include full 36-month evaluation period.



## Questions?

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