Fine Particles (PM2.5) Maintenance Plan Update for EPA's 1997 Standard

Transportation Planning Board

January 20, 2016

Item #11

BACKGROUND

1997: EPA Set Fine Particles (PM2.5) Standard

2005: EPA Designated Region as Nonattainment

2008: MWAQC Developed PM2.5 Attainment Plan

2009: EPA Approved Monitor Data Showing Region in Attainment of 1997 PM2.5 Standard

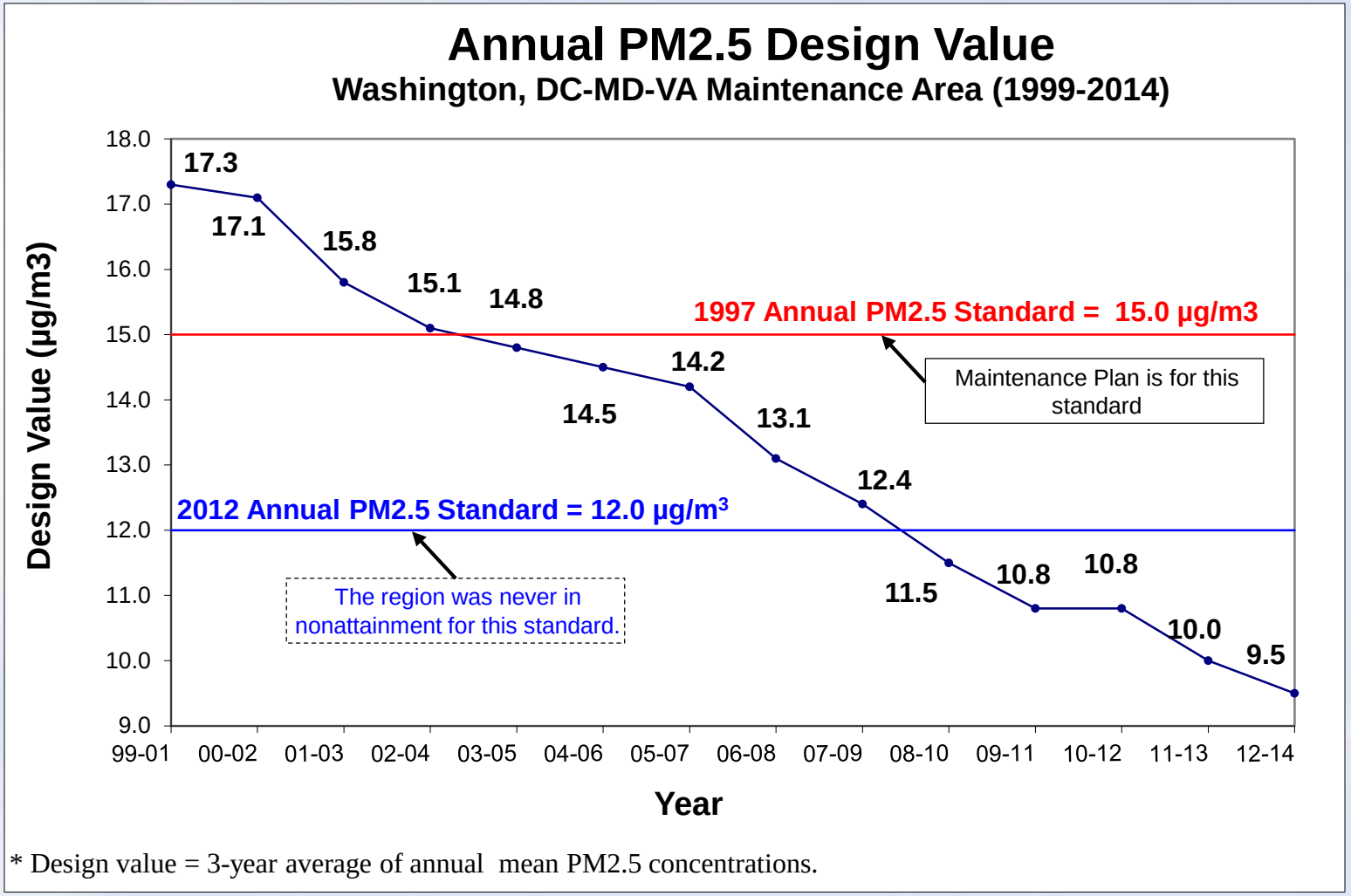
2012: EPA Updated Fine Particles (PM2.5) Standard*

2013: MWAQC Developed Redesignation Request and Original Maintenance Plan with Mobile Budgets

2014: EPA Approved Maintenance Plan and Mobile Budgets, and Redesignated Region as Maintenance Area

Note: * The region was never in nonattainment for this standard; therefore maintenance plan applies to the 1997 standard

MONITORED PM2.5 LEVELS



* Design value = 3-year average of annual mean PM2.5 concentrations.

UPDATE TO PM2.5 MAINTENANCE PLAN

The Original (2013) Fine Particles (PM2.5) Maintenance Plan included a provision (Appendix D) that committed the States to update the Maintenance Plan with new Mobile Budgets

Mobile Budgets set the allowable on-road emissions levels for the Transportation Plan (CLRP) and Program (TIP)

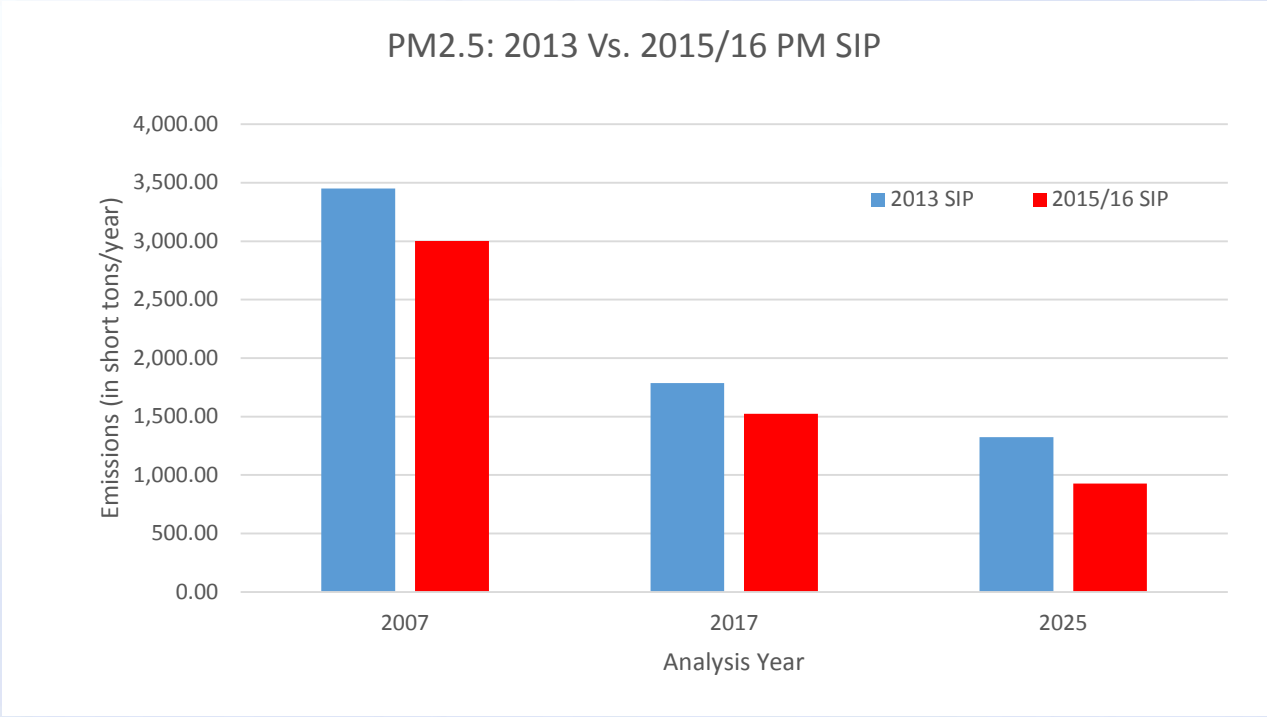
So, TPB staff is providing updated mobile inventories…

Technical Assumptions for On-Road PM2.5 Emissions Inventory Development
Original vs. Updated PM2.5 Maintenance Plan

	Original PM2.5 Inventory	Updated PM2.5 Inventory
CLRP	2011	2015
Land Activity	8.0a	8.4
Travel Demand Model	Version 2.3.36	Version 2.3.57a
Emissions Model	MOVES2010a	MOVES2014
Vehicle Registration Data	2008 VIN/2011 VIN	2008 VIN/2014 VIN
Fuel Program	No Tier 3	Tier 3
PM2.5 Study Area	TPB Modeled Area (10 jurisdictions)	TPB Modeled Area (10 jurisdictions)
Years Analyzed	2002, 2007, 2017, 2025 and 2040	2007, 2017 and 2025

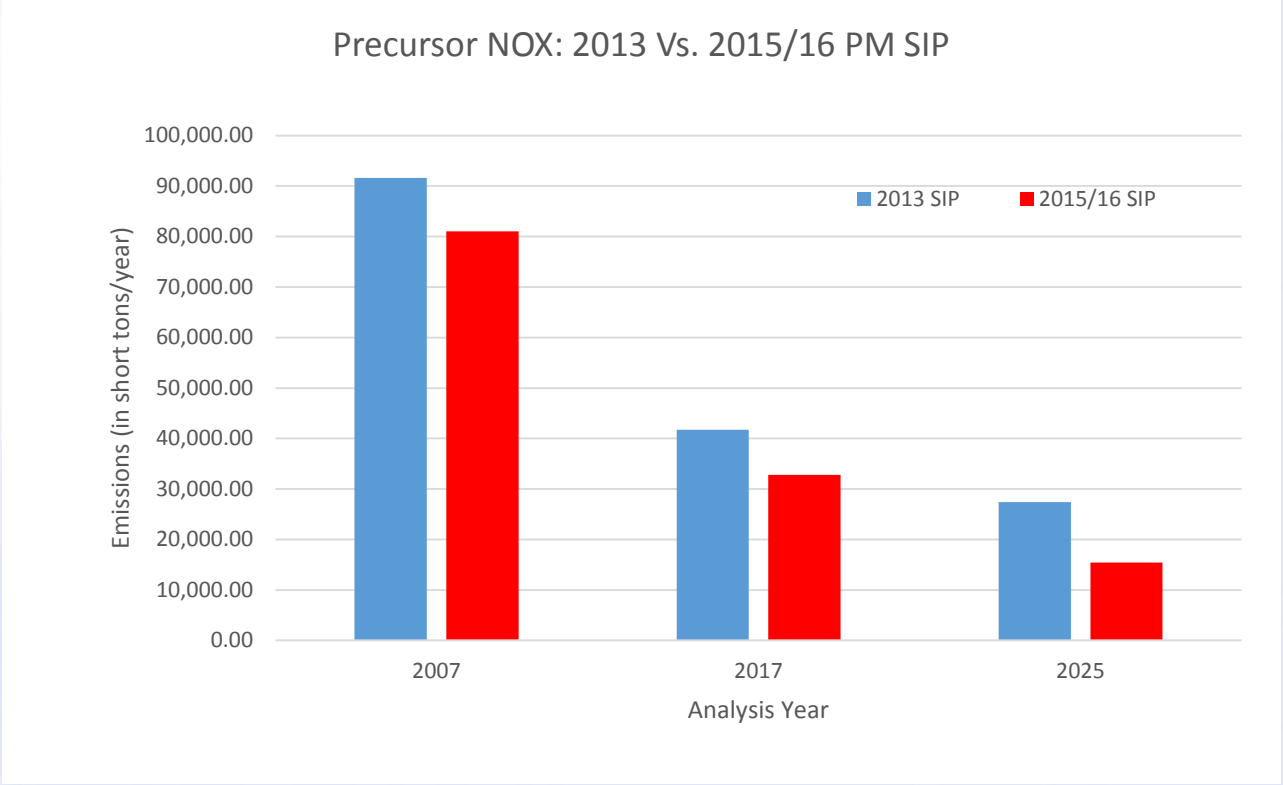
Original vs. Updated PM2.5 Maintenance Plan
On-road Mobile Source - Direct PM2.5 Emissions

Analysis Year	2013 SIP	2015/16 SIP	Δ	%Δ
2007	3,451.62	3,001.67	-449.95	-13%
2017	1,786.94	1,522.67	-264.27	-15%
2025	1,322.29	926.48	-395.81	-30%

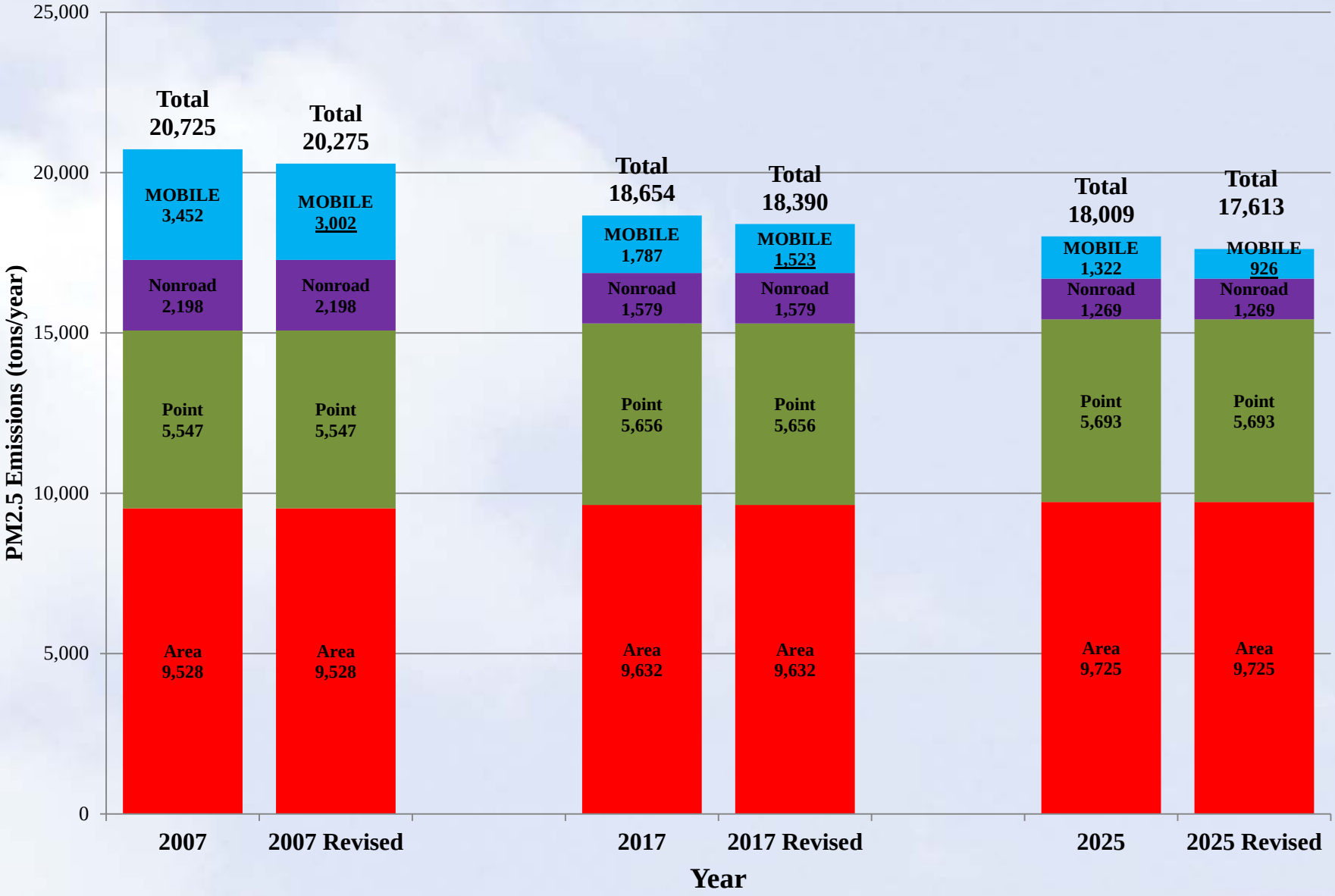


Original vs. Updated PM2.5 Maintenance Plan
On-road Mobile Source – NOx Emissions

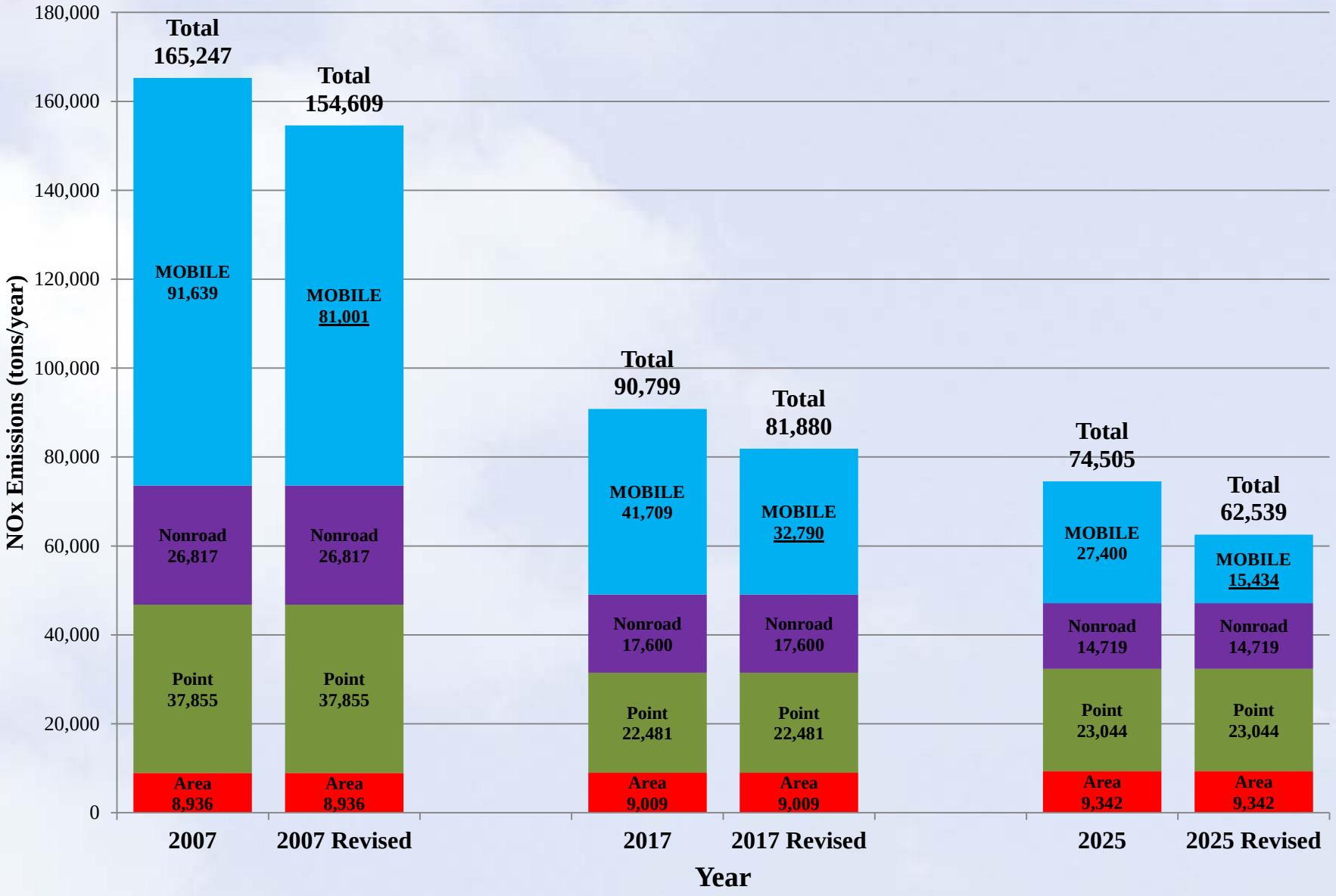
Analysis Year	2013 SIP	2015/16 SIP	Δ	%Δ
2007	91,638.63	81,000.64	-10,637.99	-12%
2017	41,708.88	32,790.05	-8,918.82	-21%
2025	27,399.65	15,433.72	-11,965.93	-44%



Original vs. Updated PM2.5 Maintenance Plan
All Sources - Direct PM2.5 Emissions



Original vs. Updated PM2.5 Maintenance Plan
All Sources - NOx Emissions



MOTOR VEHICLE EMISSIONS BUDGETS

MWAQC (with TPB consultation) sets Mobile Budgets

EPA approved mobile budgets must be used to demonstrate conformity of the Long Range Plan (CLRP) and TIP

- For years 2017-2024, emissions must be less than or equal to the 2017 budgets
- For 2025 and later years, emissions must be less than or equal to the 2025 budgets

Inability to demonstrate conformity to the mobile emissions budgets would cause a “conformity lapse”

MOTOR VEHICLE EMISSIONS BUDGETS

Consequences of Conformity Lapse

- If conformity is not attained, a one-year grace period starts: only projects already in a conforming Plan and TIP can move ahead.
- If conformity is not attained within the grace period, the Plan/TIP enter a conformity lapse period.
- No major new transit or highway projects could move forward during a conformity lapse period.
- The use of Federal Transportation Funds is restricted to:
  - Projects Exempt from Regional Air Quality Conformity determination
  - Projects committed to help attain or maintain air quality standards (Transportation Control Measures -TCMs)
  - Select phases of project development approved or authorized prior to the conformity lapse

MOTOR VEHICLE EMISSIONS BUDGETS

Setting Mobile Budgets vs. Using Mobile Budgets

Maintenance Plan Mobile Budgets:

- **Developed at a fixed point in time for specific future years**
- **Developed using one set of technical inputs, analysis tools, and assumptions**
- **Remain in place for a long period of time (20 years)**
- **Not required to be updated to address changing inputs, tools, or assumptions**

Transportation Conformity demonstrations using the Mobile Budgets:

- **Generally done every year, and future analysis years change**
- **Required to update the technical inputs, analysis tools, and assumptions**

MOTOR VEHICLE EMISSIONS BUDGETS

Uncertainties in Future Mobile Emissions

Examples:

- TPB Travel Demand Model Updates
  - Version2.1C (2002), Version2.1D (2004); Version2.2 (2008); Version 2.3 (2011)
- Future Vehicle Fleet Mix Projections
  - 2014, 2011, 2008, 2005…
  - Sensitivity tests in 2013 showed that NOx and Direct PM2.5 emissions increased by 19 percent and 16 percent, respectively, simply due to an update to the vehicle fleet mix data
- EPA Mobile Emissions Model Updates
  - MOBILE1 (1978), MOBILE2(1981), MOBILE4 (1989), MOBILE4.1 (1991), MOBILE5 (1993), MOBILE5b (1996), MOBILE6 (2002), MOBILE6.2 (2004), MOVES2010 (2010), MOVES2014 (2014)
  - NOx and Direct PM2.5 emissions increased by 126 percent and 76 percent, respectively, when comparing Mobile6.2 to MOVES, when keeping all other inputs

MOTOR VEHICLE EMISSIONS BUDGETS

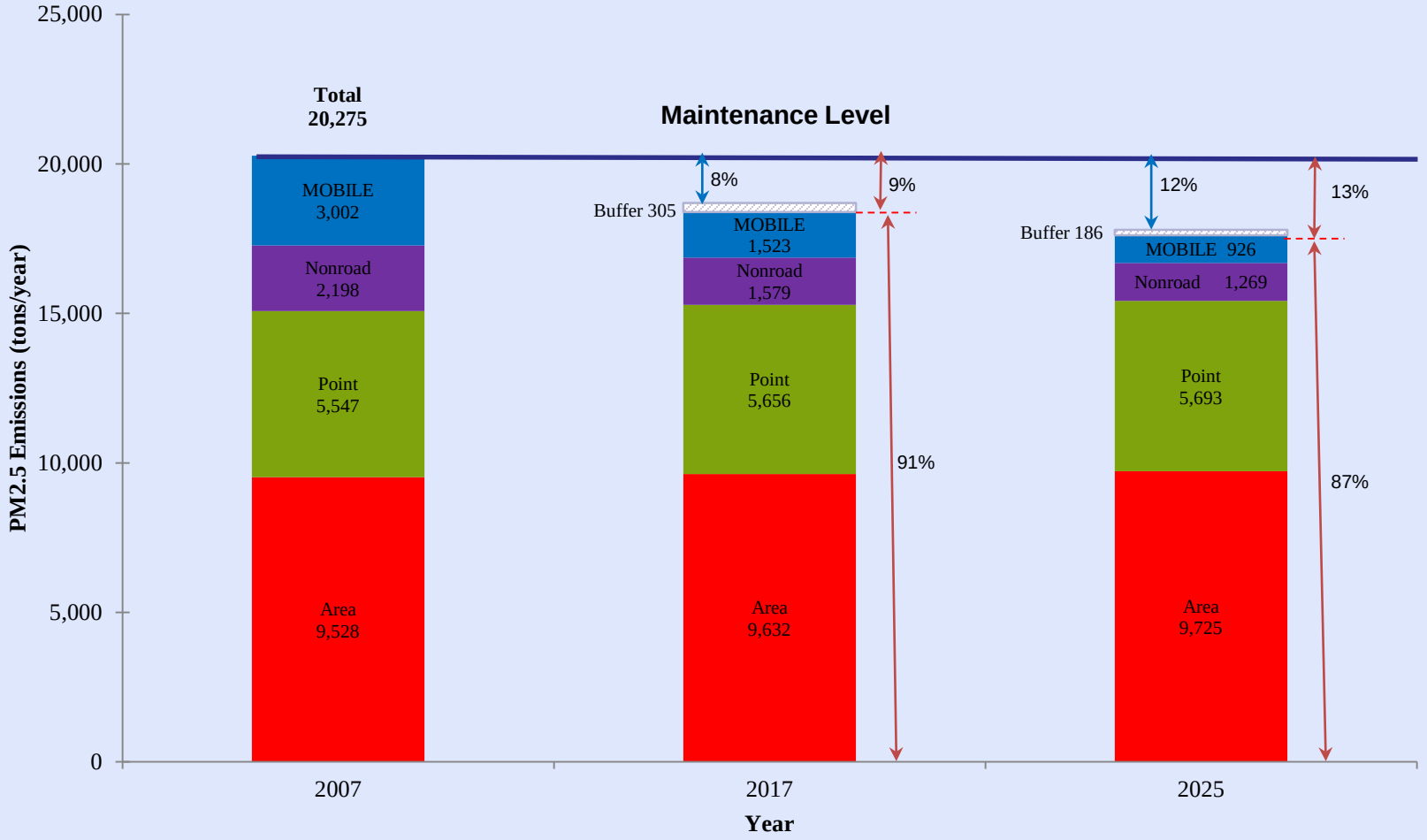
TPB Recommendation

TPB is recommending a 20% buffer above the current emissions inventories to accommodate the impact of technical uncertainties in the future.

- **Federal regulations provide for establishing a "buffer"/"safety margin" in mobile emissions budgets.**
- **The use of emissions buffers is common practice in Maintenance Plans around the country.**
- **Original (2013) PM2.5 MP provides a 20% buffer**

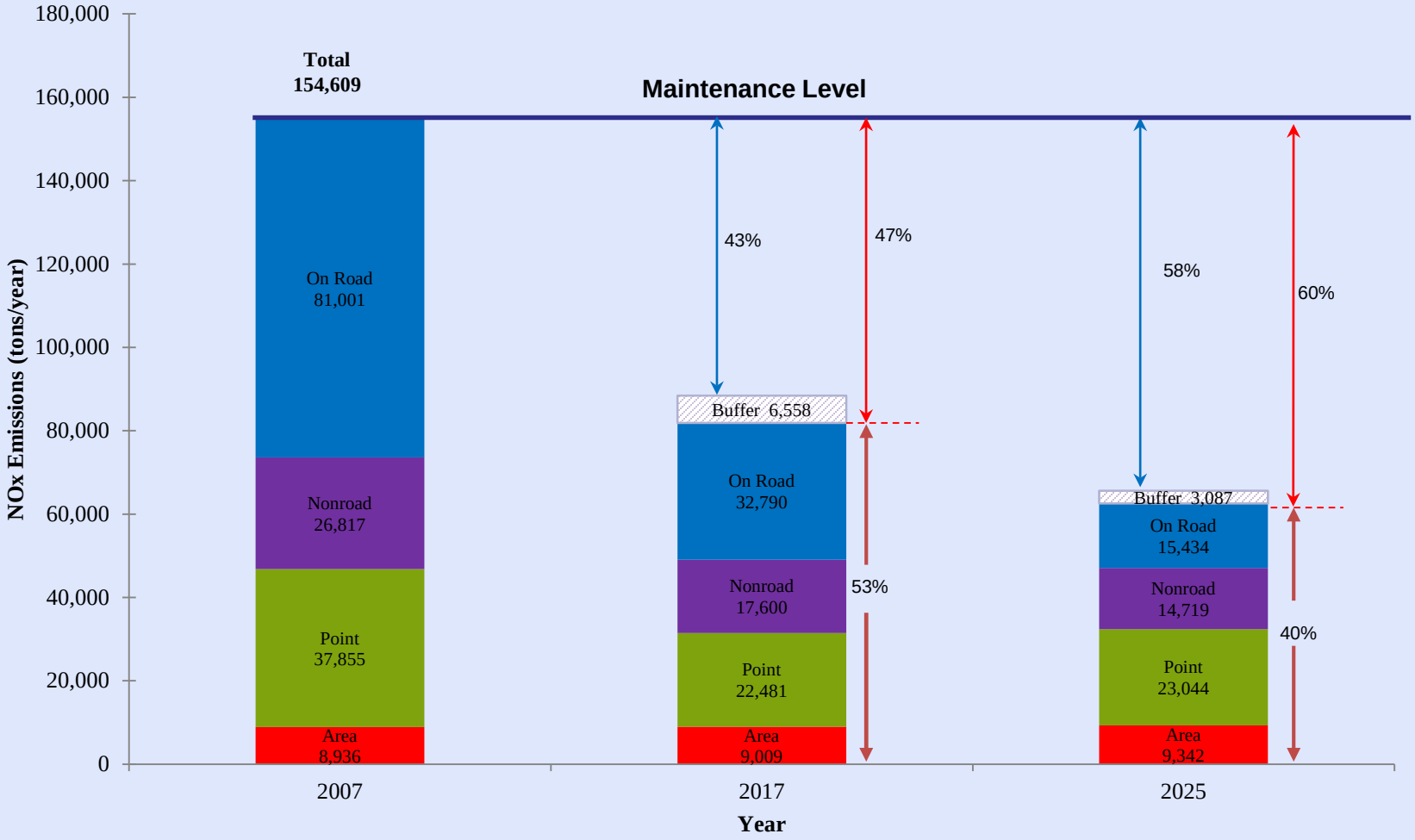
MOTOR VEHICLE EMISSIONS BUDGETS

Transportation Buffers as Percentages of Maintenance Level for PM2.5



MOTOR VEHICLE EMISSIONS BUDGETS

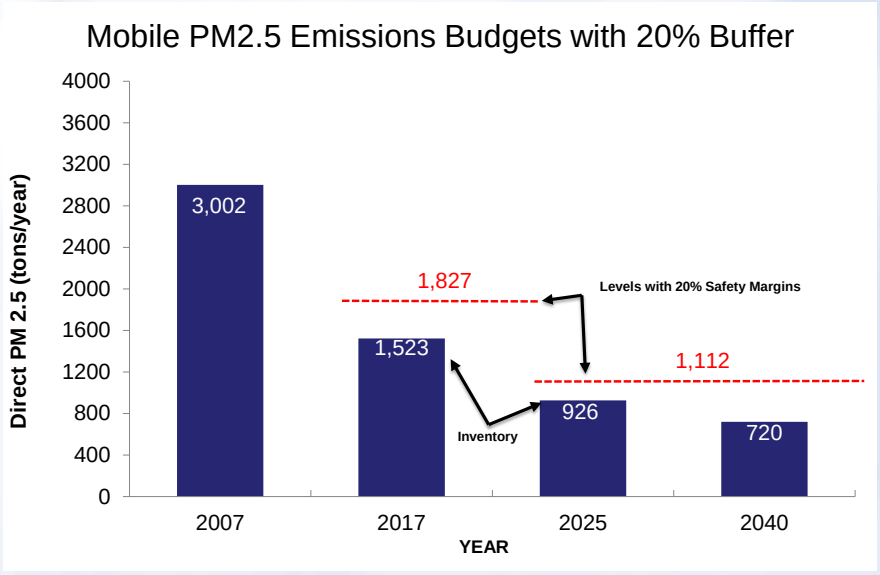
Transportation Buffers as Percentages of Maintenance Level for NOx

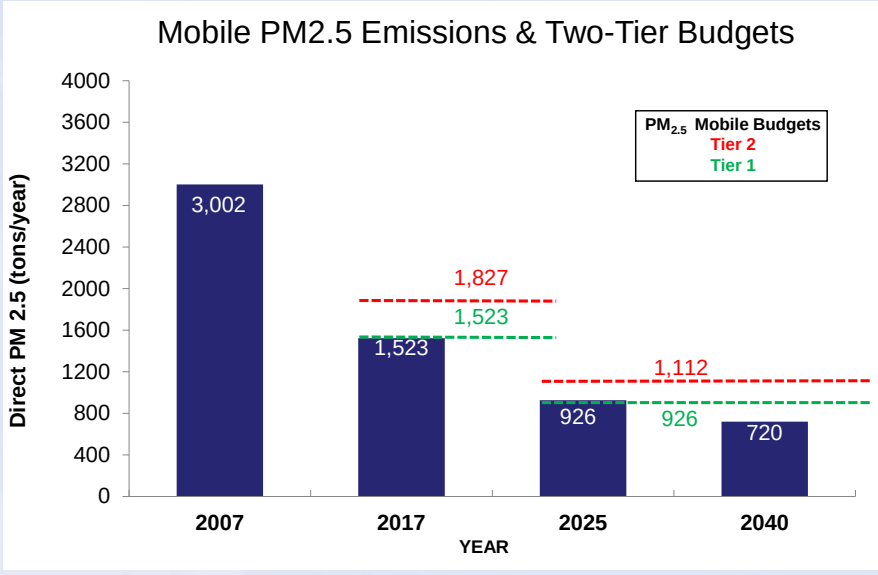


APPROACHES TO MOBILE BUDGETS UNDER CONSIDERATION

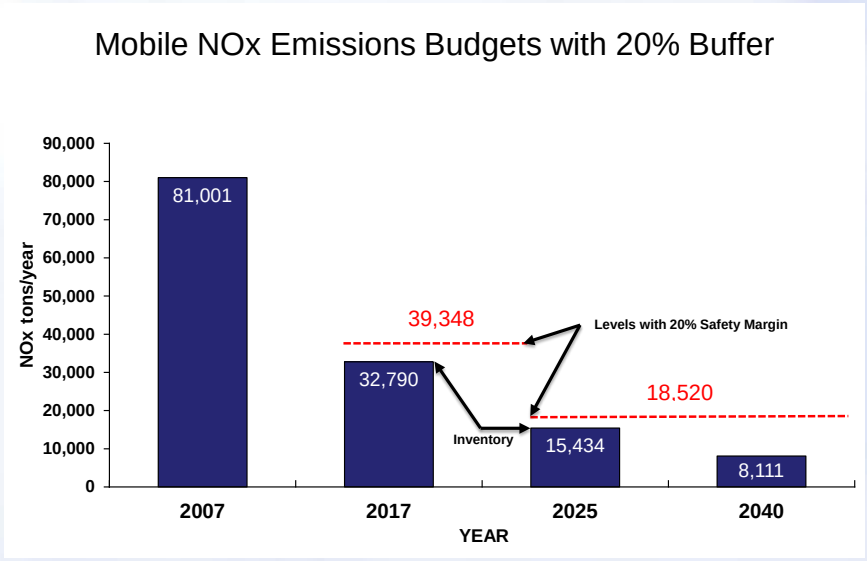
- Original PM2.5 Maintenance Plan Approach (2013)
  - Tier 1 and Tier 2 Mobile Budgets (Direct PM2.5 & NOx) for 2017 and 2025
  - Tier 2 Mobile Budgets would be triggered if it is determined that technical uncertainties due to model changes and to vehicle fleet turnover, which may affect future motor vehicle emissions inventories, lead to motor vehicle emissions estimates above the Tier 1 Mobile Budgets
- Updated PM2.5 Maintenance Plan Approaches Under Consideration (2016)
  - Mobile Budgets including 20% Transportation Buffer
  - Two Tiered Approach as in 2013 (Tier 1 & Tier 2)

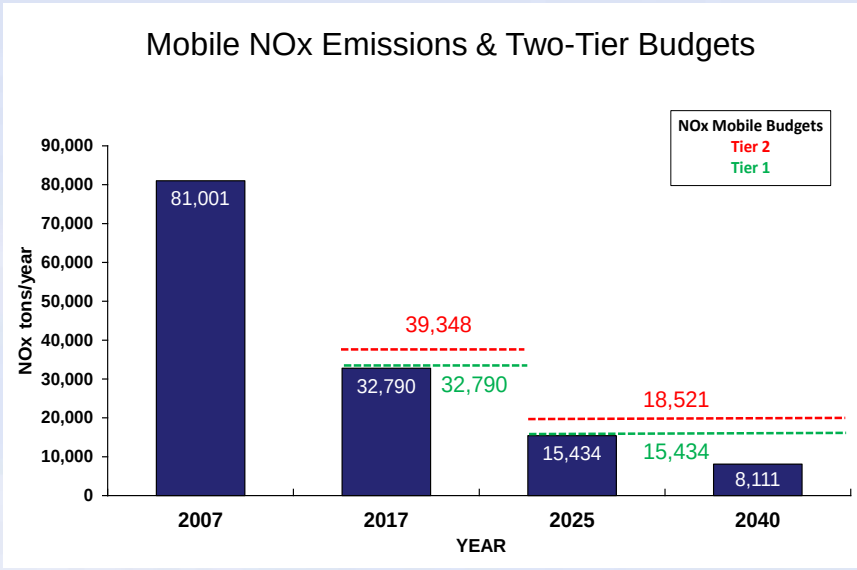
Updated PM2.5 Maintenance Plan
On-road Mobile Source Emissions Budgets Under Consideration
Direct PM2.5





Updated PM2.5 Maintenance Plan
On-road Mobile Source Emissions Budgets Under Consideration
Precursor NOx





Maintenance Plan Update Schedule

December 18, 2015	Emissions Inventory Subcommittee Call: Review Inventories for all Sectors and Discuss Updated Mobile Budgets
January 8, 2016	TPB-Technical Committee: Inventory and Updated Mobile Budget Presentation
January 12, 2016	MWAQC-TAC: Inventory and Updated Mobile Budget Presentation
January 20, 2016	TPB: Inventory and Updated Mobile Budget Presentation
February 9, 2016	MWAQC-TAC: Draft Maintenance Plan Approval for MWAQC Consideration
February 24, 2016	MWAQC: Maintenance Plan Approval for Public Comment and Hearing
March-April, 2016	Public Comment and Hearing
May 25, 2016	MWAQC: Final Approval for Submittal to EPA
June, 2016	States Submit Updated Maintenance Plan to EPA