Item 4

MOBILE EMISSIONS INVENTORIES FOR FINE PARTICLES POLLUTION

REDESIGNATION REQUEST AND MAINTENANCE PLAN

Background Information
and
Overview of Key Findings

TPB Technical Committee
February 3, 2012

PM2.5 MOBILE EMISSIONS INVENTORIES

Background

- A SIP for PM2.5 was submitted to EPA in April 2008, having attainment goal by 2009

- EPA issued a Clean Data Determination in January 2009 – based on field data -- suspending the need for: attainment demonstrations and associated reasonably available control measures, reasonable further progress plans, and contingency plans for failure to meet NAAQS

PM2.5 MOBILE EMISSIONS INVENTORIES

Components of the Redesignation Request and Maintenance Plan

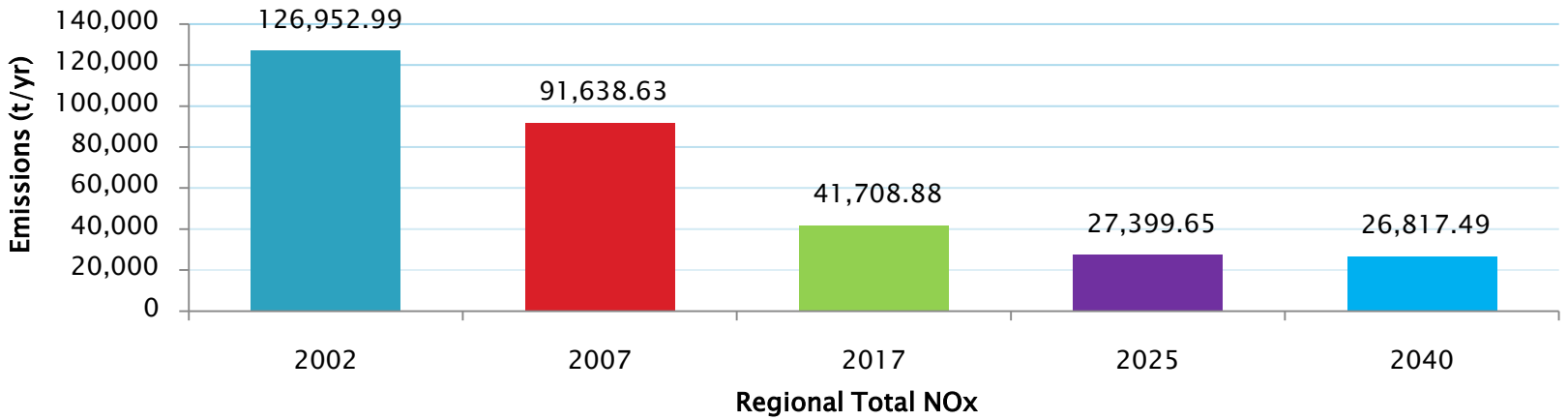
- Submit to EPA a re-designation request to attainment status by withdrawing the following components of the 2008 SIP:
  1. The Plan for reaching attainment status
  2. An analysis of reasonably available control measures
  3. An attainment demonstration
  4. Contingency plans for potential failure to reach attainment air quality standards

- Develop a Maintenance Plan demonstrating compliance with NAAQs across all sources of emissions categories: Point, Area, Non Road and On Road (on road emissions inventories will be calculated using MOVES). Milestone Years are:
  - 2002 (Base Year)
  - 2007 (Attainment Year)
  - 2017 (Interim Year)
  - 2025 (Out Year)

2040 Analyses are for informational purposes

PM2.5 MOBILE EMISSIONS INVENTORIES

Summary of Findings (Precursor NOx)

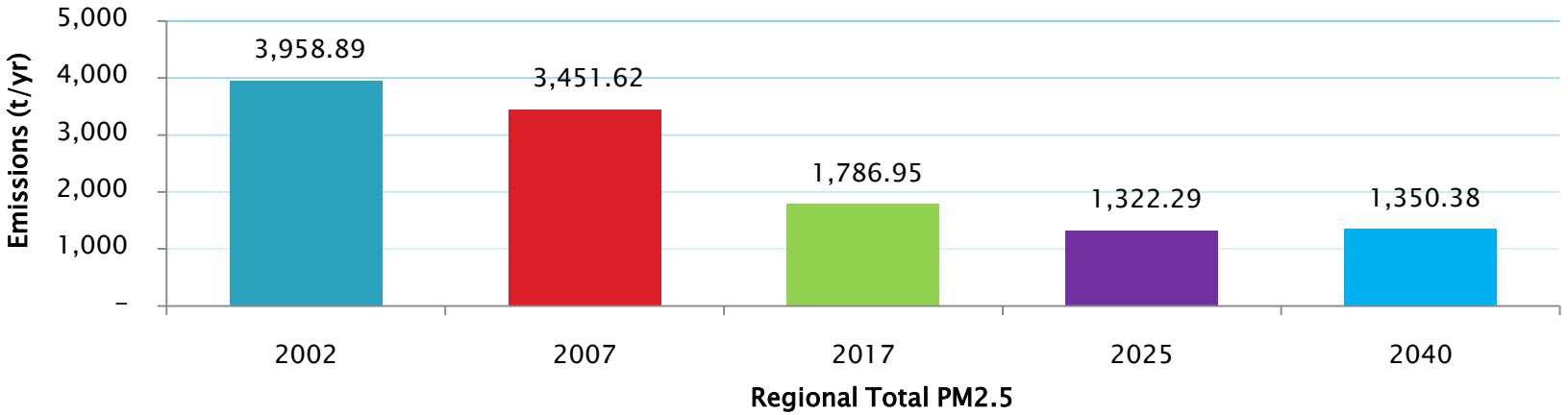


Annual Inventories of Precursor NOx (t/yr)					
State	2002	2007	2017	2025	2040
DC	9,962.80	7,511.73	3,395.06	2,005.43	1,890.08
Suburban MD	63,391.74	47,279.13	22,097.45	14,225.15	13,381.33
Northern VA	53,598.46	36,847.77	16,216.37	11,169.07	11,546.08
Regional Total	126,952.99	91,638.63	41,708.88	27,399.65	26,817.49

2025-40 Difference = 582.16 t/yr

PM2.5 MOBILE EMISSIONS INVENTORIES

Summary of Findings (Primary PM2.5)



Annual Inventories of PM2.5 (t/yr)					
State	2002	2007	2017	2025	2040
DC	302.27	272.39	157.14	123.80	120.25
Suburban MD	2,056.87	1,756.91	890.64	637.90	645.89
Northern VA	1,599.75	1,422.32	739.17	560.59	584.24
Regional Total	3,958.89	3,451.62	1,786.95	1,322.29	1,350.38

2025-40 Difference = 28.09 t/yr

PM2.5 MOBILE EMISSIONS INVENTORIES

Precursor NOx Emission Inventories (Detailed)

		DC	Suburban MD	Northern VA	REGION
2025	REGIONAL TOTAL	2,005.43	14,225.15	11,169.07	27,399.65
	Start Exhaust	334.66	2,622.96	2,226.76	5,184.38
	Running Exhaust	1,528.65	10,216.13	7,816.74	19,561.52
	Extended Idle Exhaust	141.97	1,385.13	1,124.94	2,652.05
	Crankcase Start Exhaust	0.01	0.06	0.05	0.12
	Crankcase Running Exhaust	0.13	0.80	0.53	1.46
	Crankcase Extended Idle Exhaust	0.01	0.06	0.05	0.12

		DC	Suburban MD	Northern VA	REGION
2040	REGIONAL TOTAL	1,890.08	13,381.33	11,546.08	26,817.49
	Start Exhaust	319.63	2,578.23	2,443.72	5,341.59
	Running Exhaust	1,401.49	9,158.23	7,769.92	18,329.64
	Extended Idle Exhaust	168.92	1,644.60	1,332.21	3,145.73
	Crankcase Start Exhaust	0.01	0.05	0.05	0.11
	Crankcase Running Exhaust	0.03	0.18	0.15	0.36
	Crankcase Extended Idle Exhaust	0.00	0.03	0.03	0.06

		DC	Suburban MD	Northern VA	REGION
2040-2025 Change	REGIONAL TOTAL	-115.35	-843.82	377.01	-582.16
	Start Exhaust	-15.03	-44.72	216.96	157.21
	Running Exhaust	-127.16	-1,057.90	-46.82	-1,231.88
	Extended Idle Exhaust	26.95	259.47	207.27	493.68
	Crankcase Start Exhaust	0.00	-0.01	0.00	-0.02
	Crankcase Running Exhaust	-0.10	-0.62	-0.38	-1.10
	Crankcase Extended Idle Exhaust	0.00	-0.03	-0.02	-0.06

PM2.5 MOBILE EMISSIONS INVENTORIES

Primary PM2.5 Emission Inventories (Detailed)

		DC	Suburban MD	Northern VA	REGION
2025	REGIONAL TOTAL	123.80	637.90	560.59	1,322.29
	Start Exhaust	10.14	81.32	76.16	167.62
	Running Exhaust	61.95	352.01	292.01	705.97
	Extended Idle Exhaust	0.34	2.98	2.25	5.57
	Crankcase Start Exhaust	0.09	0.76	0.68	1.54
	Crankcase Running Exhaust	2.49	14.51	9.80	26.79
	Crankcase Extended Idle Exhaust	0.03	0.20	0.13	0.36
	Brakewear	40.01	142.08	139.28	321.37
	Tirewear	8.76	44.05	40.27	93.07

		DC	Suburban MD	Northern VA	REGION
2040	REGIONAL TOTAL	120.25	645.89	584.24	1,350.38
	Start Exhaust	10.07	92.53	87.24	189.84
	Running Exhaust	55.56	328.84	285.06	669.45
	Extended Idle Exhaust	0.27	2.57	2.09	4.93
	Crankcase Start Exhaust	0.08	0.74	0.70	1.52
	Crankcase Running Exhaust	0.43	2.60	2.26	5.29
	Crankcase Extended Idle Exhaust	0.00	0.02	0.02	0.04
	Brakewear	44.37	168.44	161.35	374.17
	Tirewear	9.47	50.14	45.52	105.14

		DC	Suburban MD	Northern VA	REGION
2040–2025 Change	REGIONAL TOTAL	-3.55	7.99	23.65	28.09
	Start Exhaust	-0.07	11.21	11.08	22.22
	Running Exhaust	-6.39	-23.18	-6.95	-36.52
	Extended Idle Exhaust	-0.07	-0.40	-0.16	-0.64
	Crankcase Start Exhaust	-0.01	-0.02	0.01	-0.02
	Crankcase Running Exhaust	-2.06	-11.90	-7.54	-21.50
	Crankcase Extended Idle Exhaust	-0.03	-0.18	-0.11	-0.32
	Brakewear	4.37	26.36	22.07	52.80
	Tirewear	0.72	6.10	5.25	12.07

PM2.5 MOBILE EMISSIONS INVENTORIES

Key Findings

1. Precursor NOx emissions inventories in a declining trend since 2002; year 2025 levels are projected to be 22 percent of what they were in 2002

2. Major reductions in the running exhaust component of the overall NOx emissions were the primary reason for the overall NOx declining trend (technology driven)

3. PM2.5 emissions inventories in a declining trend since 2002; for year 2040 slight increases are projected over 2025 levels due to growth in vehicle use

PM2.5 MOBILE EMISSIONS INVENTORIES

Motor Vehicle Emission Budgets

- ✓ Motor vehicle emissions budgets will be developed for the maintenance plan per EPA Transportation Conformity Regulations:

§93.118(e)(4):

> *"The motor vehicle emissions budget(s), when considered together with all other emissions sources, is consistent with applicable requirements for….maintenance;*
>
> *The motor vehicle emissions budget(s) is consistent with and clearly related to the emissions inventory ….. in the submitted maintenance plan."*

§93.124(a):

> *"Unless the implementation plan explicitly quantifies the amount by which motor vehicle emissions could be higher while still allowing a demonstration of compliance with the milestone, attainment, or maintenance requirement …the MPO may not interpret the budget to be higher than the implementation plan's estimate of future emissions."*

PM2.5 MOBILE EMISSIONS INVENTORIES

Motor Vehicle Emission Budgets

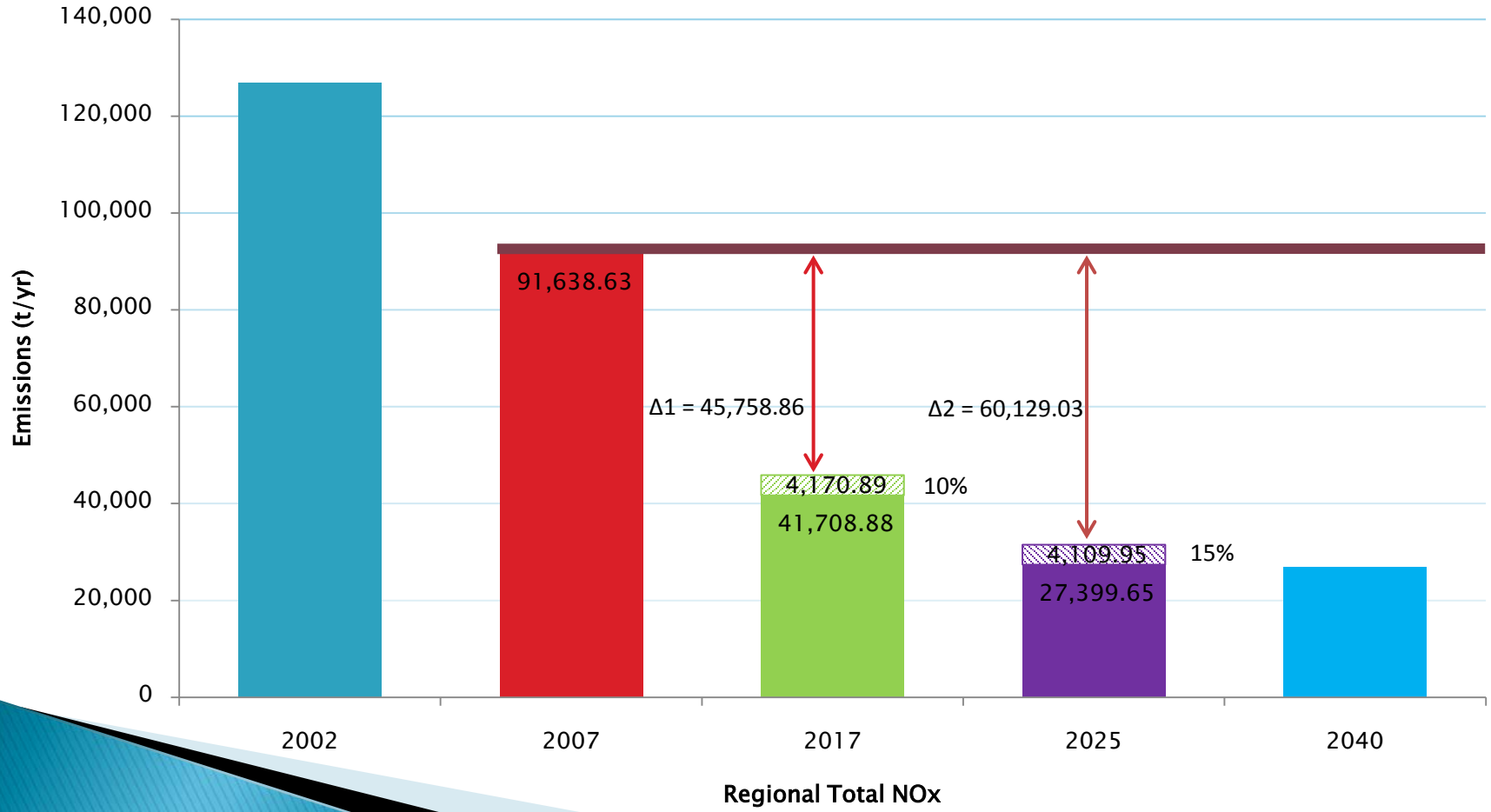
✓ Considerations during Motor Vehicle Emissions Budgets setting:

- Need for reasonable safety margins for years 2017 and 2025 to address uncertainties in future year emissions inventories stemming from future fleet mix projections and new versions of emissions estimation models (currently MOVES 2010a)

- Between 2007 and 2025, motor vehicle emissions are projected to decline at a faster rate than any other source type: 70% for NOx and 62% for PM2.5

PM2.5 MOBILE EMISSIONS INVENTORIES

Potential Motor Vehicle Emissions Safety Margins NOx



PM2.5 MOBILE EMISSIONS INVENTORIES

Potential Motor Vehicle Emissions Safety Margins PM2.5