

PM2.5 Maintenance Plan Update



TPB-Technical Committee Meeting
January 8, 2016

Background

- EPA set standards for fine particles (PM_{2.5}) in 1997 at
 - 15.0 ug/m³ (annual) – changed to 12.0 ug/m³ (2012)
 - 65 ug/m³ (24 hour average) – changed to 35 ug/m³ (2006)
- EPA designated the Washington, DC-MD-VA region as “nonattainment” for the annual PM_{2.5} standard in 2005
- Washington region submitted PM_{2.5} SIP (Attainment Plan) in 2008
- After attaining PM_{2.5} standard, Washington region submitted a request to redesignate the region to attainment and a demonstration to maintain the compliance with standard in 2013 (PM_{2.5} Redesignation Request & Maintenance Plan)

Elements of PM2.5 Redesignation Request & Maintenance Plan

- **Air Quality Data**
 - Air quality (fine particles or PM2.5) data to show compliance with the 1997 PM2.5 standard
- **Emissions Inventories (Point, Area, Nonroad, and On-road Sources)**
 - **Redesignation Request:**
 - SIP Base Year 2002 & Attainment Year 2007 demonstrating a decline in emissions between two years
 - **Maintenance Plan:**
 - Attainment Year 2007, Intermediate Year 2017, Final Maintenance Year 2025
 - Demonstrate compliance ten years into future by showing lower emissions in 2017 and 2025 compared to 2007
- **Motor Vehicle Emissions Budgets (MVEBs)**
 - Mobile emissions ceiling for transportation conformity purposes
- **Contingency Measures**
 - In case region exceeds PM2.5 standard in future, these measures would be implemented
- **State Compromise (Appendix D)**
 - Voluntary agreement between DOEE, MDE, and VDEQ to further address PM2.5 and ozone

Need to Update PM2.5 Maintenance Plan

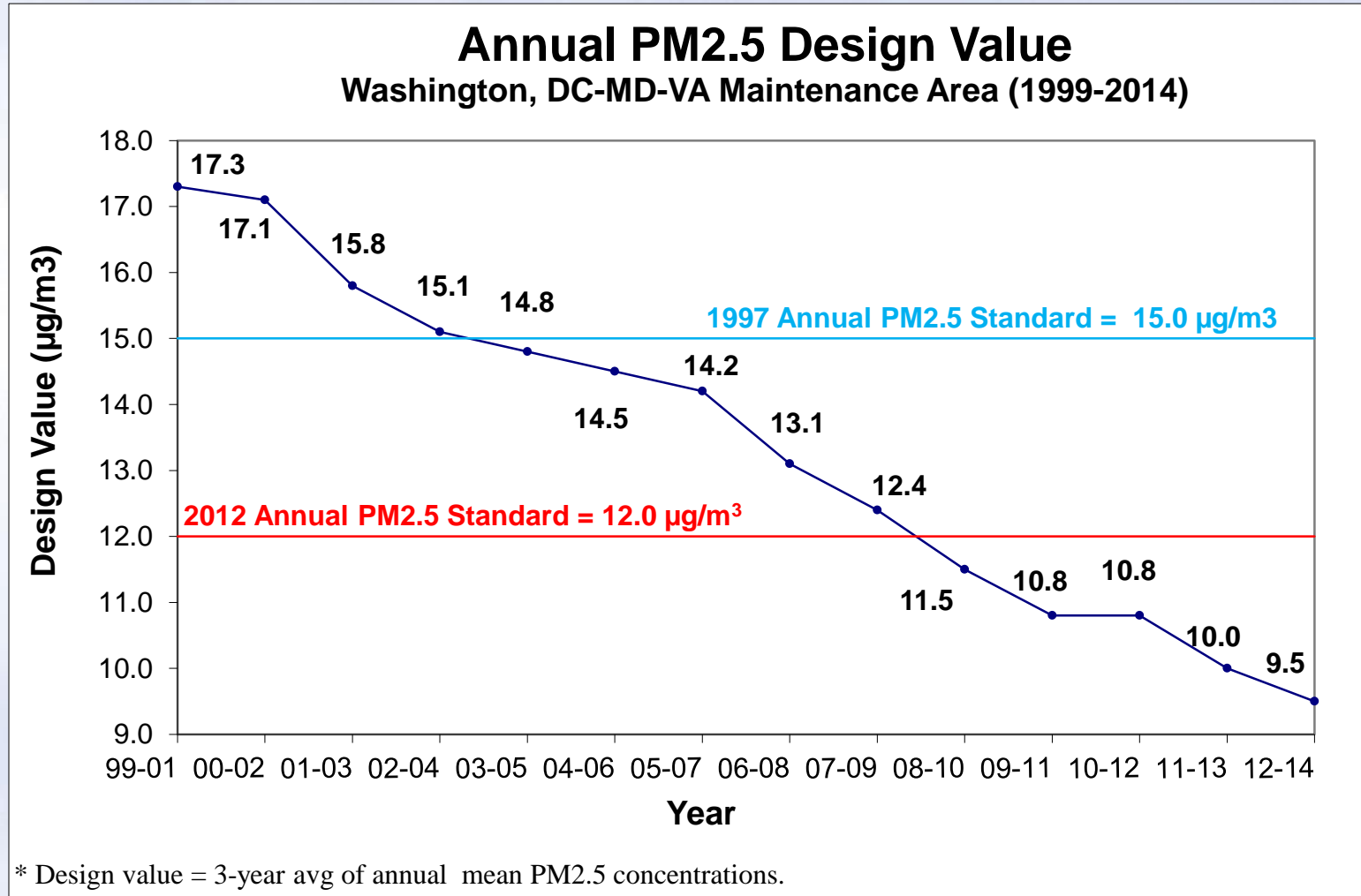
- **State Compromise (Appendix D)**
 - Is why we are updating the PM2.5 maintenance plan
 - Included an agreement between states:
 - To evaluate and submit updated annual PM2.5 & NOx MVEBs for 2017 and 2025 by the end of 2015 and to re-evaluate these budgets in 2018 to accommodate transportation planning issues when CLRP year is extended beyond 2040
 - Agreement is voluntary, not a federal requirement
- **Revision of Mobile Budgets Requires Plan Update**
 - EPA requires that emissions from the other three sectors (point, area, and nonroad) also be updated or that a justification for not updating those sectors be included while submitting revised mobile budgets

Updates in the PM2.5 Maintenance Plan

- **Electric Generating Units (Point Source)**
 - DC & VA emissions – No updates
 - MD emissions: No change, but includes a description of new power plant NOx regulations recently adopted
- **Non-EGU (Point), Area & Nonroad Mobile Sources**
 - No updates
 - Growth & control assumptions used to project future emissions either did not change or changed mostly in favor of lower emissions
- **Onroad Mobile Source**
 - Emissions revised with EPA's MOVES2014 model

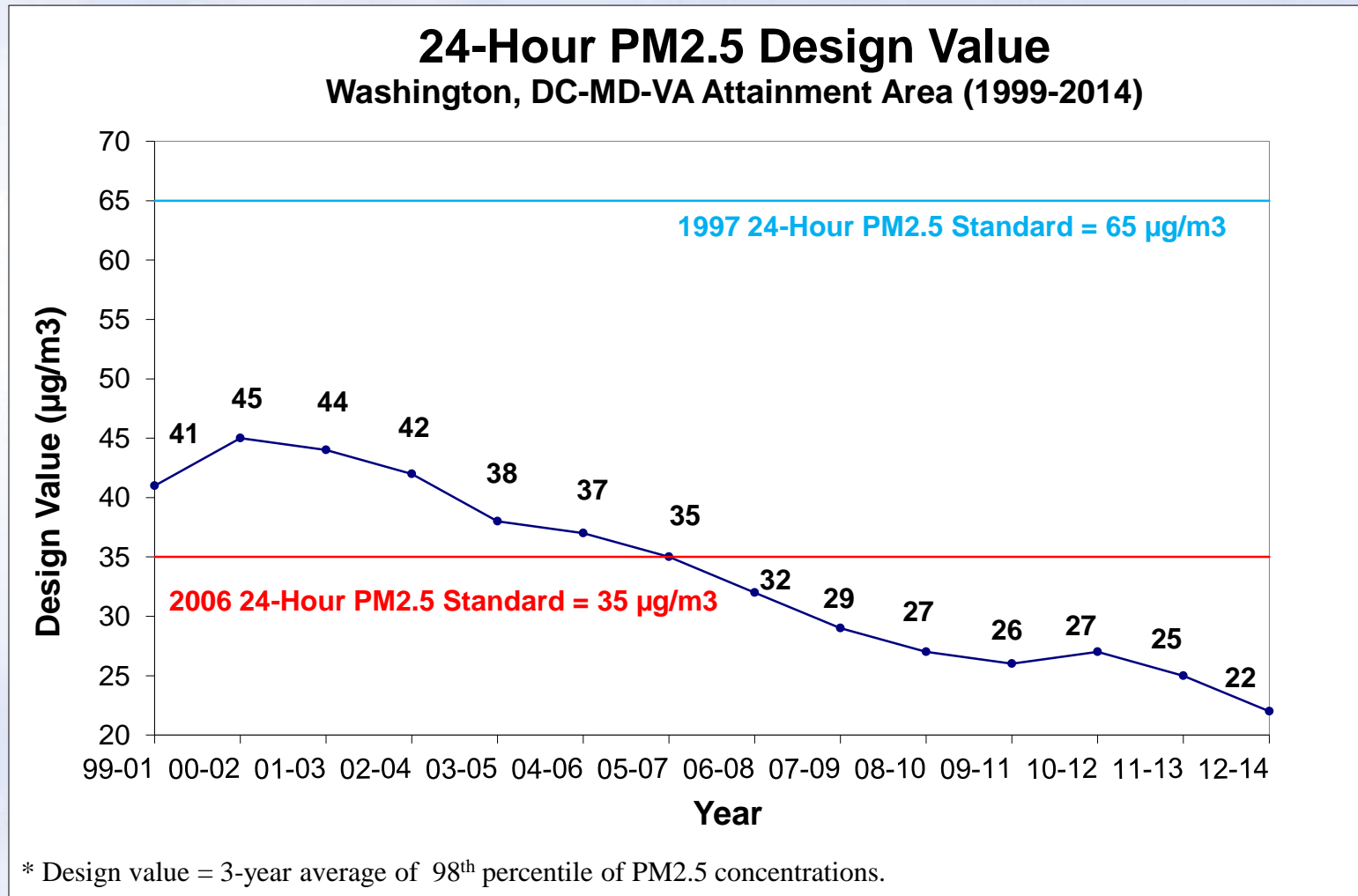
Trend in Ambient PM2.5 Levels

Washington DC-MD-VA PM2.5 Nonattainment Area

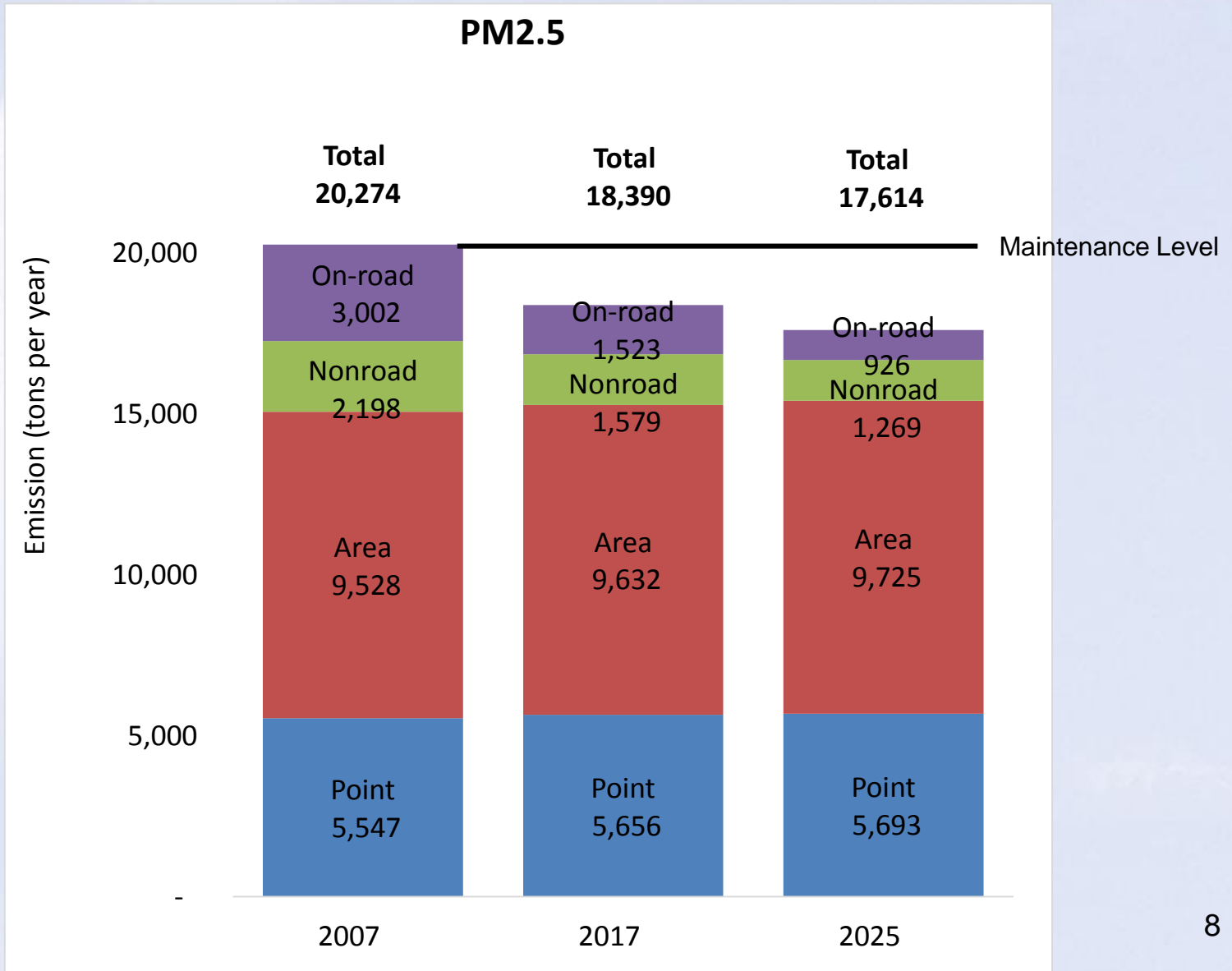


Trend in Ambient PM2.5 Levels

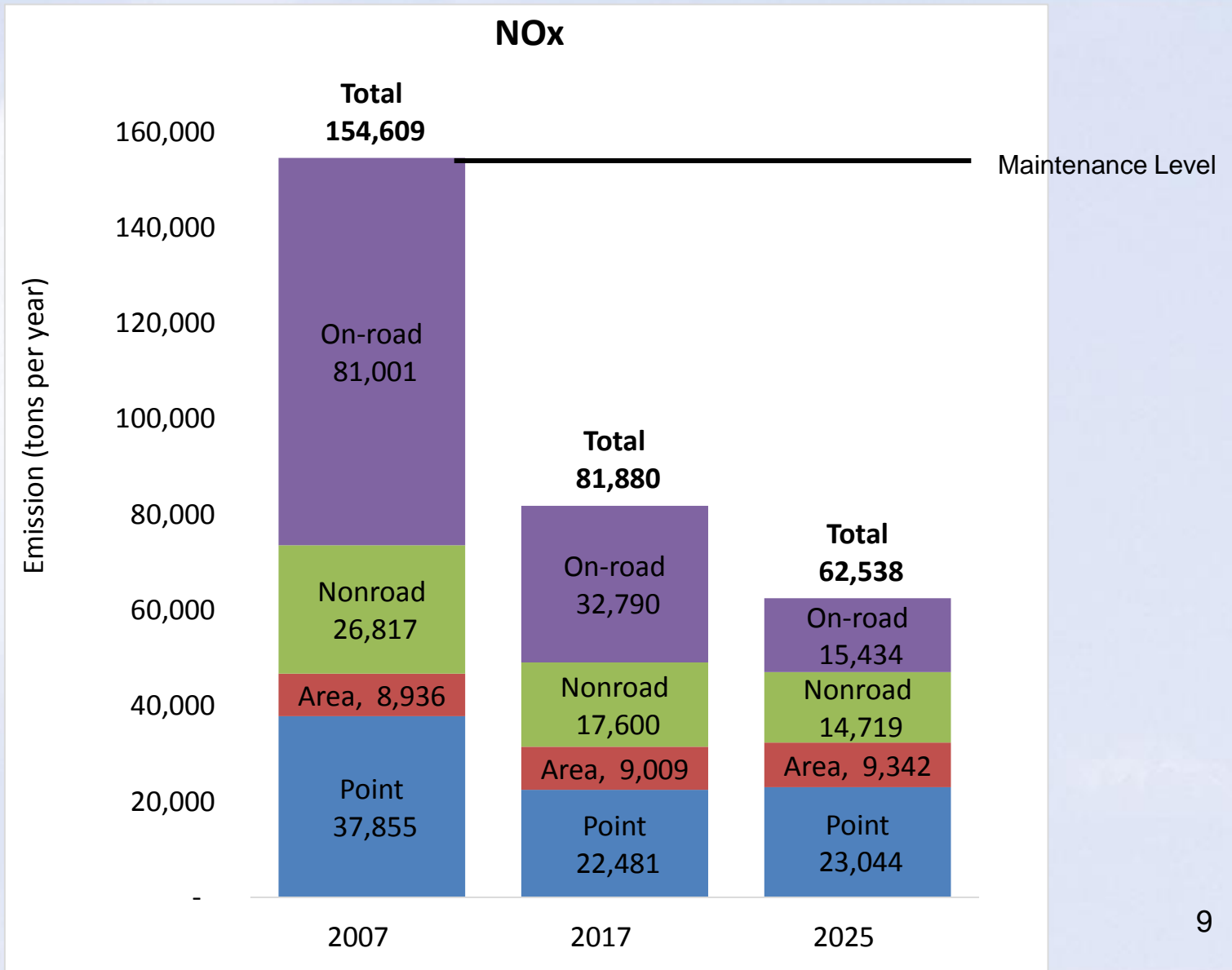
Washington DC-MD-VA PM2.5 Nonattainment Area



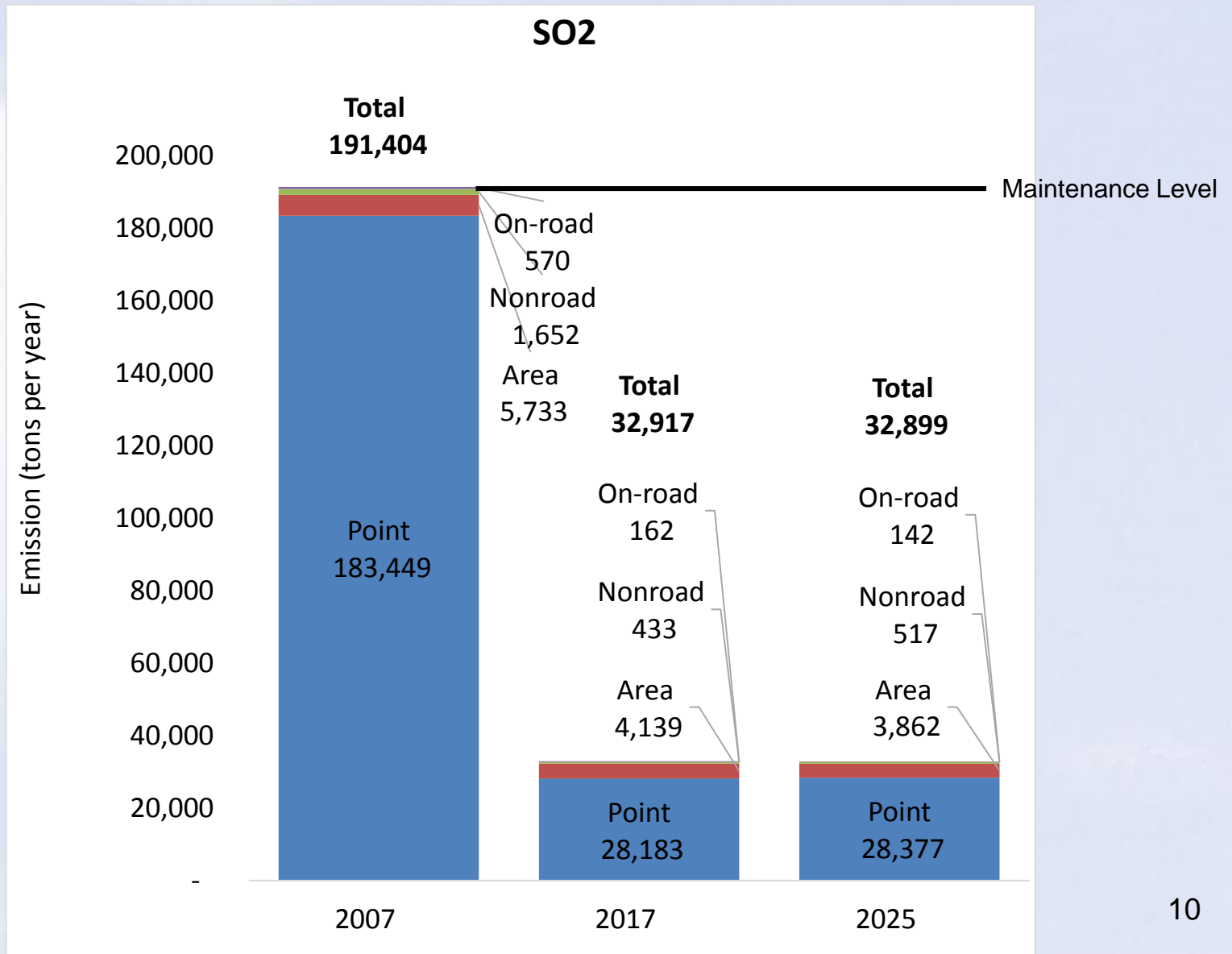
Updated PM2.5 Maintenance Plan Continues to be Lower in the Future



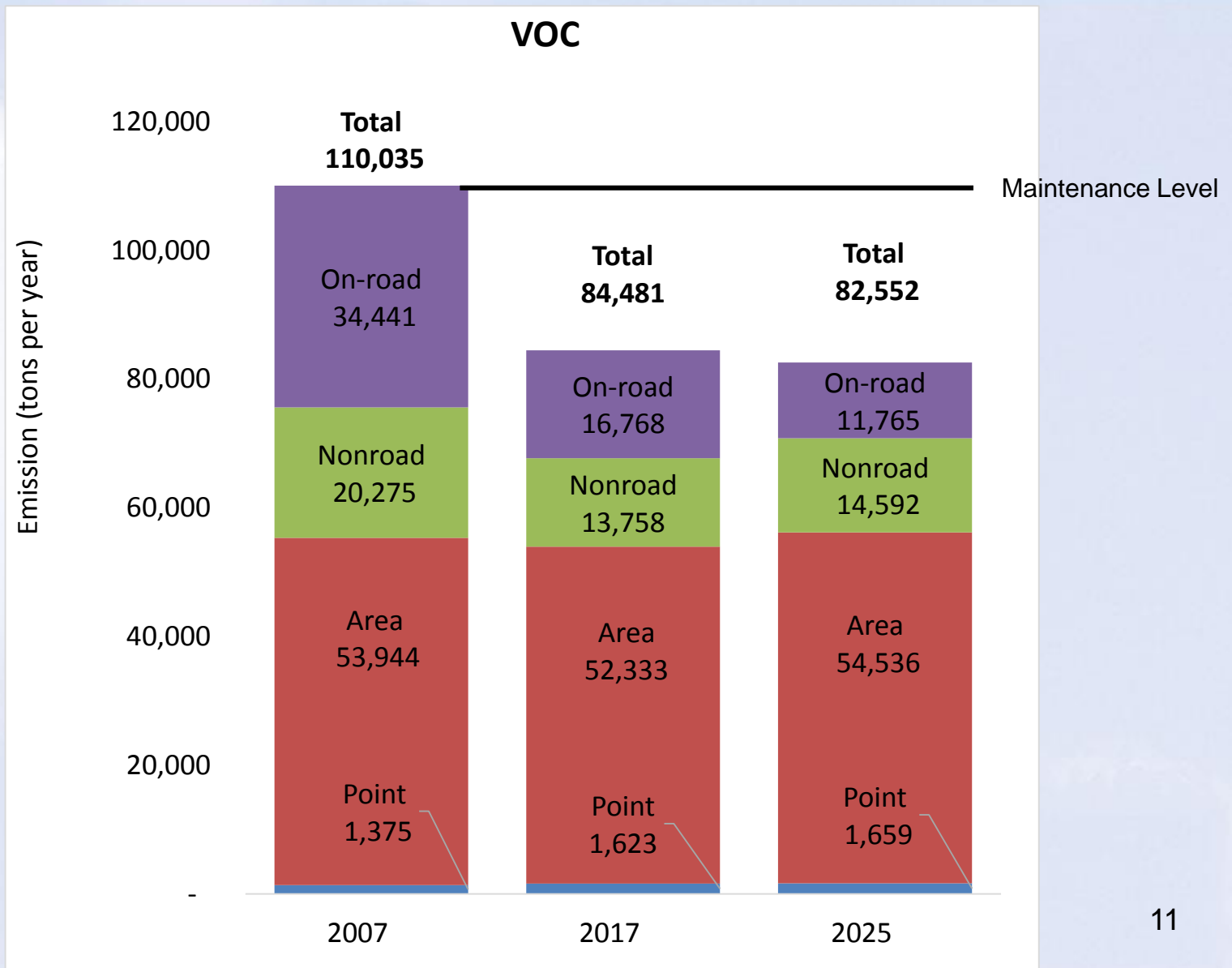
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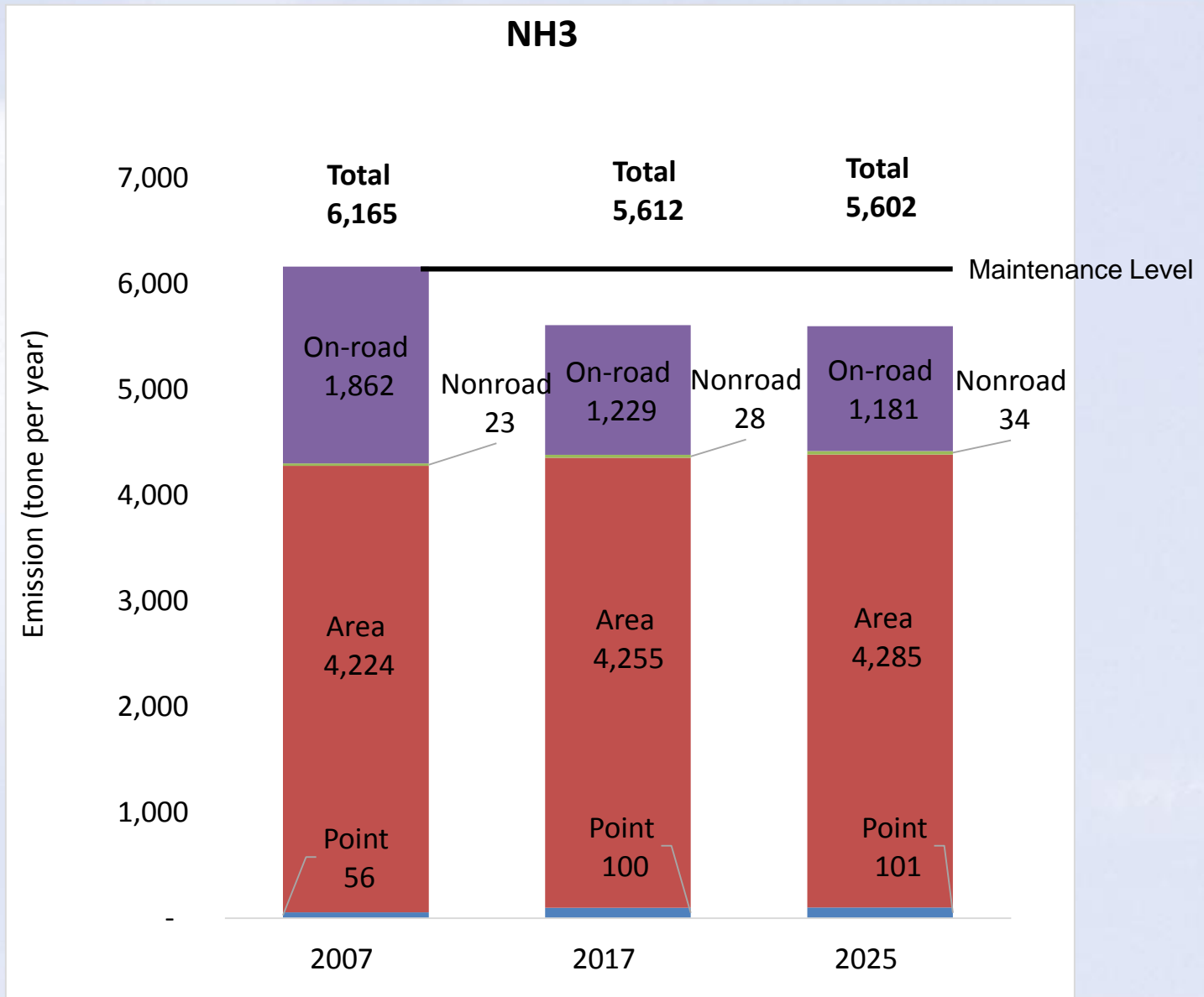
Updated PM2.5 Maintenance Plan Continues to be Lower in the Future



Updated PM2.5 Maintenance Plan Continues to be Lower in the Future



Updated PM2.5 Maintenance Plan Continues to be Lower in the Future



How Do Transportation Plans Relate to the Maintenance Plan/SIP?

- The SIP sets the *mobile budget*, the maximum allowable emissions from vehicles.
- TPB must ensure that the regional transportation plan does not result in emissions above this level.

Maintenance Plan/SIP

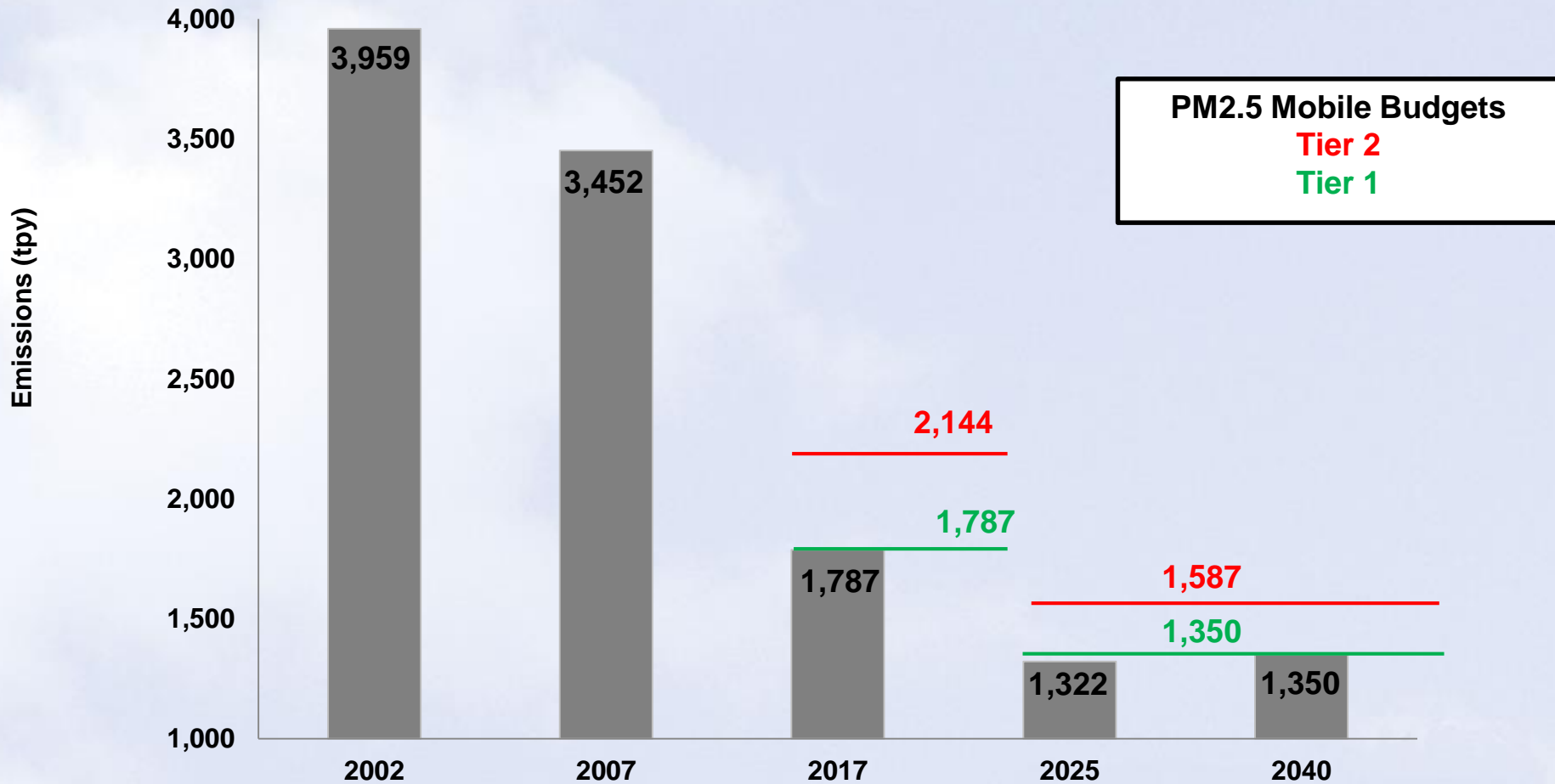
CLRP
& TIP



Mobile

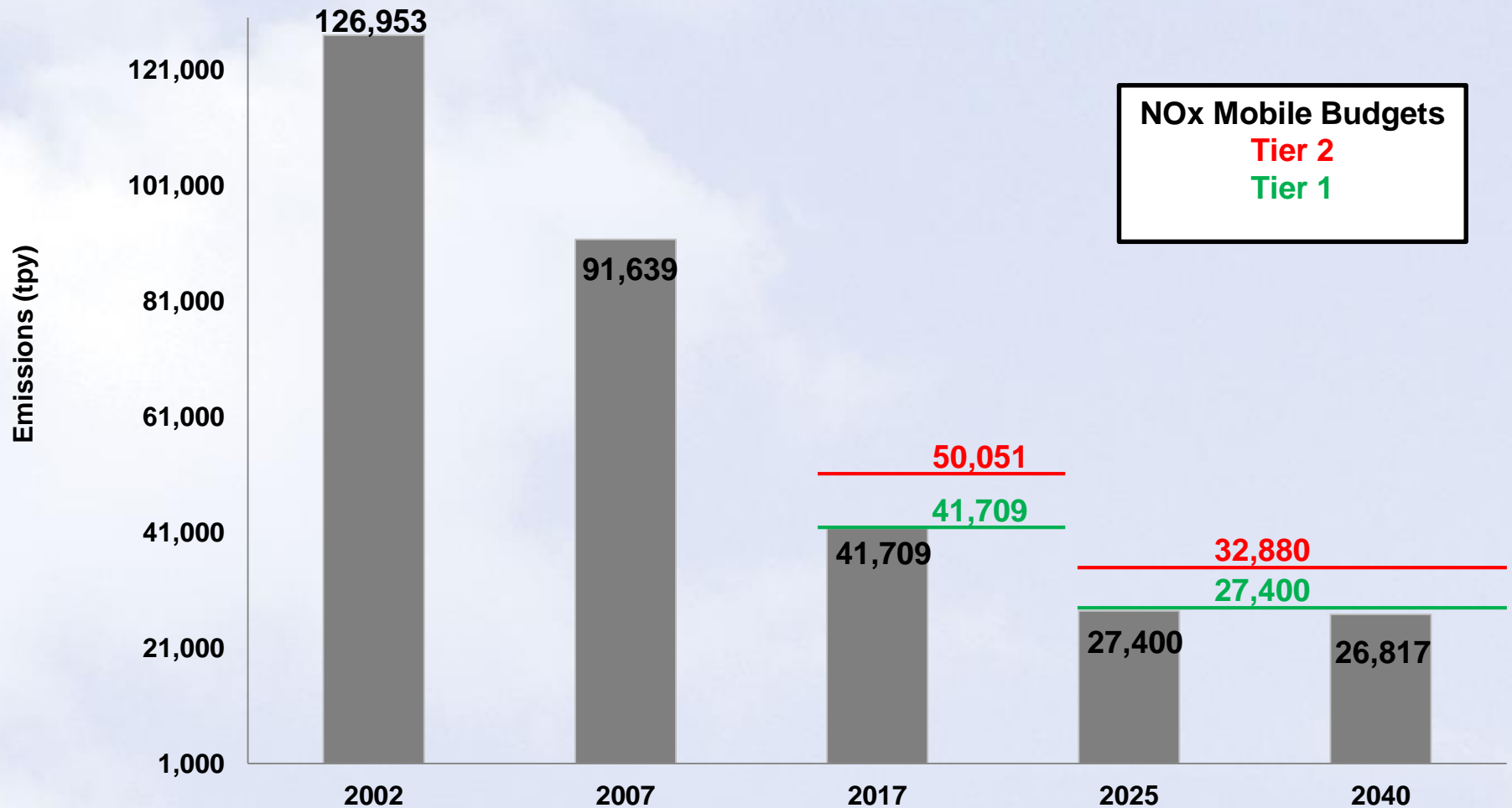
Original PM2.5 Maintenance Plan

On-road Mobile Direct PM2.5 Emissions & Budgets



Tier 2 budgets are 20% above mobile emissions inventories

Original PM2.5 Maintenance Plan On-road Mobile NOx Emissions & Budgets



Tier 2 budgets are 20% above mobile emissions inventories

Original vs. Updated PM2.5 Maintenance Plan Technical Assumptions

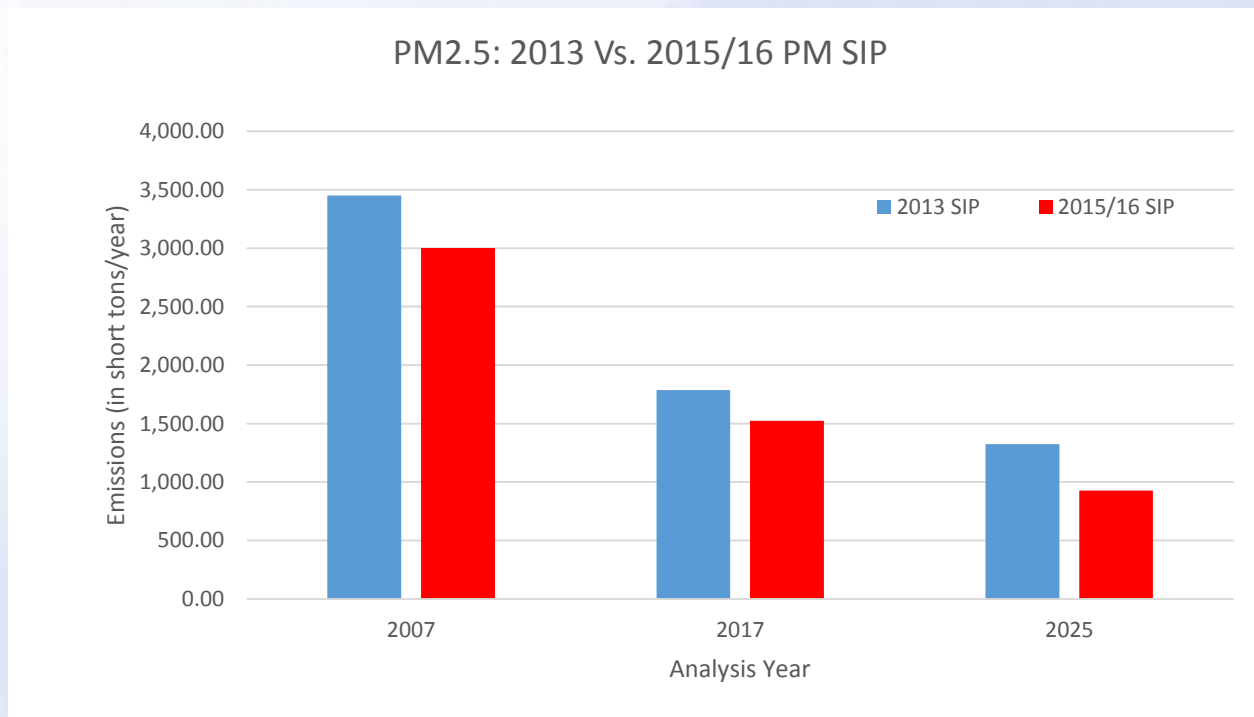
| | Original PM2.5 Inventory | Updated PM2.5 Inventory |
|---------------------------|-------------------------------------|-------------------------------------|
| CLRP | 2011 | 2015 |
| Land Activity | 8.0a | 8.4 |
| Travel Demand Model | Version 2.3.36 | Version 2.3.57a |
| Emissions Model | MOVES2010a | 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 Emissions

Direct PM2.5

| 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% |



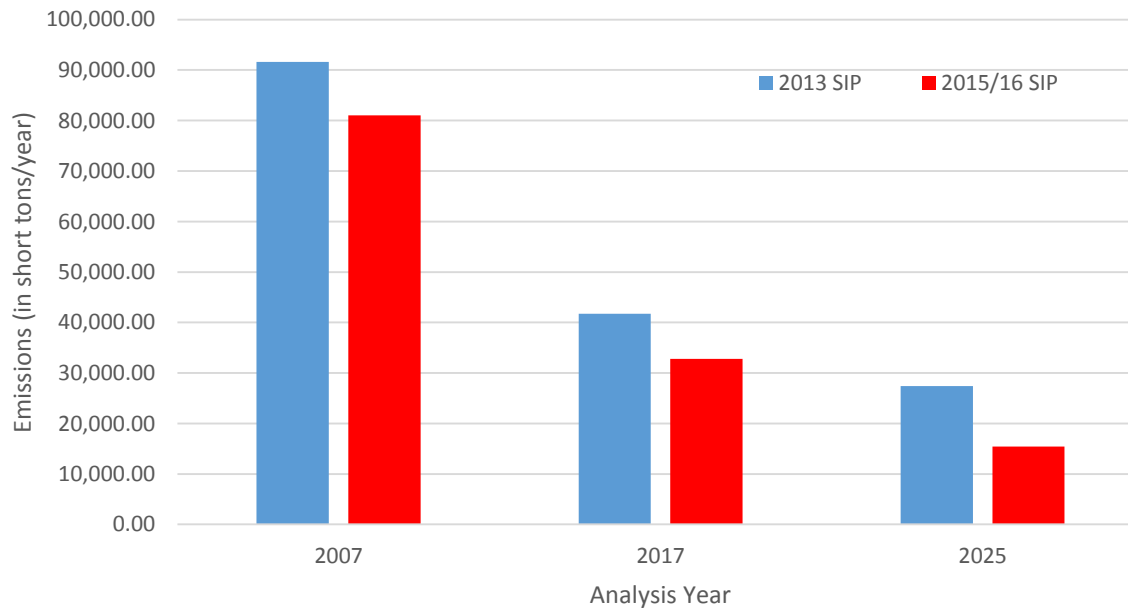
Original vs. Updated PM2.5 Maintenance Plan

On-road Mobile Source Emissions

NOx

| 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% |

Precursor NOx: 2013 Vs. 2015/16 PM SIP



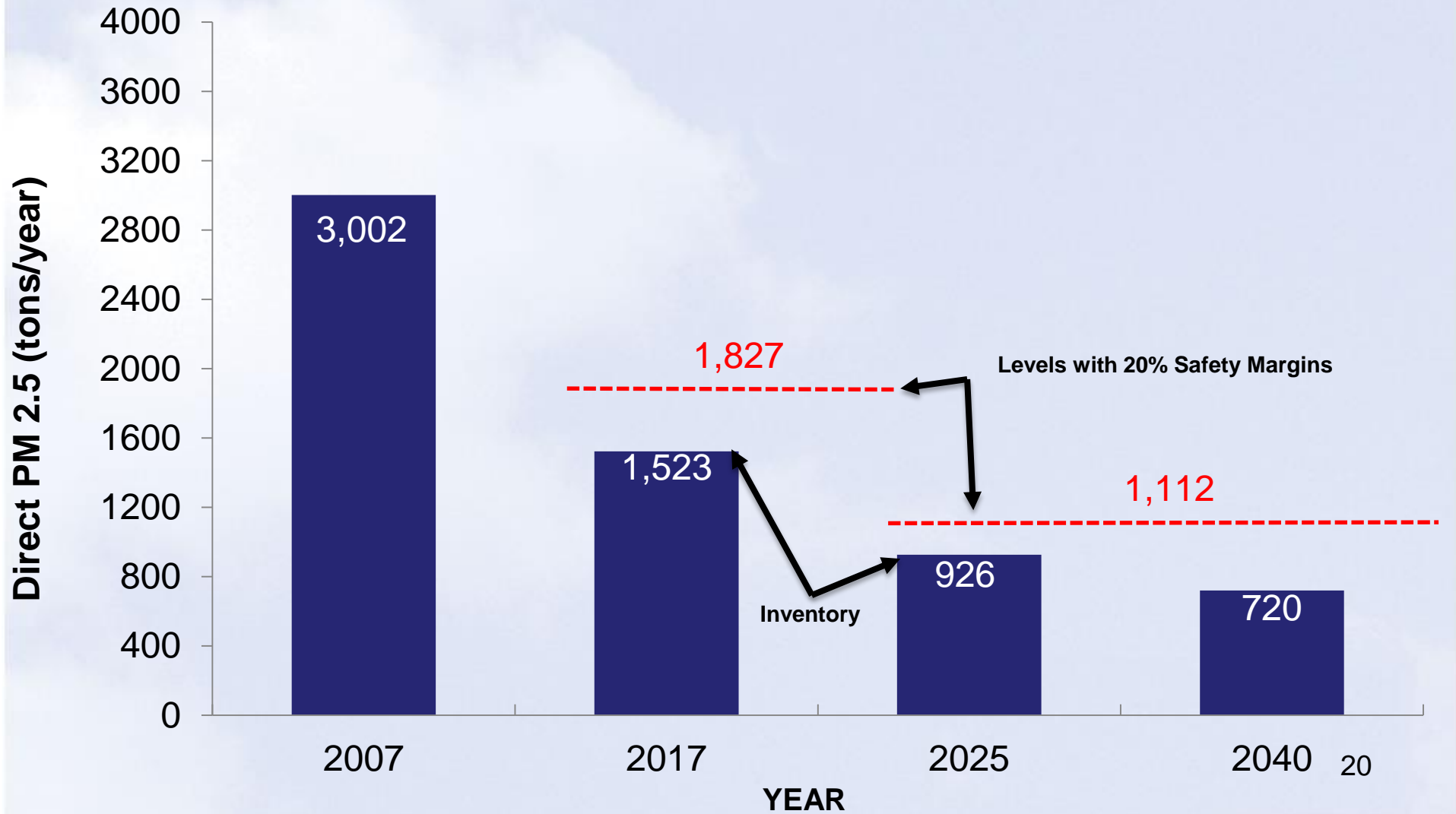
Updated PM2.5 Maintenance Plan

Proposed Revised Mobile Budgets

1. Use TPB's estimates of mobile source inventory based on the 2015 CLRP, FY 2015-2020 TIP, and MOVES 2014 model (Dec. 18, 2015 Memorandum) to revise the mobile sector inventory and mobile budgets for 2017 and 2025 in the revised PM2.5 Maintenance Plan
2. Use the same safety margins of 20 percent above the 2017 and 2025 inventory levels in the budgets for both NOx and direct PM2.5

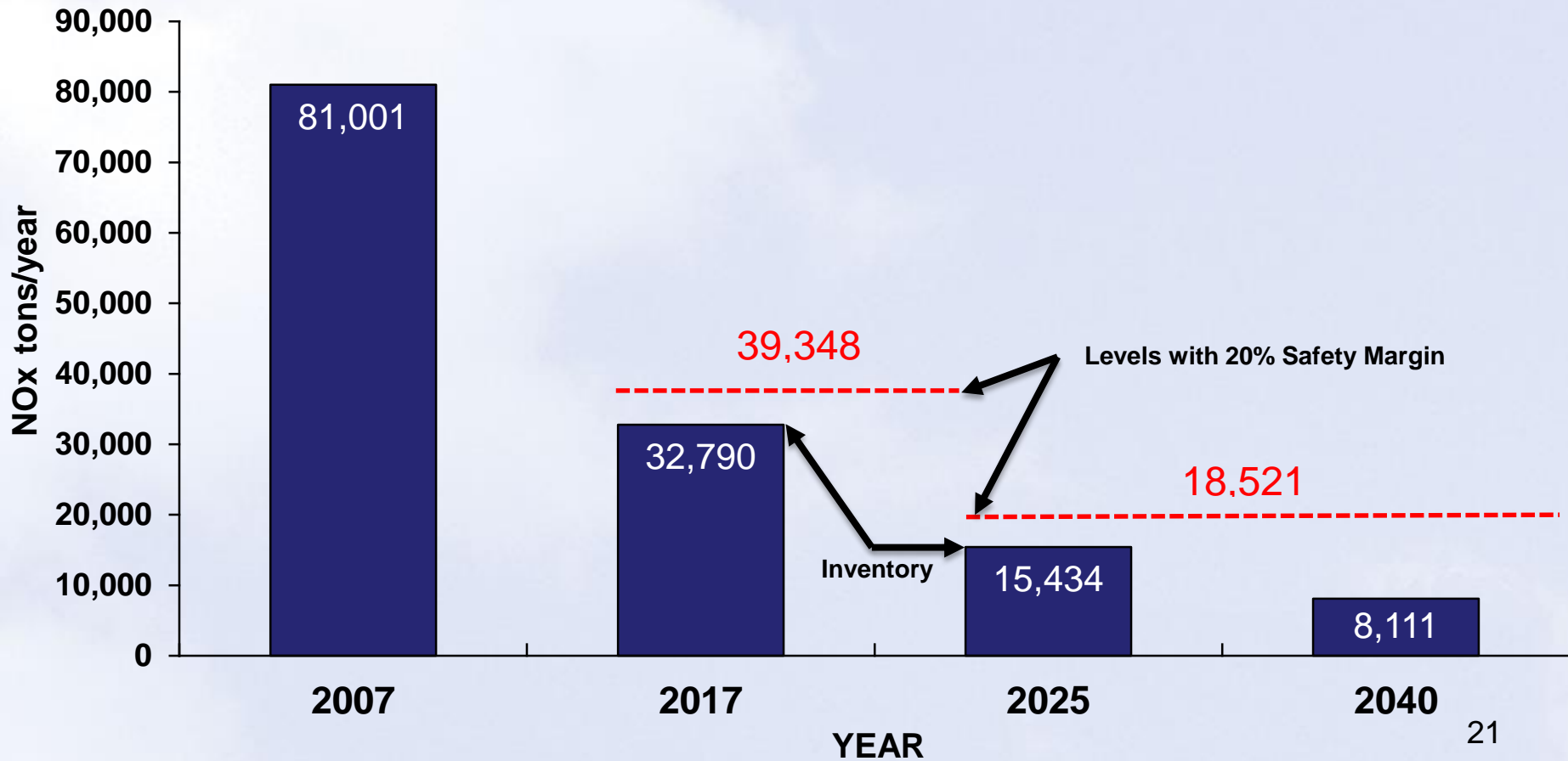
Updated

On-road Mobile Source Emissions with 20% Safety Margin Direct PM_{2.5}



Updated

On-road Mobile Source Emissions with 20% Safety Margin NOx



PM2.5 Maintenance Plan Update

Mobile Budget Approaches

- ❑ Initial PM2.5 Maintenance Plan Approach (2013)
 - ❑ Tier 1 and Tier 2 MVEBs (Direct PM2.5 & NOx) for 2017 and 2025
 - ❑ Tier 2 MVEBs 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 MVEBs

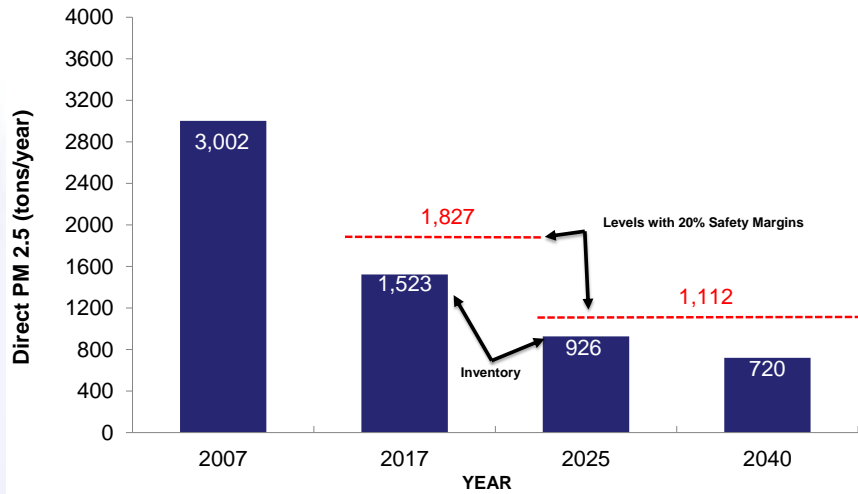
- ❑ Updated PM2.5 Maintenance Plan Proposed Approaches (2016)
 - ❑ 20% Safety Margin
 - ❑ Two Tiered Approach (Tier 1 & Tier 2)

Updated PM2.5 Maintenance Plan

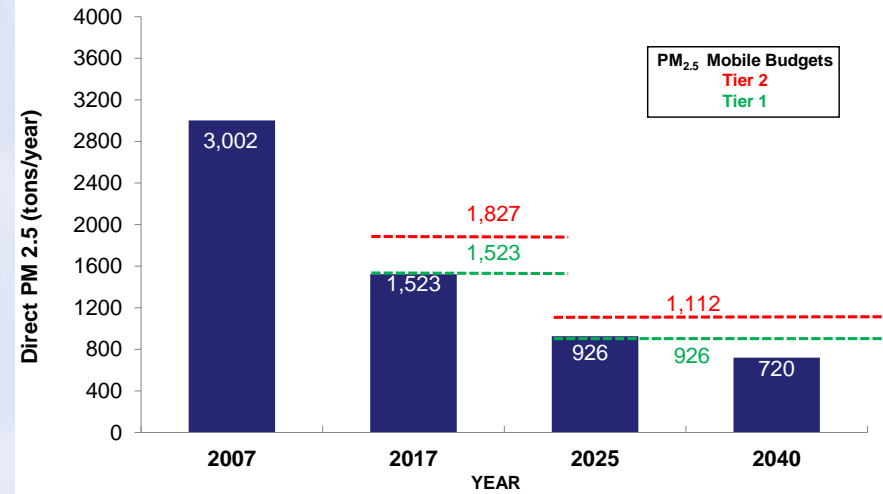
On-road Mobile Source Emissions & Proposed Budgets

Direct PM2.5

Mobile PM2.5 Emissions Budgets with 20% Safety Margin



Mobile PM2.5 Emissions & Two-Tier Budgets

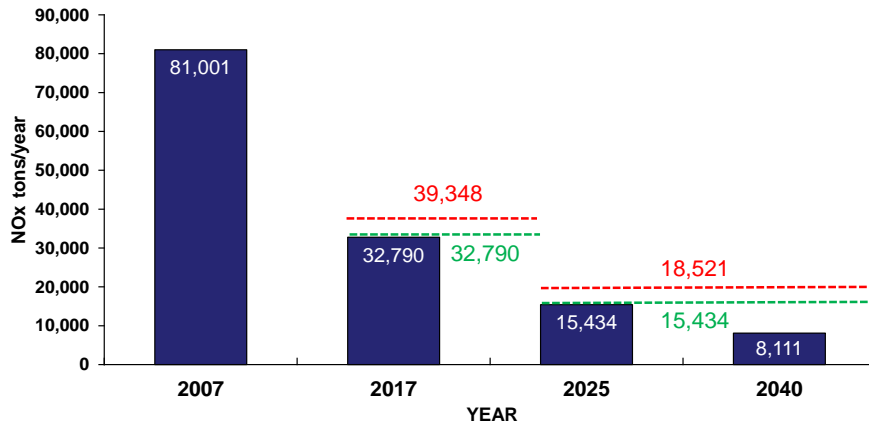


Updated PM2.5 Maintenance Plan

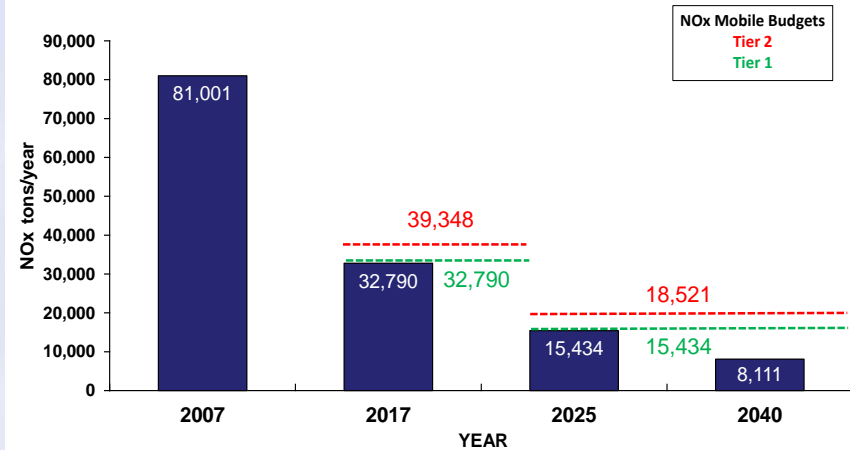
On-road Mobile Source Emissions & Proposed Budgets

NOx

Mobile NOx Emissions Budgets with 20% Safety Margin



Mobile NOx Emissions & Two-Tier Budgets



Maintenance Plan Update Schedule

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|-------------------|--|
| 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 |