

## Transportation Performance Management

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# ***Overview of Performance Measures: CMAQ On-Road Mobile Emissions and Percent of Non-Single Occupancy Vehicle (Non-SOV) Travel***

Cecilia Ho, Office of Natural Environment

Phoenix, AZ

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U.S. Department of Transportation  
Federal Highway Administration



# *Agenda*

- Discussion of 2 Measures:
  - On-Road Mobile Source Emissions
  - Percent of Non-Single Occupancy Vehicle (Non-SOV) Travel
- Introduction and Overview
- Data Sources and Calculating the Measure
- Target Establishment and Reporting
- Other Related Requirements and Information
- Questions and Conclusions

## *Acronyms*

- ACS: American Community Survey (US Census)
- CMAAQ: Congestion Mitigation and Air Quality Improvement Program
- CO: Carbon Monoxide
- NAAQS: National Ambient Air Quality Standards
- NO<sub>x</sub>: Oxides of Nitrogen
- O<sub>3</sub>: Ozone
- PM<sub>2.5,10</sub>: Particulate Matter (2.5 or 10 micrometers or less in diameter)
- VOC: Volatile Organic Compound



# *National Performance Management Measure for CMAQ On-Road Mobile Emissions*



U.S. Department of Transportation  
Federal Highway Administration



## *Why a National Emissions Measure?*

- Federal-aid highway program performance management established in 23 USC § 150 (as provided for under MAP-21) is expected to transform the program, including by a refocus on national goals
- 23 USC § 150 (c)(5) includes two measures related to the Congestion Mitigation & Air Quality Improvement (CMAQ) Program:
  - traffic congestion
  - **on-road mobile source emissions**
- 23 USC § 150 also requires States to establish performance targets for applicable measures, and to submit biennial performance reports

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# *Summary of New 23 CFR Part 490*

## *National Performance Management Measures*

### **Subpart A: General Information (Target Establishment, Reporting, and NHPP and NHFP Significant Progress Determination)**

Subpart B: Measures to Carry Out the Highway Safety Improvement Program (HSIP)

Subpart C: Measures for Assessing Pavement Condition

Subpart D: Measures for Assessing Bridge Condition

Subpart E: Measures to Assess Performance of the National Highway System (NHS)

Subpart F: Measure to Assess Freight Movement on the Interstate System

Subpart G: Measures to Assess the CMAQ Program – Traffic Congestion

**Subpart H: Measure to Assess the CMAQ Program – On-Road Mobile Source Emissions**



## **§ 490.101 & § 490.805: Definitions**

- **On-road mobile source emissions:** Emissions created by all projects and sources financed with funds from 23 USC § 149 CMAQ Program.
- **Attainment Area:** As defined in 23 CFR 450.104, any geographic area in which levels of a given criteria air pollutant (e.g., ozone, carbon monoxide, PM<sub>10</sub>, PM<sub>2.5</sub>, and nitrogen dioxide) meet the health-based National Ambient Air Quality Standards (NAAQS) for that pollutant.
- **Nonattainment Area:** As defined in 23 CFR 450.104, any geographic region of the United States that EPA designates as a nonattainment area under section 107 of the Clean Air Act for any pollutants for which an NAAQS exists.
- **Maintenance Area:** As defined in 23 CFR 450.104, any geographic region of the United States that the Environmental Protection Agency (EPA) previously designated as a nonattainment area for one or more pollutants pursuant to the Clean Air Act Amendments of 1990, and subsequently pre-designated as an attainment area subject to the requirement to develop a maintenance plan. For the purposes of the performance rule, areas that have completed the end of the 20-year maintenance period are excluded.



## ***§ 490.101 & § 490.805: Definitions***

- **National Ambient Air Quality Standard (NAAQS):** As defined in 23 CFR 450.104, those standards established pursuant to section 109 of the Clean Air Act (see 40 CFR Part 50).
- **Criteria Pollutant:** Any pollutant for which there is established a National Ambient Air Quality Standards (NAAQS) at 40 CFR part 50. The transportation-related criteria pollutants per 40 CFR 93.102(b)(1) are carbon monoxide, nitrogen dioxide, ozone, and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).

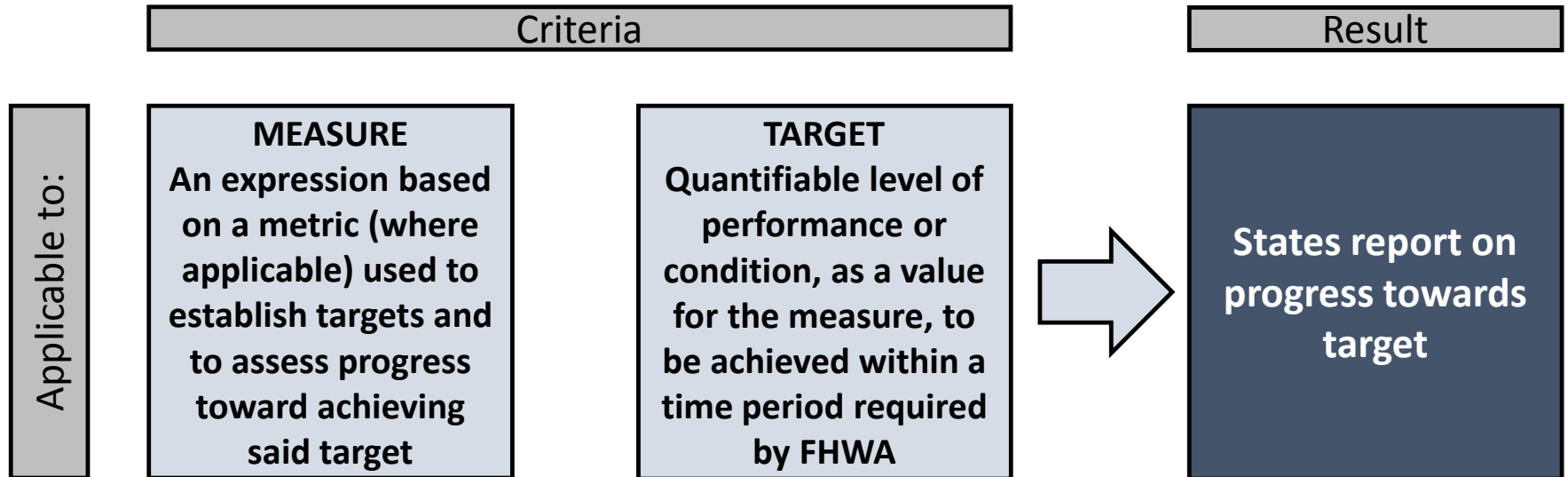


## ***§ 490.807: On-Road Mobile Source Emissions Measure for the CMAQ Program***

| Measure Area   | Performance Measure   |
|--|---|
| Measure to Assess the CMAQ Program – On-Road Mobile Source Emissions (Subpart H) | <ul style="list-style-type: none"><li>• <b>Emissions Measure:</b> Total Emission Reductions for Carbon Monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), Volatile Organic Compounds (VOCs), Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>) for CMAQ funded projects in designated nonattainment and maintenance areas</li></ul> |

- The Total Emissions Reduction is the cumulative 2-year and 4-year reported emission reductions for:
  - all projects funded by CMAQ funds and
  - **applicable** criteria pollutants and precursors

# Measures and Targets



## **§§ 490.105, 490.803, 490.809: Applicability**

- $O_3$ , CO,  $PM_{10}$  and  $PM_{2.5}$  nonattainment and maintenance areas
- Applicability Determination: one year before State DOT Baseline Performance Period Report due to FHWA
- Applicability Re-assessment: one year before State DOT Mid Performance Period Progress Report due to FHWA

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## ***§ 490.809 (c): Nonattainment and Maintenance Area Determinations***

- § 490.809 (c)(1): These areas shall be identified based on the effective date of the Environmental Protection Agency's (EPA) designation under the NAAQS in 40 CFR part 81
  - As of the date 1 year before the State DOT Baseline Performance Period Report is due to FHWA
    - If revision occurs before this date, total emissions reduction measure no longer applies
    - If revision occurs after this date, total emissions reduction measure still applies

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## § 490.809 (c): Timeline

- § 490.809 (c)(2): The nonattainment and maintenance areas to which the total emissions reduction measure applies shall be revised if:
  - On the date 1 year before the State DOT Mid Performance Progress Report is due to FHWA, the area is no longer in nonattainment or maintenance for relevant pollutants
    - If revision occurs before this date, total emissions reduction measure no longer applies
    - If revision occurs after this date, total emissions reduction measure still applies

## ***Relaxation of CMAQ Emissions Requirements for Maintenance Areas***

- “Maintenance Area” definition revised to exclude any area that has completed its 20-year maintenance plan
- States and MPOs can request their areas to be excluded from the CMAQ performance requirements if they reach attainment status (or achieve their 20-year maintenance plan) on the date 1 year before the State DOT Mid Performance Progress Report is due to FHWA

# *Data Sources and Calculating the Emissions Measure*



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## ***Subpart H: On-Road Mobile Source Emissions***

- Measure: Total Emissions Reduction
- Calculation: Cumulative 2-year and 4-year Emission Reductions (kg/day) for CMAQ funded projects of reduced emissions for:
  - Nitrogen Oxides (NO<sub>x</sub>)
  - Volatile Organic Compounds (VOCs)
  - Carbon monoxide (CO)
  - Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>)



# § 490.809 Data Requirements: Emission Reductions

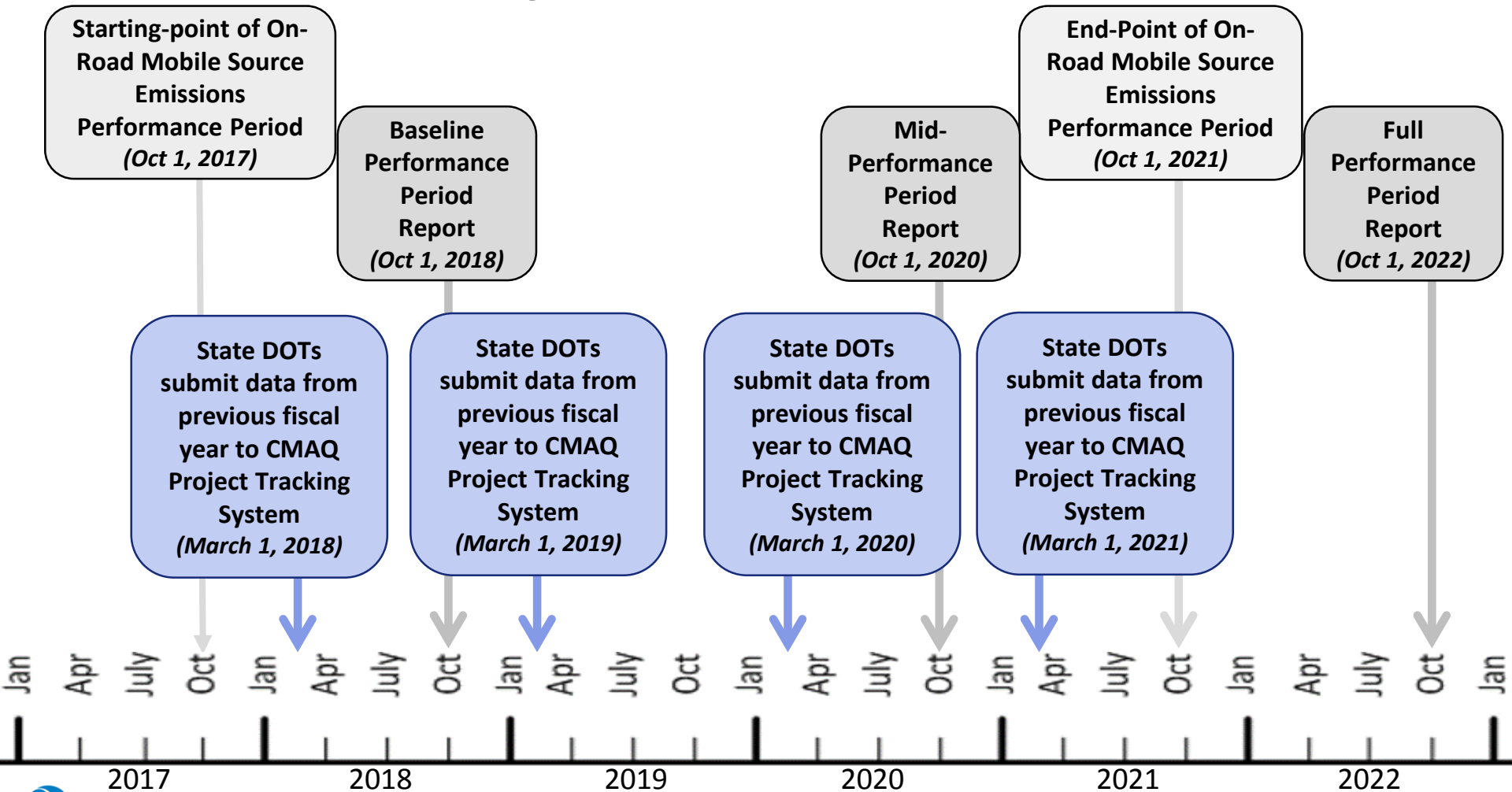
| Relevant Data   | Source   |
|---|--|
| <ul style="list-style-type: none"> <li>• <b>Nonattainment or maintenance areas</b></li> </ul>   | <ul style="list-style-type: none"> <li>• 40 CFR Part 81 or</li> <li>• EPA Green Book*</li> </ul> |
| <ul style="list-style-type: none"> <li>• <b>Applicable States and MPOs</b></li> </ul>   | <ul style="list-style-type: none"> <li>• FHWA will post on website</li> </ul>                    |
| <ul style="list-style-type: none"> <li>• <b>Emission reduction estimated for each CMAQ funded project by pollutant and precursor</b></li> </ul> | <ul style="list-style-type: none"> <li>• CMAQ Public Access System**</li> </ul>                  |

\* **EPA Green Book:** Another data source to check an area's nonattainment or maintenance status.

\*\***Data Submittal:** State DOTs shall enter project information into the CMAQ project tracking system for each CMAQ project funded in the previous Federal fiscal year by March 1 of the following Federal fiscal year.



# Public Access System Submittal Timeline



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## *Data Timeline for the 1<sup>st</sup> Performance Period*

- **Baseline Performance Period**
  - Latest data collected\*
- **Mid Performance Period**
  - Federal Fiscal Years 2018 and 2019
  - 2 years of data
- **Full Performance Period**
  - Federal Fiscal Years 2018 through 2021
  - 4 years of data

\*Baseline data for the first performance period would include CMAQ projects from FY 2014-2017.



# CMAQ Public Access System

- Visit [https://fhwaapps.fhwa.dot.gov/cmaq\\_pub/](https://fhwaapps.fhwa.dot.gov/cmaq_pub/) and navigate to the Report tab:
  - Reports
  - Project Information
    - Project Year
    - Project Reporting Category
  - Project Location
    - Project State
    - Project MPO



# Emissions Measure Formula

*Total Emission Reduction<sub>p</sub>*

$$= \sum_{i=1}^T \text{Daily Kilograms of Emission Reductions}_{p,i}$$

**Where:**

i = applicable projects reported in the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period [§ 490.105(e)(4)(i)(B)]

# Emissions Measure Formula

*Total Emission Reduction<sub>p</sub>*

$$= \sum_{i=1}^T \text{Daily Kilograms of Emission Reductions}_{p,i}$$

**Where:**

p = criteria pollutant or applicable precursor: PM<sub>2.5</sub>, PM<sub>10</sub>, CO, VOC, or NO<sub>x</sub>;

Daily Kilograms of Emission Reductions <sub>p,i</sub> = total daily kilograms, to the nearest one thousandths, of reduced emissions for a criteria pollutant or an applicable precursor “p” in the in the first year the project is obligated

# Emissions Measure Formula

*Total Emission Reduction<sub>p</sub>*

$$= \sum_{i=1}^T \text{Daily Kilograms of Emission Reductions}_{p,i}$$

## **Where:**

T = total number of applicable projects reported to the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period, [§490.105(e)(4)(i)(B)]

Total Emission Reduction<sub>p</sub> = cumulative reductions in emissions over 2 and 4 Federal fiscal years, total daily kilograms, to the nearest one thousandths, of reduced emissions for criteria pollutant or precursor “p”



# ***Knowledge Check: Which Pollutants Are to Reported?***

***Emissions reductions need to be calculated for which of the following pollutants?***

- a) Carbon Dioxide (CO<sub>2</sub>), Nitrogen Oxides (NO<sub>x</sub>), Sulfur Dioxide (SO<sub>2</sub>), and Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>)
- b) Nitrogen Oxides (NO<sub>x</sub>), Volatile Organic Compounds (VOCs), Carbon Monoxide (CO), and Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>)
- c) Carbon Monoxide (CO), Total Hydrocarbons (THC), Hazardous Air Pollutants (HAPs), and Nitrogen Oxides (NO<sub>x</sub>)
- d) Ozone (O<sub>3</sub>), Carbon Monoxide (CO), and Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>)





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## ***Knowledge Check: Calculating the Measure***

***What are the units of the on-road mobile source emissions measure?***

- a) Tons per year
- b) Grams per mile
- c) Kilograms per day

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## ***Knowledge Check: Baseline Performance Period***

***For what period are data for the on-road mobile source emissions measure to be included in the Full Performance Period Report? (for the 1<sup>st</sup> Performance Period)***

- a) Calendar Year 2018 Total Emissions Reductions
- b) Calendar Years 2018 through 2019 Total Emission Reductions
- c) Fiscal Years 2018 through 2021 Total Emissions Reductions
- d) Fiscal Year 2021 Total Emissions Reductions

# § 490.811 Calculating the Emissions Measure

## Example Calculation

| Project                                | Fiscal Year of CMAQ Obligation  | NO <sub>x</sub> Benefit (kg/day) | VOC Benefit (kg/day) | CO Benefit (kg/day) |  |
|--|---------------------------------|----------------------------------|----------------------|---------------------|--|
| 1. Ozone area transit                  | 2018                            | 10.5                             | 7.83                 |                     |  |
| 2. Ozone area traffic flow improvement | 2019                            | 0.953                            | 0.487                |                     |  |
| 3. CO area bike/ped                    | 2018                            |                                  |                      | 2.127               |  |
| 4. CO area traffic flow improvement    | 2019                            |                                  |                      | 2.335               |  |
| 5. CO area transit project             | 2020                            |                                  |                      | 49.9                |  |
| <b>Measure Calculation</b>             | <b>2-Year Total (2018-2019)</b> | <b>11.453</b>                    | <b>8.317</b>         | <b>4.462</b>        |  |
|  | <b>4-Year Total (2018-2021)</b> | <b>11.453</b>                    | <b>8.317</b>         | <b>54.362</b>       |  |



# *Target Establishment and Reporting*



U.S. Department of Transportation  
Federal Highway Administration



## ***§ 490.105 Establishing Targets: State DOTs***

- Must establish statewide 2-year and 4-year targets for each performance period
  - For all nonattainment and maintenance areas within the State boundary
  - For each applicable criteria pollutant and precursors
- Targets shall reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System
- State may establish additional targets
  - Must report in the baseline performance period report and evaluate progress in subsequent reports

# § 490.811 Calculating the Emissions Measure

## Example Calculation

| Project                                | Fiscal Year of CMAQ Obligation  | NO <sub>x</sub> Benefit (kg/day) | VOC Benefit (kg/day) | CO Benefit (kg/day) | PM <sub>2.5</sub> Benefit (kg/day) |
|--|---------------------------------|----------------------------------|----------------------|---------------------|------------------------------------|
| 1. Ozone area transit                  | 2018                            | 10.5                             | 7.83                 | 5.1                 | 1.2                                |
| 2. Ozone area traffic flow improvement | 2019                            | 0.953                            | 0.487                | 0.25                | 1.3                                |
| 3. CO area bike/ped                    | 2018                            | 4.5                              | 1.03                 | 2.127               | 0.93                               |
| 4. CO area traffic flow improvement    | 2019                            | 5.6                              | 4.5                  | 2.335               | 2.335                              |
| 5. CO area transit project             | 2020                            | 7.45                             | 0.784                | 49.9                | 3.5                                |
| <b>Measure Calculation</b>             | <b>2-Year Total (2018-2019)</b> | <b>21.553</b>                    | <b>13.847</b>        | <b>9.812</b>        | <b>5.765</b>                       |
|  | <b>4-Year Total (2018-2021)</b> | <b>29.003</b>                    | <b>14.631</b>        | <b>59.712</b>       | <b>9.265</b>                       |

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## ***State DOT Target Setting: Timeline***

- First set of targets within 1 year of the effective date of the final rule – May 20, 2018 [23 USC 150(d)]
- Targets must be reported to FHWA by Oct. 1, 2018
- Adjustment of 4-year target allowed at the midpoint of performance period

## ***Applicability Determinations for State Targets***

- Nonattainment and maintenance areas for an applicable criteria pollutant effective as of 1 year before the State Baseline Performance Period Report is due
- Shall be revised if the area is no longer nonattainment or maintenance as of 1 year before the State Mid Performance Period Report is due
  - States with no nonattainment and maintenance areas at the Mid Performance Period are not required to meet target setting and reporting requirements for the rest of the performance period



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## ***§ 490.105: Establishing Targets: MPOs***

- An MPO shall establish quantifiable targets for each applicable pollutant and precursors for the nonattainment or maintenance areas within the Metropolitan Planning Area boundary
- Targets shall reflect the anticipated cumulative emission reduction to be reported in the CMAQ Public Access System

## ***MPO Targets***

- An MPO must develop both 2-year and 4-year quantifiable targets if any part of a designated nonattainment and maintenance area overlaps the boundary of an urbanized population 1 million\* or more
- Otherwise, only 4-year targets are needed

*\*Based on U.S. Census' most recent published annual population estimates available one year before the State Baseline Performance Period Report is due*



## *State DOT Target Adjustment: MPO Impact*

- If State(s) adjust 4-year target(s) in the Mid Performance period, and the MPO\* established a target to support the State target(s)
  - The MPO shall report to State(s) within 180 days that it:
    - Agrees to plan a program of projects to contribute to the State's target
    - or**
    - Commits to a new quantifiable target

\* Only applies to MPOs with 1 million or less population

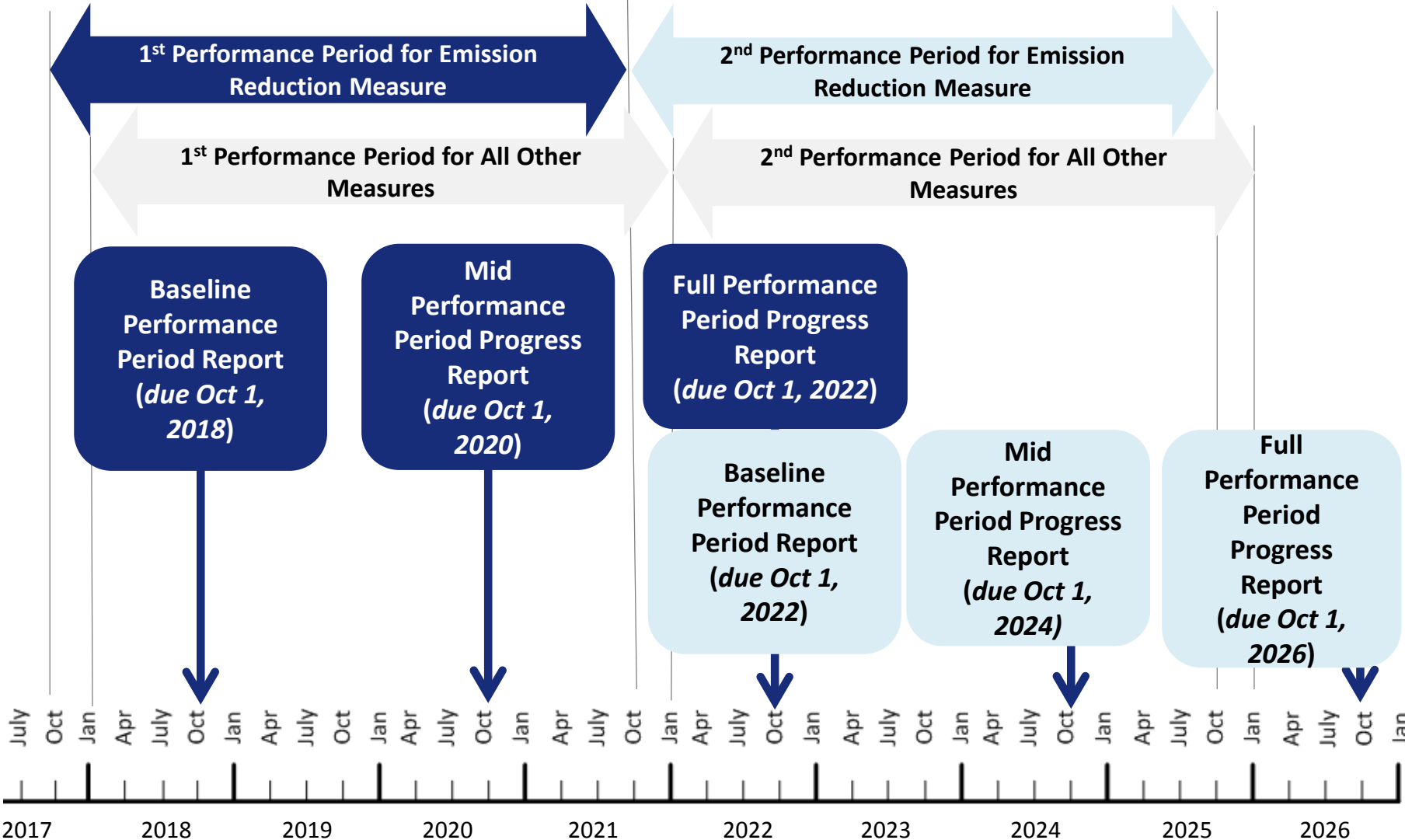


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## *Target Adjustment*

- Adjustment of quantifiable targets in a manner that is collectively developed, documented and mutually agreed upon by the State DOT and the MPO [23 CFR 490.105(f)(8)]

# Performance Period & State DOT Biennial Performance Reporting Timeline



## ***§ 490.107 Target Reporting\*: State DOTs***

- **Baseline Performance Period Report includes:**
  - Baseline condition/performance
  - 2- and 4-year targets
  - Nonattainment and maintenance area boundaries
  - MPO CMAQ performance plan, where applicable
- **Mid Performance Period Progress Report includes:**
  - 2-year condition/performance
  - 2-year progress in achieving performance targets
  - Adjusted 4-year targets (optional)
  - MPO CMAQ performance plan, where applicable
- **Full Performance Period Progress Report includes:**
  - 4-year condition/performance
  - 4-year progress in achieving performance targets
  - MPO CMAQ performance plan, where applicable

\*Must use an electronic template provided by FHWA



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## ***§ 490.107 Target Reporting: MPOs***

- Targets to respective State DOT(s) in a manner that is documented and mutually agreed upon by both parties
- Baseline level and progress toward targets in Metropolitan Transportation Plan
- CMAQ Performance Plan in State Biennial Performance Reports (for applicable MPOs only)



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## **§ 490.107 CMAQ Performance Plan**

- MPOs will provide CMAQ Performance Plans to State DOTs
  - The CMAQ Performance Plan will be attached to the Biennial Performance Reports from the State DOTs to FHWA
- FHWA is developing guidance for developing CMAQ Performance Plans
  - FHWA will post the list of MPOs for which the CMAQ Performance Plan is applicable/required



## § 490.107 CMAQ Performance Plan

- CMAQ performance plan includes CMAQ congestion and total emissions measures:
  - Baseline Performance Period Report includes:
    - Baseline condition/performance
    - Targets (2-year and 4-year Targets)
    - Description of projects for funding and the projects will contribute to achieving targets
  - Mid Performance Period Report includes:
    - 2-year condition/performance,
    - 2-year progress assessment in achieving performance targets
    - If applicable, adjusted 4-year target
    - Update description of projects and their contribution to achieving the 4-year target
  - Full Performance Period Progress Report includes:
    - 4 year condition/performance
    - 4-year progress assessment in achieving performance 4-year targets

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## ***Knowledge Check: State DOT Target Setting***

***A State DOT needs to set quantifiable targets for what time periods in the Baseline Performance Report?***

- a) 5-year and 10-year targets
- b) 2-year and 4-year targets
- c) 4-year targets
- d) 2-year targets



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## ***Knowledge Check: MPO Target Setting***

***True or False: MPOs must always set 2-year and 4-year targets for Total Emissions Reductions.***

**False**

- 1) If you are in attainment status one year before State DOT Baseline Performance Period Report is due to FHWA
- 2) If any part of a designated nonattainment and maintenance area overlaps the boundary of an urbanized population 1 million\* or more, otherwise set only 4 year targets

*\*Based on U.S. Census' most recent published annual population estimates available one year before the State Baseline Performance Period Report is due*



# *Other Related Requirements and Information*



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## ***§ 490.109 Significant Progress Determination***

- No significant progress determination required for the CMAQ On-Road Mobile Source Emissions measure

## ***Legislative and Regulatory Requirements: CMAQ Performance Plan in 23 USC § 149(I)***

- *(1) In general.— Each MPO serving a TMA with a population over 1,000,000 people representing a nonattainment or maintenance area shall develop a performance plan that—*
  - *(A) includes an area baseline level for traffic congestion and on-road mobile source emissions for which the area is in nonattainment or maintenance;*
  - *(B) describes progress made in achieving the performance targets described in section 150(d); and*
  - *(C) includes a description of projects identified for funding under this section and how such projects will contribute to achieving emission and traffic congestion reduction targets.*
- *(2) Updated plans.— Performance plans shall be updated biennially and include a separate report that assesses the progress of the program of projects under the previous plan in achieving the air quality and traffic congestion targets of the previous plan.*

*Questions?*



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## *Contacts*

For questions or more information, please contact:

FHWA Office of Natural Environment:

*Cecilia Ho*, [Cecilia.ho@dot.gov](mailto:Cecilia.ho@dot.gov), 202-366-9862

*Karen Perritt*, [Karen.Perritt@dot.gov](mailto:Karen.Perritt@dot.gov), 202-366-9066





***National Performance Management Measure for  
Traffic Congestion: Percent of Non-Single  
Occupancy Vehicle (Non-SOV) Travel***



U.S. Department of Transportation  
Federal Highway Administration



# Agenda

- What We'll Cover:
  - Precise step-by-step procedures for calculating one of the CMAQ congestion measures
    - Percent of Non-SOV travel
  - Definitions
  - Applicability
  - Data requirements
  - Calculation methods



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## *Subpart G Measures*

- **PHED Measure:** Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita
- **Non-SOV Travel Measure:** Percent of Non-Single Occupancy Vehicle (SOV) Travel

## ***Definitions***

- *American Community Survey (ACS)* is a national level ongoing survey from the U.S. Census Bureau that includes data on jobs, occupations, educational attainment, and transportations patterns
- *Highway Performance Monitoring System (HPMS)* is a national level highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways

## § 490.703 Applicability: PHED and Non-SOV Travel Measures

- Areas with the following criteria:

### Area Characteristics

- Designated urbanized area,
- Contains NHS mileage, **AND**
- Population over 200,000\*



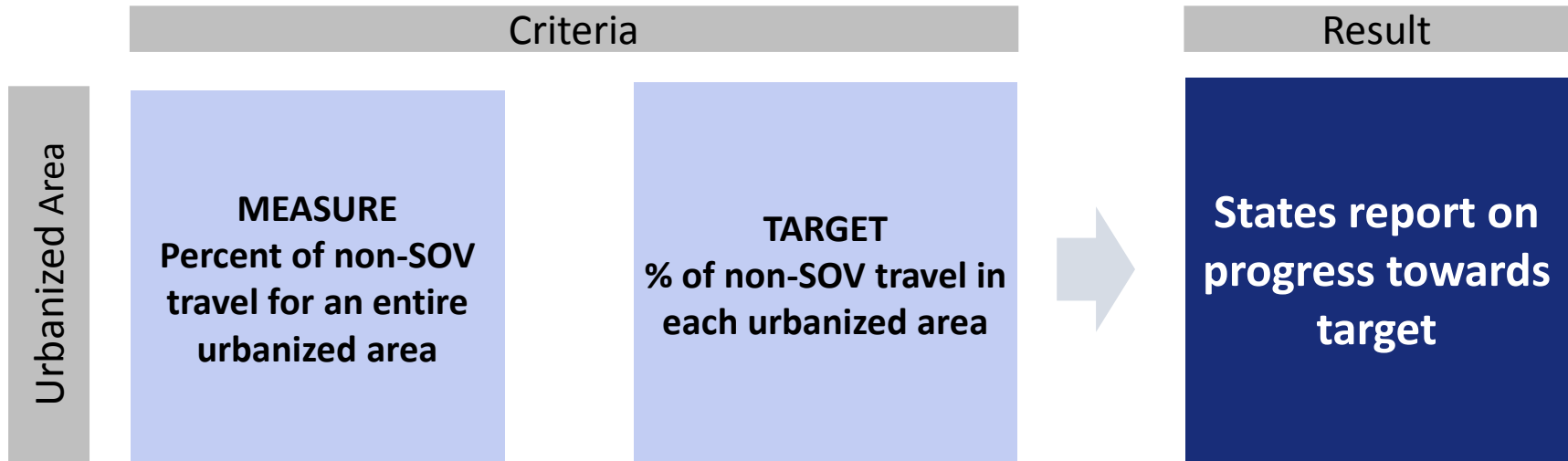
### Nonattainment or Maintenance Area

- ozone (O<sub>3</sub>),
- carbon monoxide (CO), **OR**
- particulate matter (PM<sub>10</sub> or PM<sub>2.5</sub>)

- **All MPOs and State DOTs** that have NHS mileage that overlaps with an applicable urbanized area must coordinate on a **single, unified target** and report on the measures

\* *For the first performance period only, applies to urbanized areas with populations over 1 million*

# § 490.707 Non-SOV Travel Measure



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## ***§ 490.709 Data Requirements for Non-SOV Travel Measure***

- Based on person travel
- Requires estimates of the number of people traveling by single occupancy and non-single occupancy vehicles
- Computed to 0.1%
- Can be developed from one of three data sources and methods
  - A. American Community Survey (ACS)
  - B. Local travel survey
  - C. System use measurement

## ***§ 490.709 Data Requirements for Non-SOV Travel Measure***

| <b>Option</b>   | <b>Relevant Data</b>   | <b>Source</b>  |
|-----------------|--|--|
| <b>Method A</b> | <ul style="list-style-type: none"> <li>• <b>5-Year Estimate for “Commuting to Work” totaled by mode, as of August 15 the year Performance Report is due</b></li> </ul> | <ul style="list-style-type: none"> <li>• American Community Survey (Table DP03)</li> </ul> |
| <b>Method B</b> | <ul style="list-style-type: none"> <li>• <b>Travel mode choices gathered within 2 years of the start of Performance Period</b></li> </ul>                              | <ul style="list-style-type: none"> <li>• Local Survey</li> </ul>                           |
| <b>Method C</b> | <ul style="list-style-type: none"> <li>• <b>Sample or continuous count of travelers using different modes</b></li> </ul>   | <ul style="list-style-type: none"> <li>• Modal Counts</li> </ul>                           |



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## ***§ 490.713 Non-SOV Travel Measure***

Based on one of three methods

- A. 100% - SOV% travel
- B. Results of local survey
- C. 
$$\frac{\text{Annual volume of non-SOV}}{\text{Total annual volume}}$$

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## ***Method A: American Community Survey (Default)***

- Use “5 Year Estimate” DP03 Table
  - “Commuting to Work” section
  - “Estimate” column

$$\% \text{ nonSOV Travel} = 100\% - \% \text{ SOV Travel}$$

- Based on work trips only
- Assumes all other modes, including telecommuting, are part of non-SOV travel

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# *American Community Survey*

<https://www.census.gov/programs-surveys/acs/>

Then go to:

- Data>Data Tables and Tools>Data Profiles
- Select State from drop-down menu, then Get Data Profile>Economic Characteristics

# American Community Survey

## American Community Survey

[About the Survey](#)

[Respond to the Survey](#)

[News & Updates](#)

**Data**

**Data Tables & Tools**

**Data Profiles**

[Narrative Profiles](#)

[Subject Tables](#)

[Ranking Tables](#)

[American FactFinder](#)

[Statistical Testing Tool](#)

[My Congressional District](#)

[Data via FTP](#)

[Summary File Data](#)

[PUMS Data](#)

[Variance Replicate Tables](#)

[Race/Ethnicity & AIAN Data](#)

[Custom Tables](#)

[Guidance for Data Users](#)

[Geography & the ACS](#)

### Data Profiles

[Tell Us What You Think!](#)

Data Profiles have the most frequently requested social, economic, housing, and demographic data. Each of these four subject areas is a separate data profile. The data profiles summarize the data for a single geographic area, both numbers and percent, to cover the most basic data on all topics.

### 2011 - 2015 ACS 5-Year Data Profiles

#### United States

[Social Characteristics](#) — includes Education, Marital Status, Relationships, Fertility, Grandparents...

[Economic Characteristics](#) — includes Income, Employment, Occupation, Commuting to Work...

[Housing Characteristics](#) — includes Occupancy and Structure, Housing Value and Costs, Utilities...

[Demographic Characteristics](#) — includes Sex and Age, Race, Hispanic Origin, Housing Units...

\*All links go to [American FactFinder](#)

**Choose your State, County, or Place**

Select a state to begin:

You have selected:

Refine your selection:

County

Place

Select County/Place:



# American Community Survey

**Choose your State, County, or Place**

**Select a state to begin:**

Tennessee ▼

**You have selected:**

**Tennessee**

**Refine your selection:**

County

Place

**Select County/Place:**

▼

Get Data Profile

Clear Selections

**Tennessee**

[Social Characteristics](#) — includes Education, Marital Status, Relationships, Fertility, Grandparents...

[Economic Characteristics](#) — includes Income, Employment, Occupation, Commuting to Work...

[Housing Characteristics](#) — includes Occupancy and Structure, Housing Value and Costs, Utilities...

[Demographic Characteristics](#)— includes Sex and Age, Race, Hispanic Origin, Housing Units...

Source: 2011-2015 American Community Survey 5-year estimates.

For Data Profiles for additional geographies, search on American FactFinder:

[https://factfinder.census.gov/bkmk/navigation/1.0/en/d\\_dataset:ACS\\_15\\_5YR/d\\_product\\_type:DATA\\_PROFILE/](https://factfinder.census.gov/bkmk/navigation/1.0/en/d_dataset:ACS_15_5YR/d_product_type:DATA_PROFILE/)



# American Community Survey, Table DP03

|                          |   | Knoxville, TN Urbanized Area (2010) |                 |         |                         |
|--------------------------|---|-------------------------------------|-----------------|---------|-------------------------|
| Subject                  |   | Estimate                            | Margin of Error | Percent | Percent Margin of Error |
| <b>EMPLOYMENT STATUS</b> |   |                                     |                 |         |                         |
|                          | Population 16 years and over                  | 464,407                             | +/-2,568        | 464,407 | (X)                     |
|                          | In labor force                                | 291,336                             | +/-2,695        | 62.7%   | +/-0.4                  |
|                          | Civilian labor force                          | 290,985                             | +/-2,676        | 62.7%   | +/-0.4                  |
|                          | Employed                                      | 271,304                             | +/-2,487        | 58.4%   | +/-0.4                  |
|                          | Unemployed                                    | 19,681                              | +/-1,118        | 4.2%    | +/-0.2                  |
|                          | Armed Forces                                  | 351                                 | +/-135          | 0.1%    | +/-0.1                  |
|                          | Not in labor force                            | 173,071                             | +/-2,177        | 37.3%   | +/-0.4                  |
|                          | Civilian labor force                          | 290,985                             | +/-2,676        | 290,985 | (X)                     |
|                          | Unemployment Rate                             | (X)                                 | (X)             | 6.8%    | +/-0.4                  |
|                          | Females 16 years and over                     | 242,293                             | +/-1,508        | 242,293 | (X)                     |
|                          | In labor force                                | 137,896                             | +/-1,763        | 56.9%   | +/-0.6                  |
|                          | Civilian labor force                          | 137,863                             | +/-1,757        | 56.9%   | +/-0.6                  |
|                          | Employed                                      | 128,960                             | +/-1,754        | 53.2%   | +/-0.6                  |
|                          | Own children of the householder under 6 years | 38,920                              | +/-863          | 38,920  | (X)                     |
|                          | All parents in family in labor force          | 24,640                              | +/-965          | 63.3%   | +/-2.1                  |
|                          | Own children of the householder 6 to 17 years | 78,568                              | +/-1,396        | 78,568  | (X)                     |
|                          | All parents in family in labor force          | 54,172                              | +/-1,730        | 68.9%   | +/-1.7                  |
| <b>COMMUTING TO WORK</b> |   |                                     |                 |         |                         |
|                          | Workers 16 years and over                     | 266,189                             | +/-2,424        | 266,189 | (X)                     |
|                          | Car, truck, or van -- drove alone             | 225,588                             | +/-2,299        | 84.7%   | +/-0.5                  |
|                          | Car, truck, or van -- carpoled                | 22,094                              | +/-1,141        | 8.3%    | +/-0.4                  |
|                          | Public transportation (excluding taxicab)     | 1,868                               | +/-334          | 0.7%    | +/-0.1                  |
|                          | Walked  | 3,611                               | +/-448          | 1.4%    | +/-0.2                  |
|                          | Other means                                   | 2,777                               | +/-344          | 1.0%    | +/-0.1                  |
|                          | Worked at home                                | 10,251                              | +/-776          | 3.9%    | +/-0.3                  |
|                          | Mean travel time to work (minutes)            | 21.7                                | +/-0.3          | (X)     | (X)                     |



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## *Method B: Local Travel Survey*

- % non-SOV travel is that travel that is not occurring by driving alone in a motorized vehicle, including telecommuting
- May be for work trips or all trips
- Needs to have been conducted as recently as 2 years prior to the reporting period

## ***Method C: System Use Measurement***

- Based on counts of travelers
- Sample or continuous methods can be used

*% nonSOV travel*

$$= 100 \times \left( \frac{Volume_{nonSOV}}{Volume_{nonSOV} + Volume_{SOV}} \right)$$

$Volume_{SOV}$  = annual person volume of travelers making trips by driving alone



## ***Method C: System Use Measurement***

$Volume_{nonSOV}$  = annual volume of person travel by modes other than driving alone

$$= \sum_{m=1}^t Volume_m$$

$m$  = travel mode, SOV travel excluded

$Volume$  = annual volume of person travel for mode  $m$

$t$  = total number of non-SOV modes

## ***Example: Method A (ACS Data)***

- Following the previous instructions for accessing ACS data, we have found Table DP03 for Detroit

| COMMUTING TO WORK                         |           |
|---|-----------|
| Workers 16 years and over                 | 1,602,992 |
| Car, truck, or van -- drove alone         | 1,346,658 |
| Car, truck, or van -- carpooled           | 136,483   |
| Public transportation (excluding taxicab) | 27,819    |
| Walked                                    | 22,493    |
| Other means                               | 18,188    |
| Worked at home                            | 51,351    |
|   |           |
| Mean travel time to work (minutes)        | 25.9      |

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## ***Example: Method A (ACS Data)***

$$\begin{aligned}\% \text{SOV Travel} &= \frac{\text{Workers who drove alone}}{\text{Total workers}} \\ &= \frac{1,346,658}{1,602,992} \\ &= 84.0\%\end{aligned}$$

$$\begin{aligned}\% \text{NonSOV Travel} &= 100\% - 84.0\% \\ &= 16.0\%\end{aligned}$$

*Questions?*



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## ***Contacts***

For questions or more information, please contact:

FHWA Office of Operations:

*Rich Taylor, [rich.taylor@dot.gov](mailto:rich.taylor@dot.gov), 202-366-1327*



*Questions?*



U.S. Department of Transportation  
Federal Highway Administration

