

**OVERVIEW OF THE
TRANSPORTATION EMISSIONS REDUCTIONS MEASURES
ANALYSIS
FOR THE 2013 CLRP AND FY2013-18 TIP**

Commuter Connections Subcommittee
July 16, 2013

WHAT NECESSITATED THE TERMS UPDATE

- 1. MODEL CHANGES:** TPB Travel Demand and Mobile Emissions, which required project inputs to be adjusted and MOVES-compatible emissions estimating methodologies to be developed
- 2. OPPORTUNITY TO FULLY INTEGRATE REGIONAL TRAVEL DEMAND MANAGEMENT (TDM) PROGRAMS INTO THE TERMS ANALYSES:** TPB Commuter Connections and Regional Incident Management Program (MATOC)
- 3. OPPORTUNITY TO BE ALL INCLUSIVE** by incorporating projects from the CLRP/TIP, CMAQ program and local input
- 4. OPPORTUNITY TO TRANSITION INTO A NEW FORMAT** that makes project inventorying, periodic reviews and updates easier

MODEL DRIVEN CHANGES

TPB TRAVEL DEMAND MODEL	EMISSIONS ESTIMATING MODEL
<p>1) Validated to 2010 data:</p> <ul style="list-style-type: none">• 2010 Traffic Counts• 2010 American Community Survey• 2010 Metrorail Counts• 2010 Geographically Focused Household Travel Survey <p>2) Pre-2010 TERMS are now part of the model baseline</p>	<p>1) Transition to MOVES from MOBILE6.2, which are structurally different models, and use of 2011 VIN data for future year projections</p> <p>2) The 2013 CLRP & FY 2013-18 TIP Air Quality Conformity Determination is the first one using MOVES; TERMS analyses needed to be in MOVES for consistency of results</p> <p>3) Mobile emissions inventories for the 2013 CLRP & FY 2013-18 TIP Air Quality Conformity were developed in MOVES Inventory Approach ⁽¹⁾; it generates emissions inventories not emissions rates, which needed to be accounted for during the development of TERMS methodologies</p>

⁽¹⁾: The MOVES Inventory Approach was recommended by the MOVES Task Force

REGIONAL TDM PROGRAMS

TPB COMMUTER CONNECTIONS	REGIONAL INCIDENT MANAGEMENT PROGRAM
<p>1) A successful TDM program with regional reach supported by the three states. Experienced steady growth over time in terms of:</p> <ul style="list-style-type: none">▪ Participation▪ Vehicle Miles Traveled (VMT) reductions regionally▪ Vehicle Trips (VT) reductions regionally <p>2) Opportunity for a full integration of the program into TERMS analyses via:</p> <ul style="list-style-type: none">▪ Systematic Data Exchanges▪ Oversight Committees Briefings▪ Data Collection Coordination▪ Sharing of Databases	<p>1) Metropolitan Area Transportation Operations Coordination (MATOC) operational since 2008</p> <p>2) Clearance House of real-time information sharing when significant incidents occur; monitors, gathers and communicates information to reduce queuing, delays, fuel consumption and mobile emissions</p> <p>3) Regional reach and jointly funded by three states</p> <p>4) Opportunity for an incorporation of its Congestion Mitigation, Incident Management and TDM functions into the TERMS analysis.</p>

ALL INCLUSIVE PROJECT REPRESENTATION

- Fact: “TERMs-like” projects (e.g., sidewalks, trails, bike paths, bike sharing, transit center enhancements) are featured in the 2013 CLRP & FY 2013-18 TIP; however, there is no separate TERMs project category

- Fact: “TERMs-like” projects are not coded in the TPB travel demand model networks or “captured” directly by the model. Non-motorized trips are generated by the model based on inputs such as urban density, employment etc.

- Fact: The CMAQ Program contains the following broad categories of projects:
 - DC: Streetcars, sidewalks and trails
 - MD: Roundabouts, geometric improvements, intersection improvements and state-share of the Commuter Connections Program
 - VA: A transit access ramp off I-66 to the Vienna Metro Station, P&R Lot leasing/expansions, ITS/operational enhancements

THE NEW TERMS PROGRAM

Consists of four broad categories:

- 1) TPB Commuter Connections Program (post-2010)
- 2) Regional Incident Management Program (MATOC)
- 3) Pedestrian Facilities Expansions & Enhancements
- 4) Informal Carpooling Lots

The mobile emissions reductions from TERMS were not used in the 2013 CLRP & FY2013-18 TIP Air Quality Conformity analysis to meet conformity. Instead, they were reported as part of the documentation as available credits to be used, if necessary, to offset future growth in mobile emissions.

COMMUTER CONNECTIONS

Current Activities of the Program:

- 1) Telework Resource Center
- 2) Guaranteed Ride Home
- 3) Expanded telecommuting
- 4) Integrated Rideshare
- 5) Employer Outreach
- 6) Employer Outreach – Bicycling
- 7) Mass Marketing
- 8) Commuter Operations Center

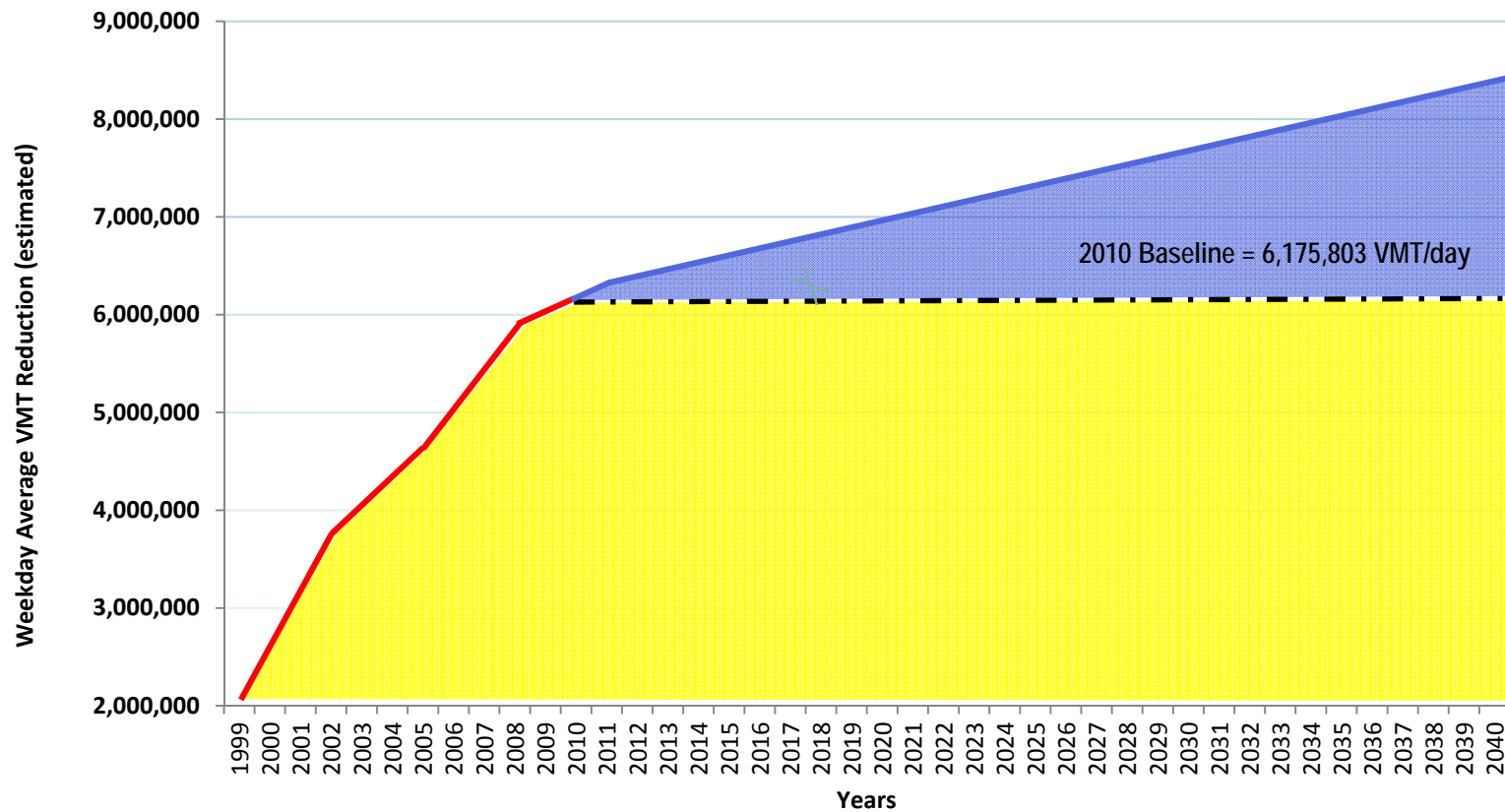


COMMUTER CONNECTIONS PROGRAM REGIONAL VMT REDUCTIONS

Commuter Connections Program

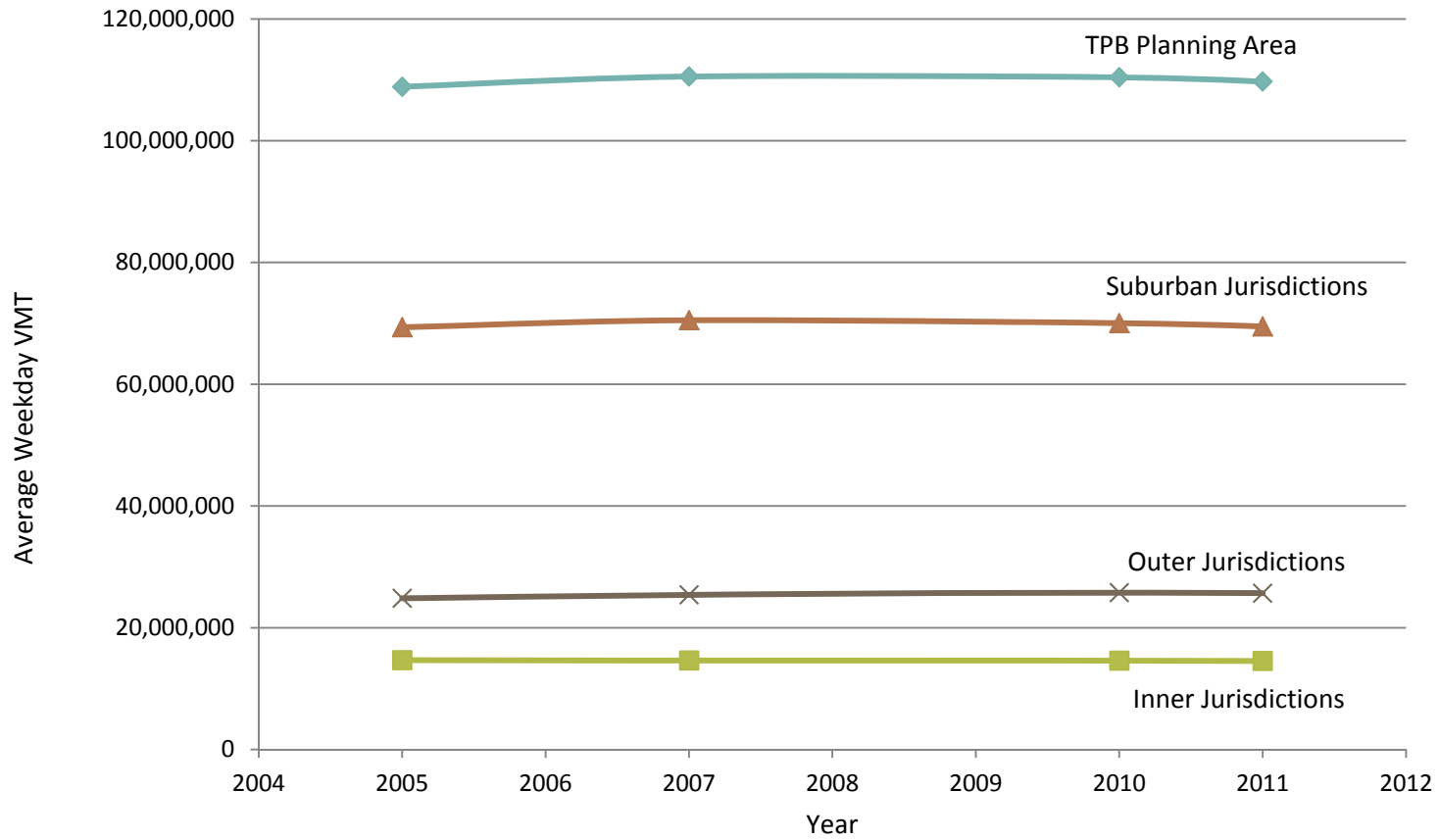
Historic VMT Reduction Estimates (Years 1999-2010)

Future VMT Reduction Projections (Years 2011-2040)



Source: Historic Growth data Courtesy of Commuter Connections

REGIONAL VMT GROWTH (2005-2011)



COMMUTER CONNECTIONS PROGRAM

Methodology:

- 1) Regional Emissions Inventories from passenger cars and light duty trucks
Source: 2013 CLRP & FY 2013-18 TIP Air Quality Conformity MOVES runs
- 2) Regional VMT from passenger cars and light duty trucks
Source: 2013 CLRP & FY 2013-18 TIP Air Quality Conformity MOVES runs
- 3) Regional Mobile Emissions Rates (by Pollutant & Analysis Year):
Mobile Emission Rates = Regional Emission Inventories/Regional VMT
- 4) Mobile Emissions Reductions (by Pollutant & Analysis Year):
Mobile Emission Reductions = Mobile Emission Rates * Weekday Average VMT Reductions

COMMUTER CONNECTIONS PROGRAM

REGIONAL MOBILE EMISSIONS REDUCTION ESTIMATES					
Analysis Years	Ozone- VOC	Ozone-NO _x	PM _{2.5} Direct	PM _{2.5} Precursor NO _x	Winter CO
	(tons/day)	(tons/day)	(tons/year)	(tons/year)	(tons/day)
2015	0.15	0.22	2.22	58.10	3.34
2017	0.17	0.24	2.83	63.13	4.04
2020	0.21	0.26	3.73	67.99	5.10
2025	0.27	0.30	5.29	80.75	7.03
2030	0.33	0.36	7.04	96.49	9.22
2040	0.53	0.54	11.04	146.14	14.63

REGIONAL INCIDENT MANAGEMENT PROGRAM

Core functions of the Metropolitan Area Transportation Operations Coordination (MATOC) Program:

- 1) Real-time information sharing when significant incidents occur
- 2) Monitors, gathers and communicates accurate and timely incident and mobility information
- 3) Reduces incident timeline
- 4) Provides travelers advance warning to modify trip making in order to reduce queue buildup, traffic delays and secondary crashes
- 5) Yields mobile emissions reductions by reducing queue buildup and VMT

REGIONAL INCIDENT MANAGEMENT PROGRAM (MATOC)

Methodology:

1) Regional Mobile Emissions Rates (by Pollutant & Analysis Year):

Regional Emission Rates = Regional Emissions Inventories/Regional VMT

Source: 2013 CLRP & FY 2013-18 TIP Air Quality Conformity

2) Emission Rate Adjustment Factor for slow speeds in an incident queue

Source: 2012 CLRP & FY 2013-18 TIP Air Quality Conformity MOVES Run in Rate Approach for Fairfax County; year 2015

3) Mobile Emissions Reductions (by Pollutant & Analysis Year):

Mobile Emission Reductions = Average Daily or Annual Number of Incidents * Queue VMT Savings * Regional Emissions Rates * Emission Rate Adjust Factor

Source: Average Daily or Annual Number of Incidents, Queue VMT Savings were retrieved from the "MATOC Benefit-Cost Analysis White Paper", June 2010, authored by Sabra, Wang & Associates, Inc.

REGIONAL INCIDENT MANAGEMENT PROGRAM (MATOC)

REGIONAL MOBILE EMISSIONS REDUCTION ESTIMATES					
Analysis Years	Ozone- VOC	Ozone-NO _x	PM _{2.5} Direct	PM _{2.5} Precursor NO _x	Winter CO
	(tons/day)	(tons/day)	(tons/year)	(tons/year)	(tons/day)
2015	0.02	0.03	0.42	10.40	0.24
2017	0.01	0.03	0.36	8.49	0.22
2020	0.01	0.02	0.29	6.59	0.18
2025	0.01	0.02	0.25	5.20	0.19
2030	0.01	0.02	0.23	4.65	0.18
2040	0.01	0.01	0.23	4.49	0.19

PEDESTRIAN FACILITIES EXPANSIONS & ENHANCEMENTS

Methodology:

1. VMT Reductions (per mile) = Baseline VMT Reductions/Baseline Length of Pedestrian Facilities

Where:

Baseline (2010) VMT Reductions = 2010 HBW Bike Trips % * 2010 HBW Trips * Average Bike Trip Length
Baseline (2010) Length of Pedestrian Facilities

Source: 2010 Bicycle and Pedestrian Plan, TPB, October 2010

2. Mileage of New or Expanded Pedestrian Facilities

Source: 2013 CLRP and FY2013-18 TIP

3. Regional Emissions Inventories from passenger cars and light duty trucks

Source: 2013 CLRP & FY 2013-18 TIP Air Quality Conformity MOVES runs

4. Regional VMT from passenger cars and light duty trucks

Source: 2013 CLRP & FY 2013-18 TIP Air Quality Conformity MOVES runs

5. Regional Mobile Emissions Rates (by Pollutant & Analysis Year):

Mobile Emission Rates = Regional Emission Inventories /Regional VMT

6. Mobile Emissions Reductions (by Pollutant & Analysis Year):

Mobile Emission Reductions = VMT Reductions * Mileage of New or Expanded Facilities * Regional Mobile Emission Rates

PEDESTRIAN FACILITIES EXPANSIONS & ENHANCEMENTS

REGIONAL MOBILE EMISSIONS REDUCTION ESTIMATES					
Analysis Years	Ozone- VOC	Ozone-NO _x	PM _{2.5} Direct	PM _{2.5} Precursor NO _x	Winter CO
	(tons/day)	(tons/day)	(tons/year)	(tons/year)	(tons/day)
2015	0.0000	0.0000	0.0003	0.0087	0.0005
2017	0.0000	0.0000	0.0000	0.0007	0.0000
2020	0.0000	0.0000	0.0001	0.0016	0.0001
2025	0.0000	0.0000	0.0001	0.0008	0.0001
2030	0.0000	0.0000	0.0000	0.0000	0.0000
2040	0.0000	0.0000	0.0000	0.0000	0.0000

INFORMAL CARPOOLING LOTS

Methodology:

- 1) Regional Mobile Emissions Rates (by Pollutant & Analysis Year):

Regional Emission Rates = Regional Emissions Inventories/Regional VMT

Source: 2013 CLRP & FY 2013-18 TIP Air Quality Conformity

- 2) Mobile Emissions Reductions (by Pollutant & Analysis Year):

Mobile Emission Reductions = Weekday Average Daily VMT (to/from Slug Lots) * Regional Emissions Rates

INFORMAL CARPOOLING LOTS REGIONAL INVENTORY

	2011 Parking Spaces	Average Trip Length	Daily VMT
FAIRFAX CO.			
AMF Centreville Lanes	31	4.5	186
Apple Federal Credit Union	12	4.5	72
Autumn Willow Park	105	4.5	630
Greenbriar Park	60	7.5	600
LOUDOUN CO.			
Ashburn Farm	20	7.5	200
Ashburn Village	40	7.5	400
Broadlands	30	4.5	180
Potomac Station	50	4.5	300
Sterling Park Shopping Center	46	7.5	460
Crossroads United Methodist Church	90	4.5	540
PRINCE WILLIAM CO.			
Montclair Commuter Lot	49	7.5	490
Harbor Drive	183	7.5	1,830
Good Shepherd United Methodist Church	58	4.5	348
Cherrydale Road	30	4.5	180
Princedale	75	4.5	450
Prince William Stadium	190	4.5	1,140
Bethel United Methodist Church	49	4.5	294
FREDERICK CO.			
Frederick Armory	125	7.5	1,250
Frederick Stadium	112	4.5	672
Mount Zion East	36	4.5	216
Jefferson	105	7.5	1,050
New Market	54	4.5	324
Rosemont	44	7.5	440
Urbana (North Lot)	250	7.5	2,500
Woodsboro	23	4.5	138
PRINCE GEORGE'S CO.			
Beltway (I95 south of I495)	100	7.5	1,000
CALVERT CO.			
Calvert Co Fairgrounds	480	4.5	2,880
Lusby	30	7.5	300

*Source: Commuter
Connections Program &
Local Jurisdictions*

INFORMAL CARPOOLING LOTS

REGIONAL MOBILE EMISSIONS REDUCTION ESTIMATES					
Analysis Years	Ozone- VOC	Ozone-NO _x	PM _{2.5} Direct	PM _{2.5} Precursor NO _x	Winter CO
	(tons/day)	(tons/day)	(tons/year)	(tons/year)	(tons/day)
2015	0.01	0.01	0.11	2.84	0.16
2017	0.01	0.01	0.10	2.32	0.15
2020	0.01	0.01	0.10	1.81	0.14
2025	0.00	0.01	0.10	1.46	0.13
2030	0.00	0.00	0.10	1.30	0.12
2040	0.00	0.00	0.10	1.28	0.13

ALL TERMS CATEGORIES COMBINED

REGIONAL MOBILE EMISSIONS REDUCTION ESTIMATES					
Analysis Years	Ozone- VOC	Ozone-NO _x	PM _{2.5} Direct	PM _{2.5} Precursor NO _x	Winter CO
	(tons/day)	(tons/day)	(tons/year)	(tons/year)	(tons/day)
2015	0.17	0.27	2.75	71.35	3.75
2017	0.19	0.28	3.29	73.94	4.41
2020	0.23	0.28	4.12	76.40	5.43
2025	0.29	0.32	5.64	87.41	7.35
2030	0.34	0.38	7.37	102.43	9.53
2040	0.54	0.56	11.36	151.91	14.95

2013 CLRP & FY2013-18 TIP AIR QUALITY CONFORMITY

REGIONAL MOBILE EMISSIONS INVENTORIES					
Analysis Years	Ozone- VOC	Ozone-NO _x	PM _{2.5} Direct	PM _{2.5} Precursor NO _x	Winter CO
	(tons/day)	(tons/day)	(tons/year)	(tons/year)	(tons/day)
2015	59.20	133.83	1,884.81	46,903.95	561.71
2017	52.47	110.53	1,649.56	38,891.61	516.70
2020	46.65	87.67	1,384.52	31,094.69	481.95
2025	42.87	72.13	1,233.96	25,695.73	466.29
2030	40.56	66.94	1,211.30	23,988.90	473.19
2040	44.07	68.22	1,255.55	24,609.45	508.24
Budgets	66.5	146.1/144.3⁽¹⁾	3,959.0⁽²⁾	126,953⁽²⁾	1,671.5

Notes:

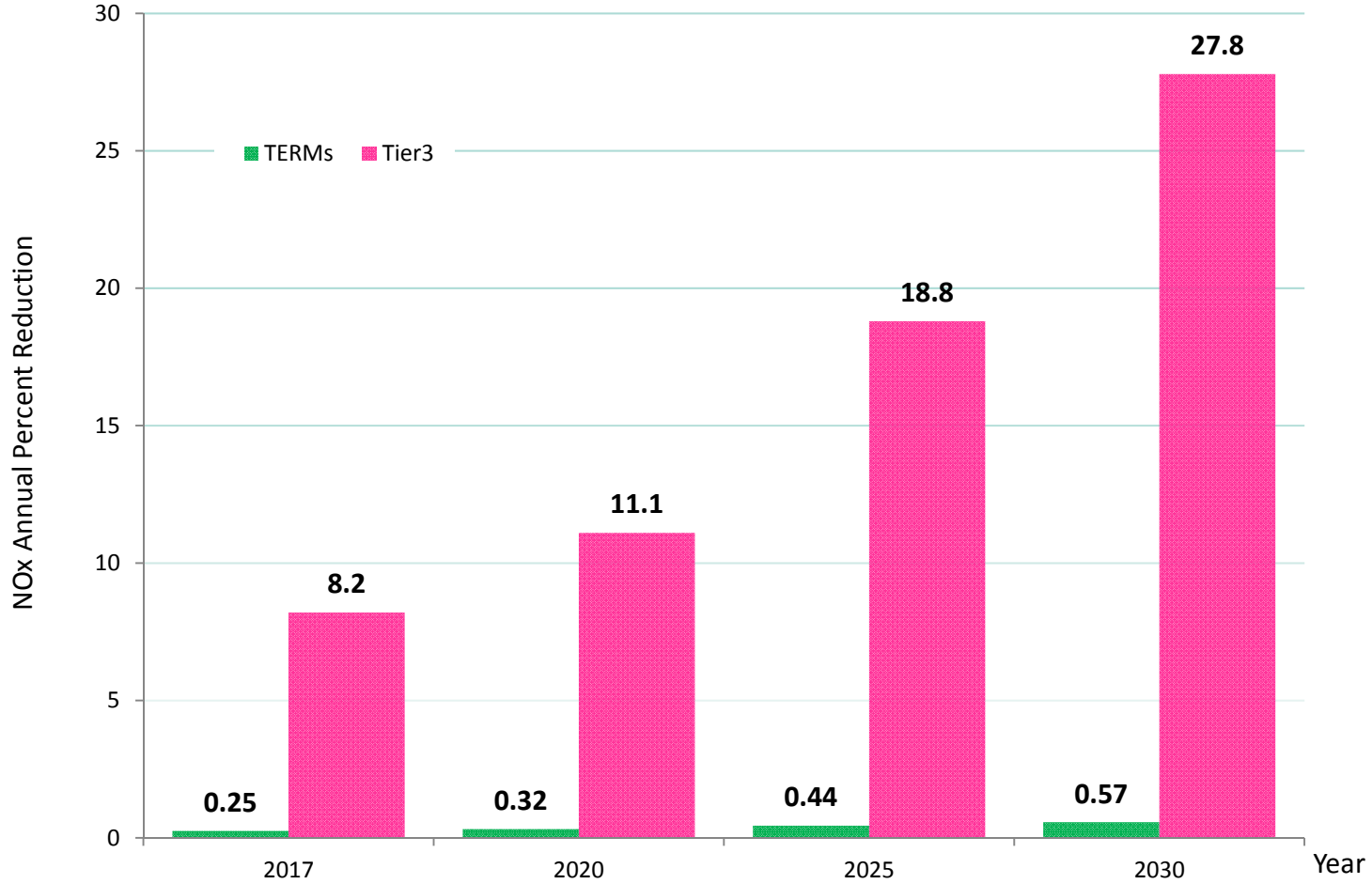
- (1): 2009 Ozone Season NO_x Attainment Budget = 146.1 tons/day & 2010 Ozone NO_x Contingency Budget = 144.3 tons/day
- (2): MWAQC recently approved a PM_{2.5} Maintenance Plan, which contains 2017 and 2025 budgets. Until they are approved by EPA, the Forecast Year emissions should not exceed Base Year 2002 levels. PM_{2.5} Direct (2002 Level) = 3,959 tons/year PM_{2.5} Precursor NO_x (2002 Level) = 126,952 tons/year

THE IMPACT OF TERMS

TERMs EMISSIONS REDUCTIONS as percentages of the 2013 CLRP & FY2013-18 TIP Air Quality Conformity Inventories					
Analysis Years	Ozone- VOC	Ozone-NO _x	PM _{2.5} Direct	PM _{2.5} Precursor NO _x	Winter CO
2015	0.29%	0.20%	0.15%	0.15%	0.67%
2017	0.36%	0.25%	0.20%	0.19%	0.85%
2020	0.49%	0.32%	0.30%	0.25%	1.13%
2025	0.68%	0.44%	0.46%	0.34%	1.58%
2030	0.84%	0.57%	0.61%	0.43%	2.01%
2040	1.23%	0.82%	0.90%	0.62%	2.94%

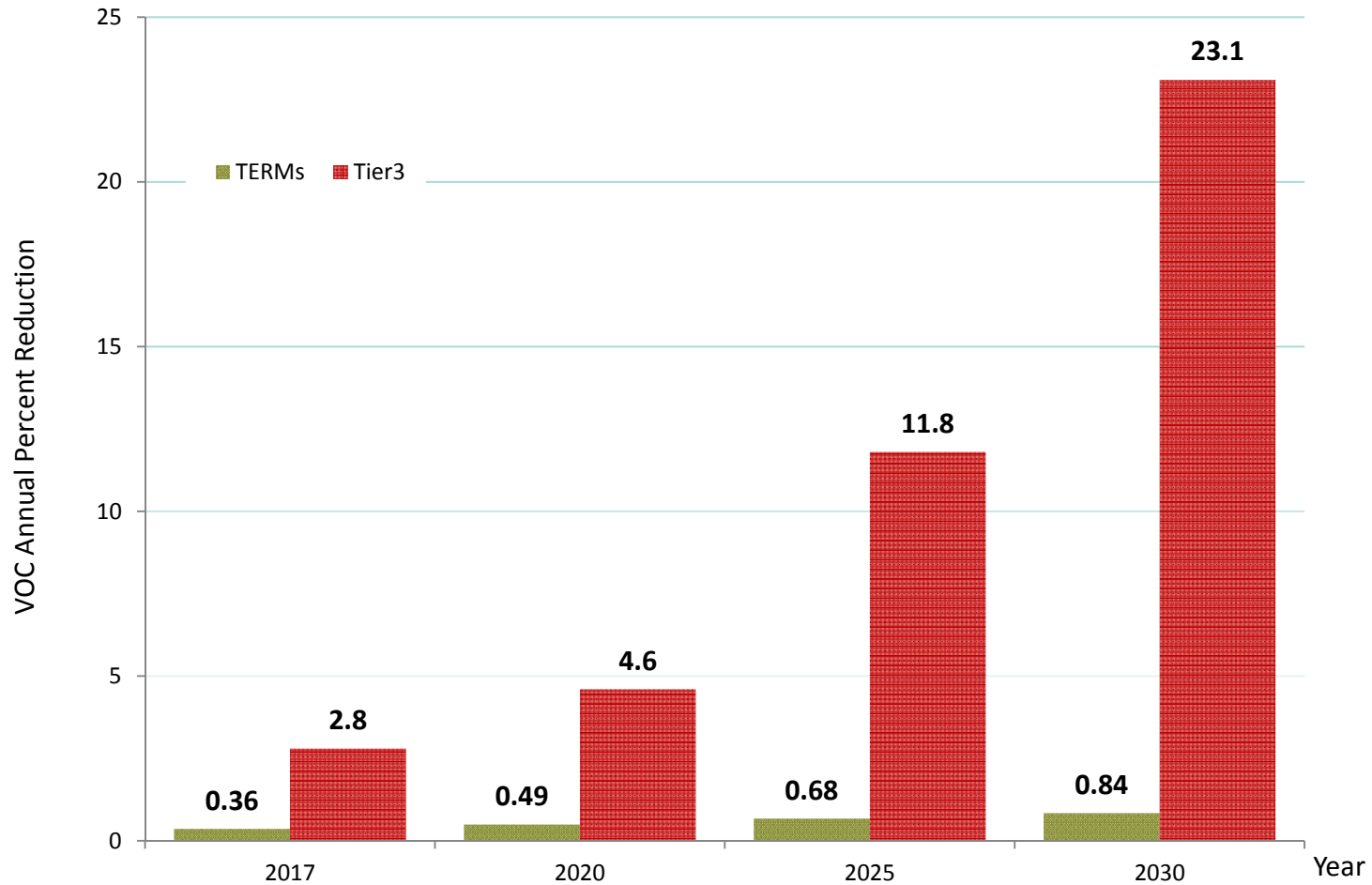
A COMPARATIVE ANALYSIS:

Regional Programs (TERMs) vs Federal Programs (Tier 3)



Source: EPA Draft Regulatory Impact Analysis: Tier 3 Motor vehicle Emission & Fuel Standards, EPA-420-D-13-002, March 2013, Table 7-15

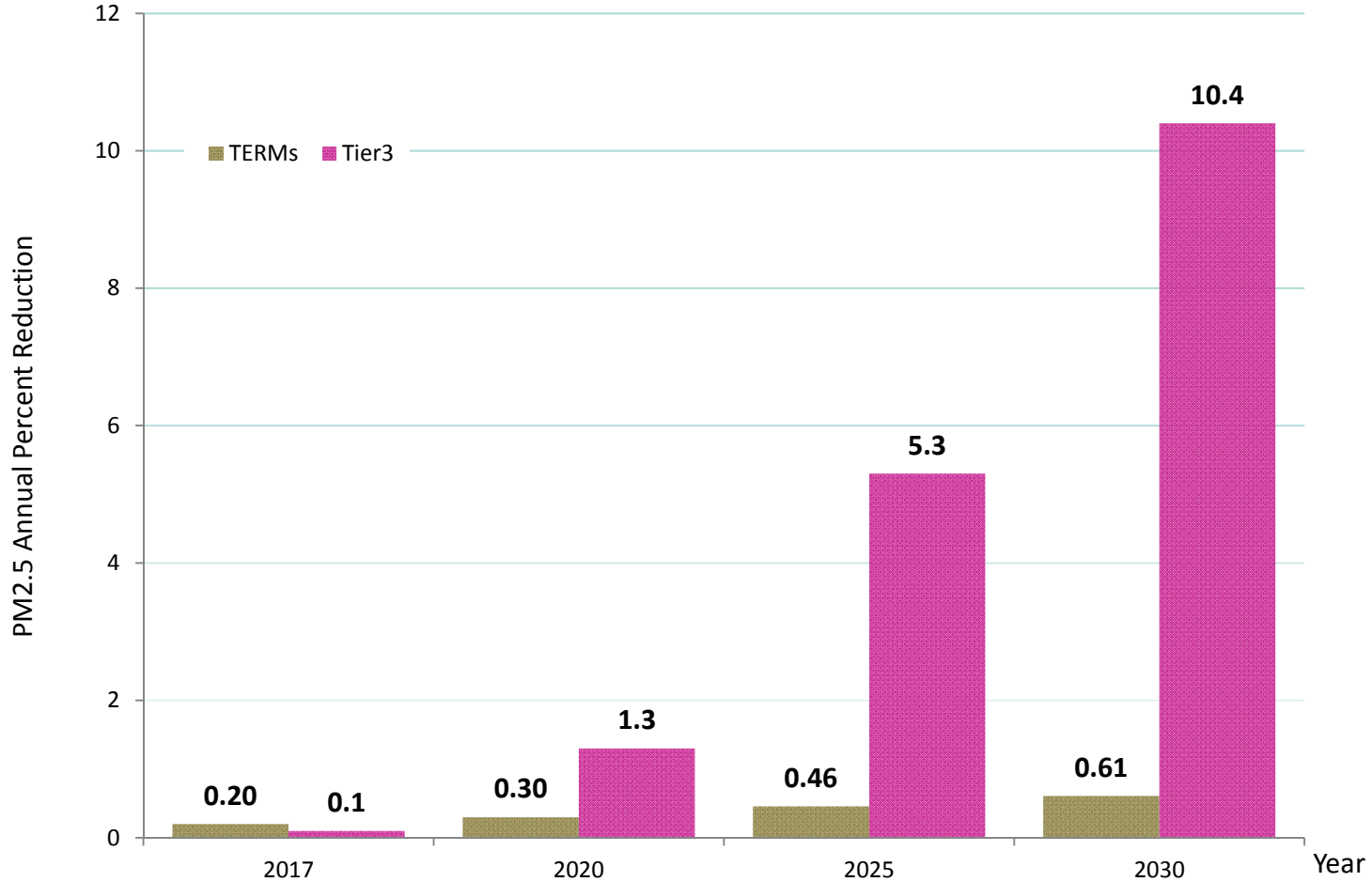
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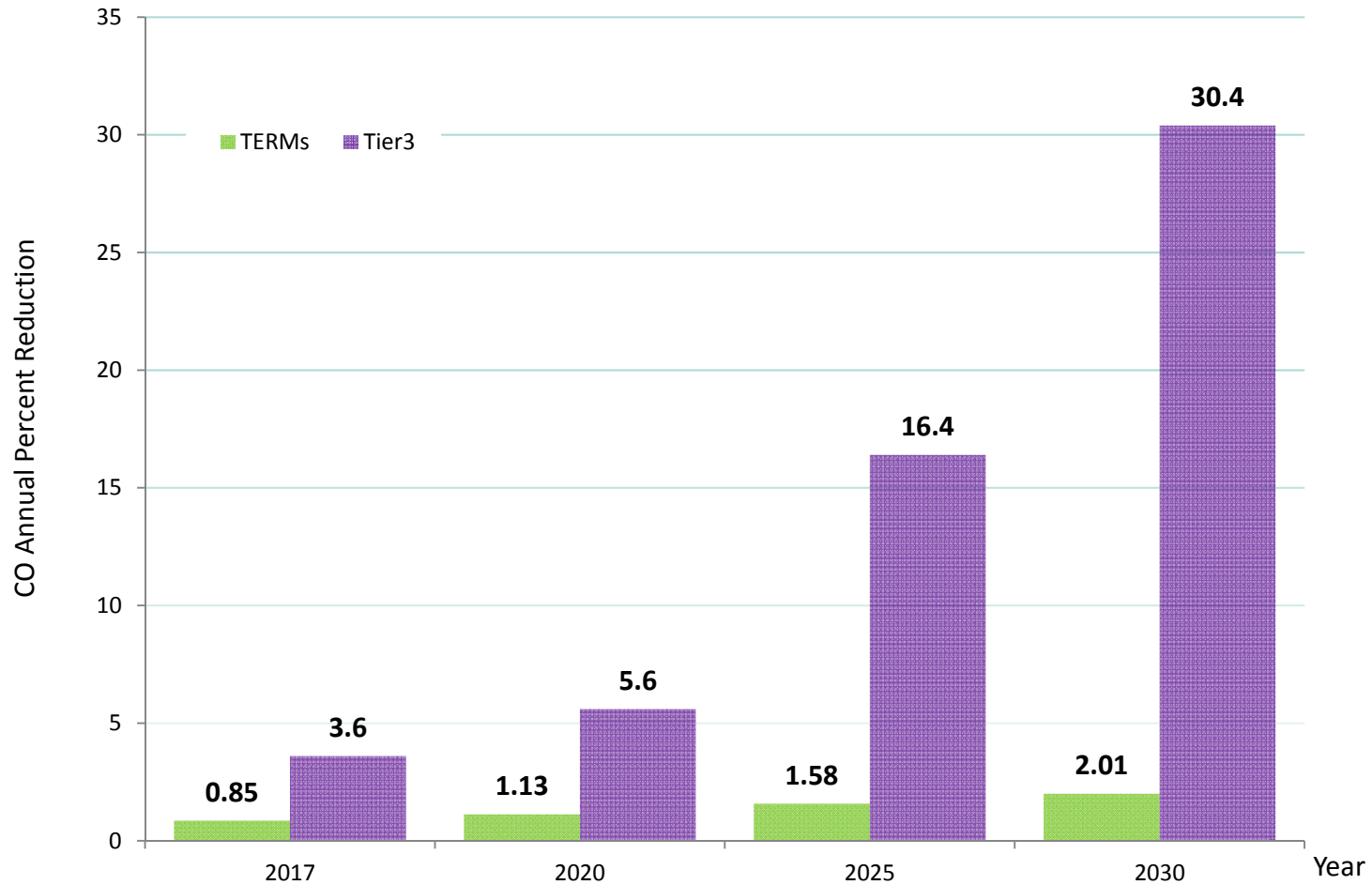
A COMPARATIVE ANALYSIS:

Regional Programs (TERMs) vs Federal Programs (Tier 3)



Source: EPA Draft Regulatory Impact Analysis: Tier 3 Motor vehicle Emission & Fuel Standards, EPA-420-D-13-002, March 2013, Table 7-21

A COMPARATIVE ANALYSIS: Regional Programs (TERMs) vs Federal Programs (Tier 3)



Source: EPA Draft Regulatory Impact Analysis: Tier 3 Motor vehicle Emission & Fuel Standards, EPA-420-D-13-002, March 2013, Table 7-19



» Questions?