Regional Perspectives on Implementing the New NAAQS

The Air Quality Planning Process

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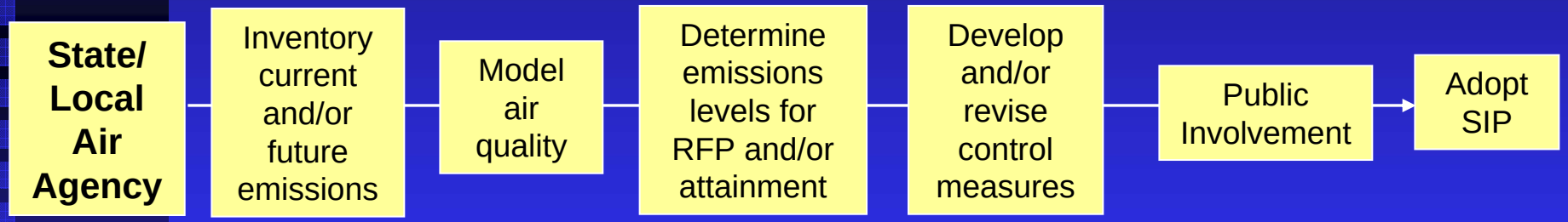
The Air Quality Planning Process

- **Steps in SIP Development**
- Preparation and Use of SIP Emissions Inventories
- Implementation of Control Measures
- Motor Vehicle Emissions Budgets

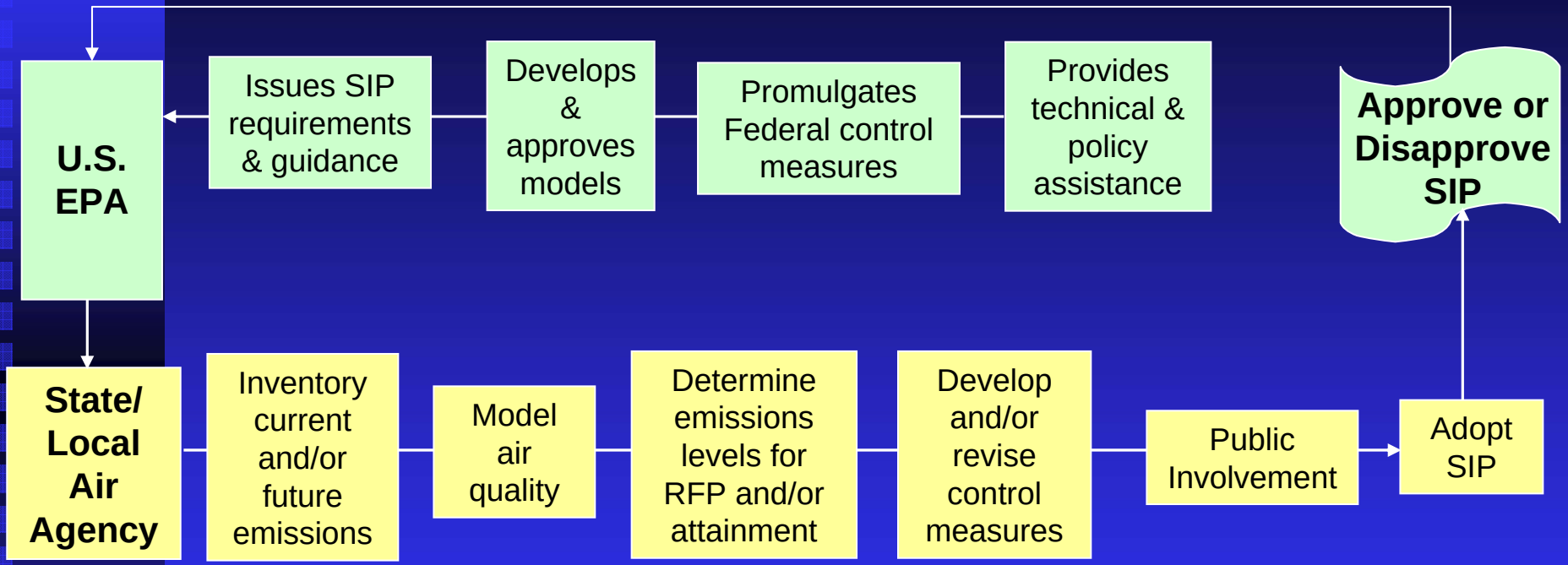
Who are the Participants?

- State & Regional Air Quality Agencies
- U.S. EPA
- Metropolitan Planning Organizations (MPO)
- State DOT
- Interest Groups & Public Stakeholders
- U.S. Department of Transportation (DOT)

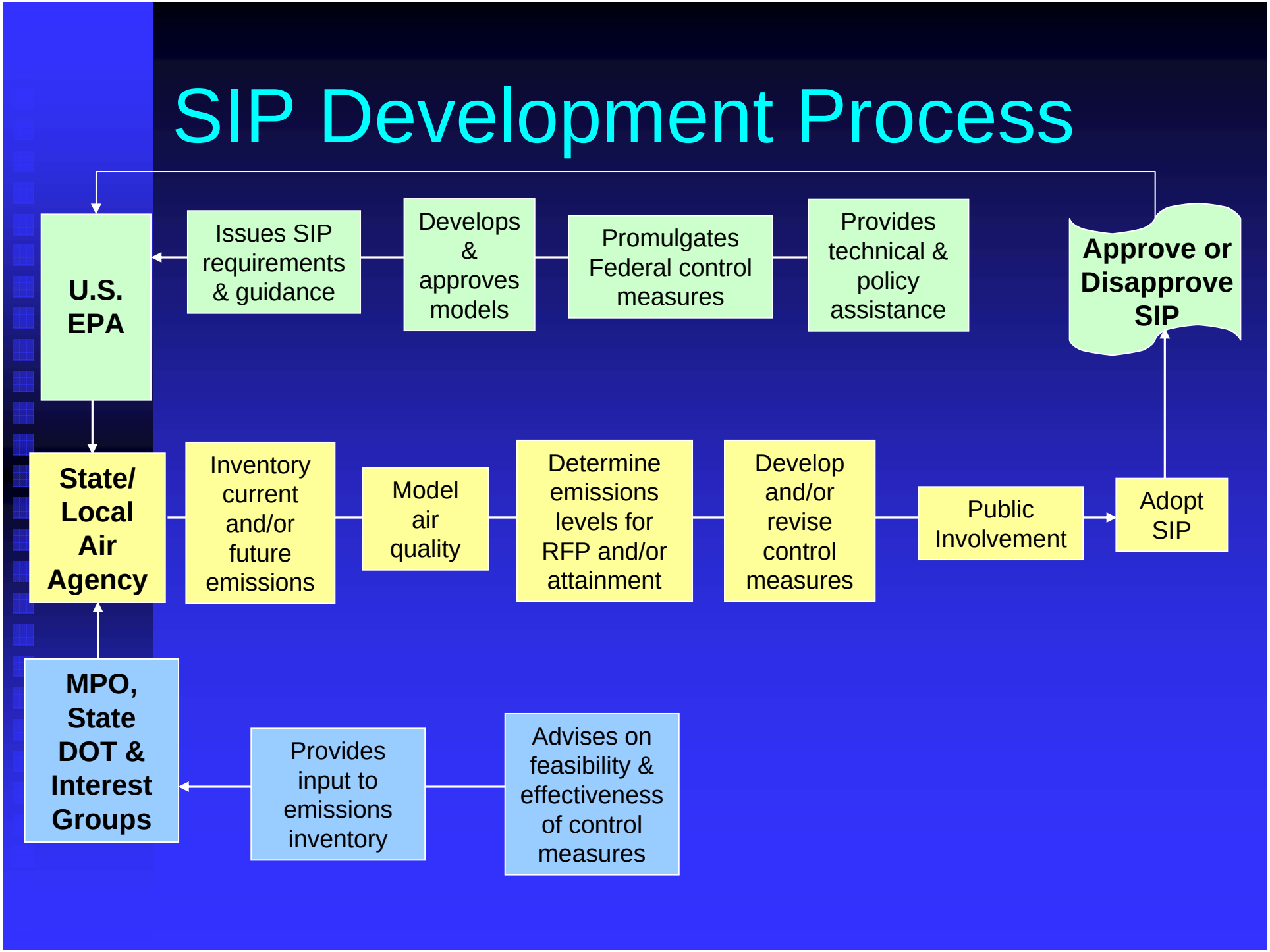
SIP Development Process (State Implementation Plan)



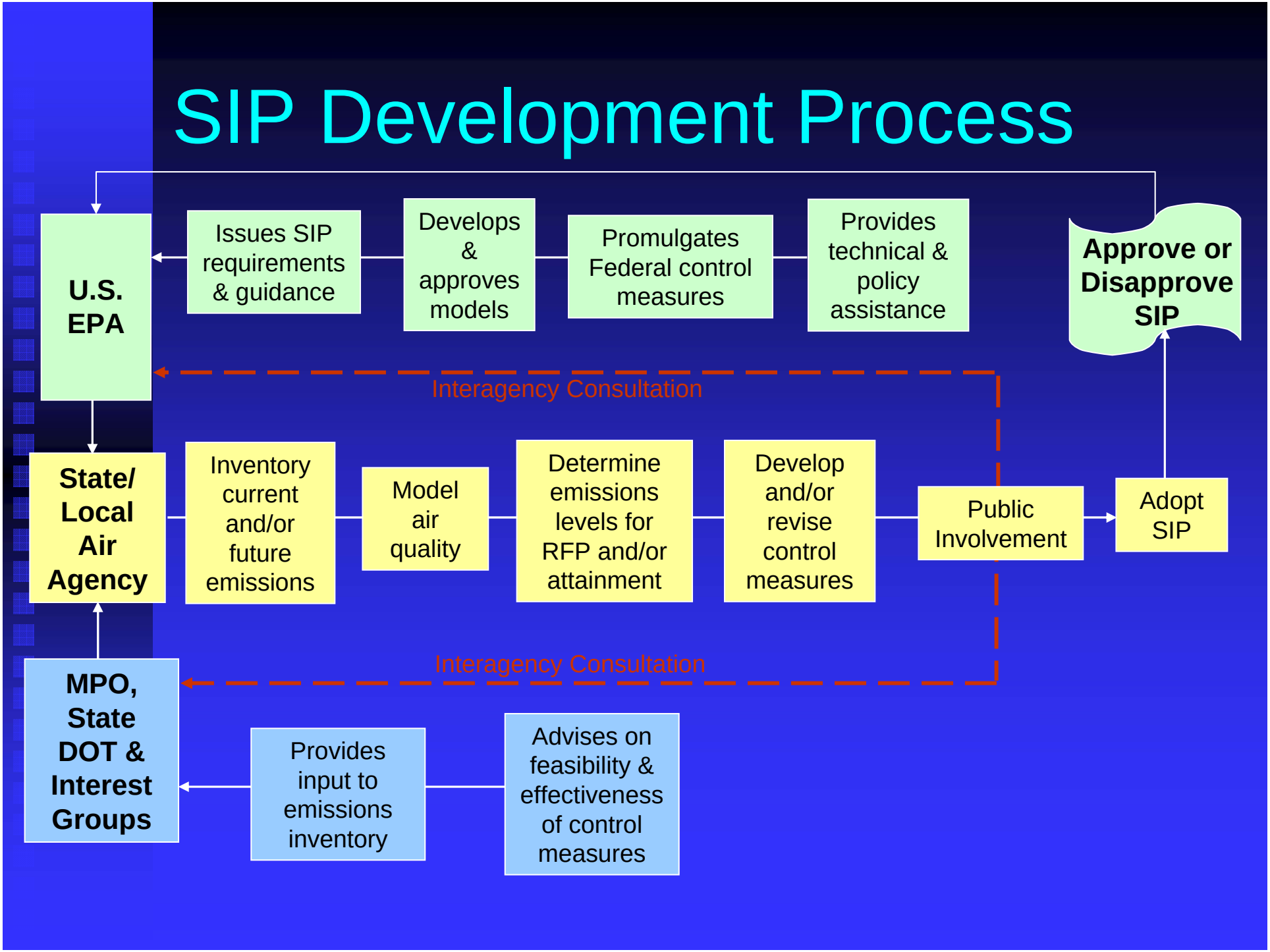
SIP Development Process



SIP Development Process



SIP Development Process



The Air Quality Planning Process

- Steps in SIP Development
- **Preparation and Use of SIP Emissions Inventories**
- Implementation of Control Measures
- Motor Vehicle Emissions Budgets

What is an Emissions Inventory?

- Current, comprehensive listing of air pollutant emissions
  - By source
  - By specific geographic area
  - By specific time period
  - For specific purposes

SIP Emissions Inventory Purpose

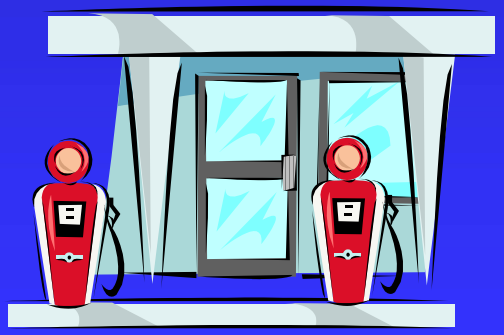
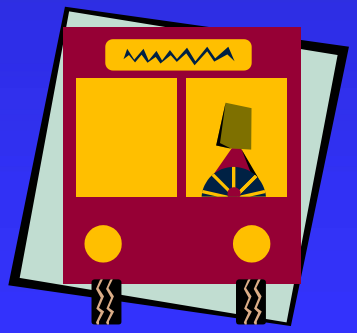
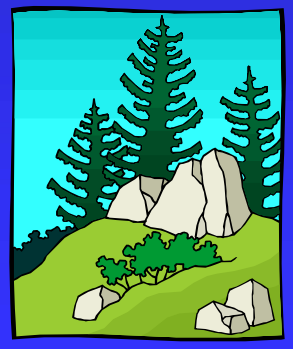
- Estimate baseline emissions
- Estimate future emissions levels
- Quantify reductions from control strategies
- Determine reductions needed to demonstrate RFP, attainment, or maintenance

Importance of SIP Emissions Inventories

- Emissions inventories are the foundation of key decisions
  - Number & stringency of control measures
  - Vehicle emissions budgets
- Inventory defines the “problem”

Sources Addressed in SIP Inventories

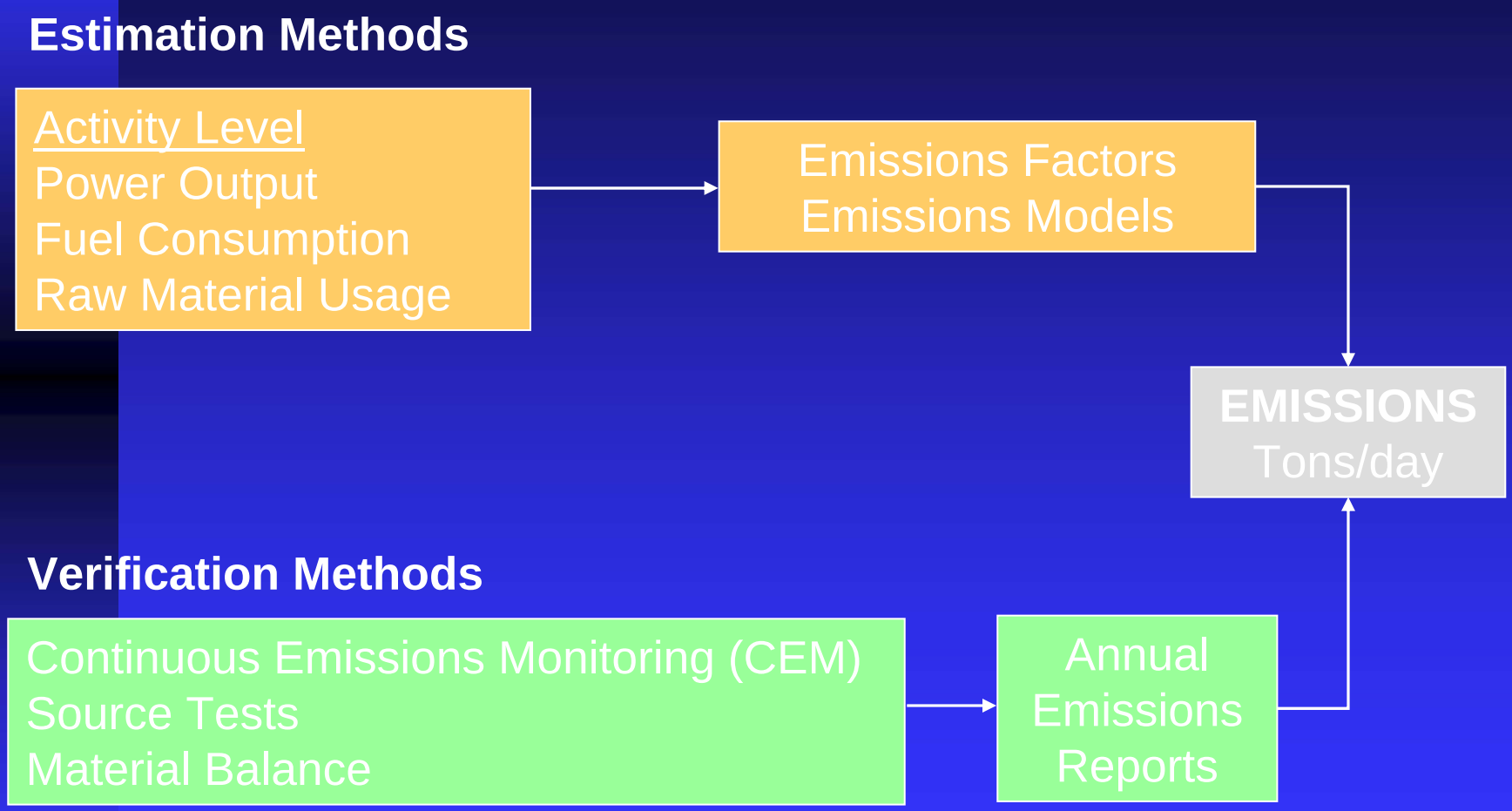
- Point sources
- Area sources
- Mobile sources (on-road & non-road)
- Biogenic sources (baseline and modeling inventories)

Point Sources

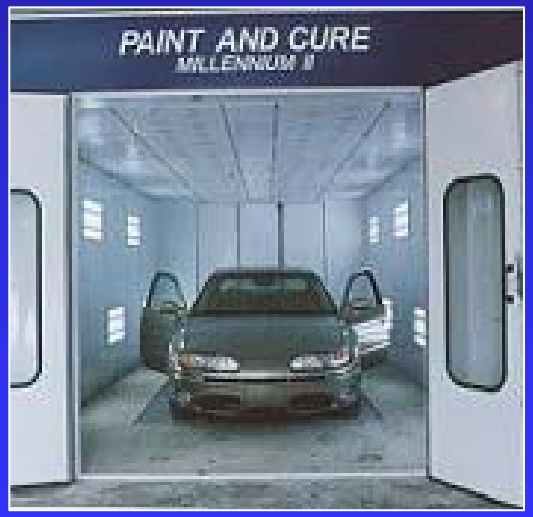
- Individual stationary sources of emissions that exceed threshold levels (tons/year)
- CAA defines major stationary sources based on
  - Threshold emissions levels
  - Nonattainment classification
  - Pollutant
- CAA requires operating permits for major stationary sources

Estimation Methods: Point Sources



Area Source

- Smaller or more numerous stationary sources than point source
- Emissions fall below threshold levels of point sources



Estimation Methods: Area Sources

Emissions = activity factors x emissions factors

- Activity factors: Population, employment,
- EPA source specific emissions factors
- Growth projections
- Material balance
- Emissions models

Mobile Sources

- On-road sources are licensed for highway use
- Non-road sources are not licensed for highway use

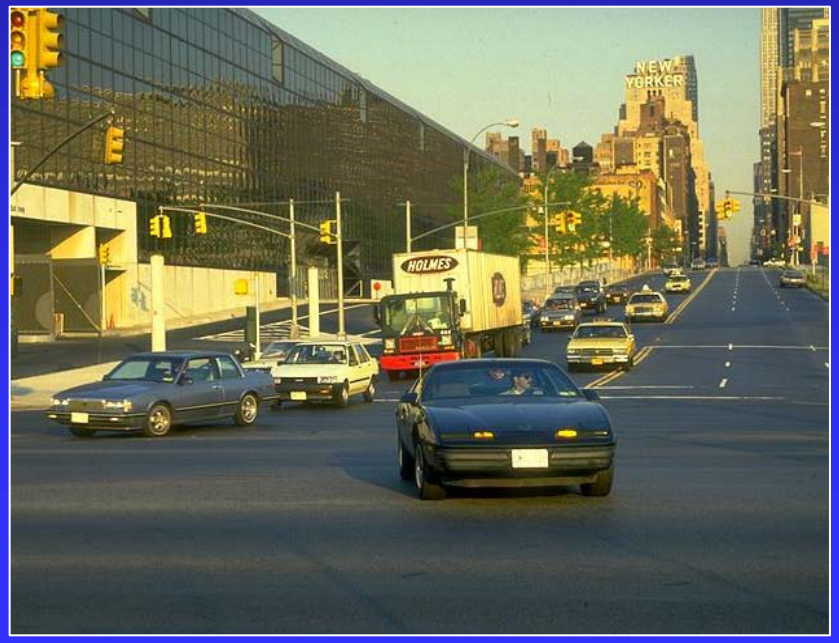
Non-Road Mobile Sources

Emissions = equip. population x activity/load factor x emissions factor x rated horsepower

- EPA NONROAD Model
- Covers > 80 types of non-road engines
- Estimates emissions for CO, NOx, SOx, VOCs, PM10, and PM2.5
- Reports emissions down to county level

On-Road Mobile Sources

- Cars
- Trucks
- Buses
- Motorcycles



Estimation Methods: On-Road Mobile Sources

Emissions = activity data x emissions factor

- Activity data
  - Vehicle miles traveled (VMT)
  - Vehicle speeds
- Emissions factors
  - MOBILE6.2 – CO, NOx, VOCs, HAPs, PM2.5

VMT Estimation

- Required for all nonattainment and maintenance areas
- Data compiled according to
  - Time of day & year
  - Roadway & facility type
  - Vehicle type

Emissions Factor Models: MOBILE6.2

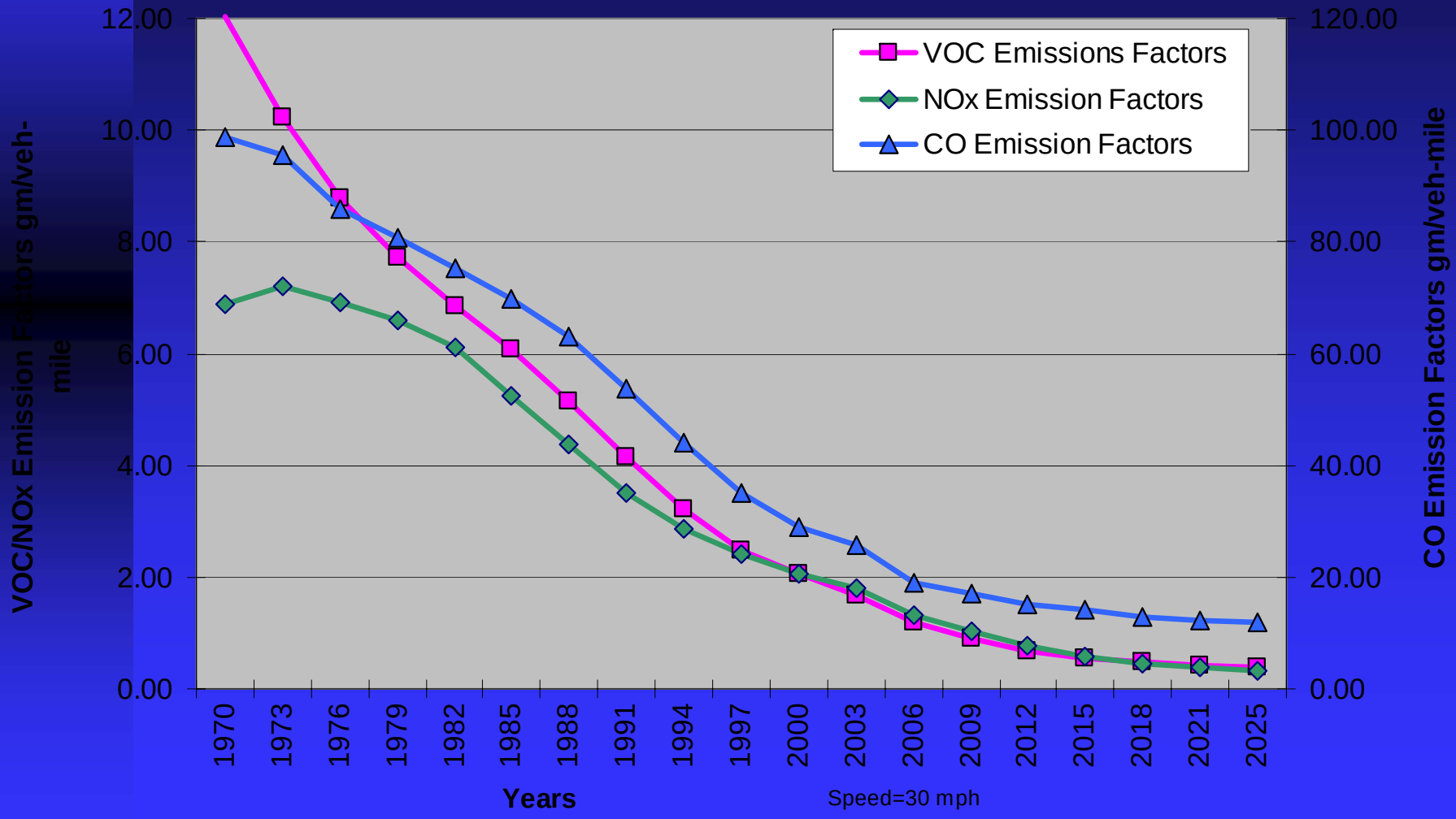
- EPA emissions factor model to estimate on-road vehicle emissions
- Covers model years 1952-2051
- Estimates CO, NOx, hydrocarbons, HAPs & PM
- Includes exhaust, evaporative & refueling emissions
- Emissions factors in grams per vehicle mile as function of speed by facility type

Key Transportation Data Affecting MOBILE6 Emissions Estimates

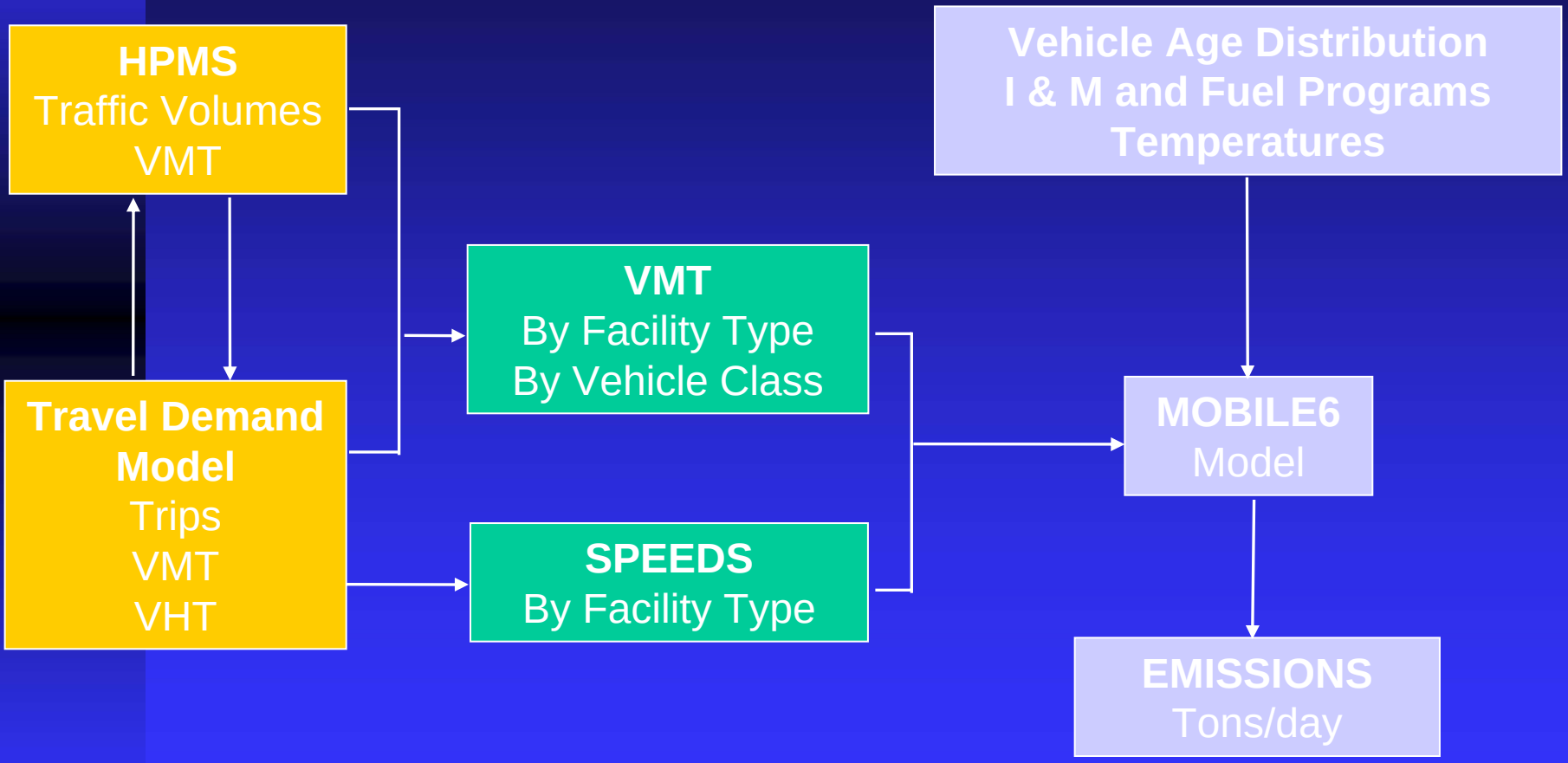
- Vehicle registration data
- Vehicle classification
- Vehicle speeds
- Trip starts per day

Future Emissions Rates vs. Time

Mobile6 CO, NOX and VOC Emission Factors for Years 1970-2025



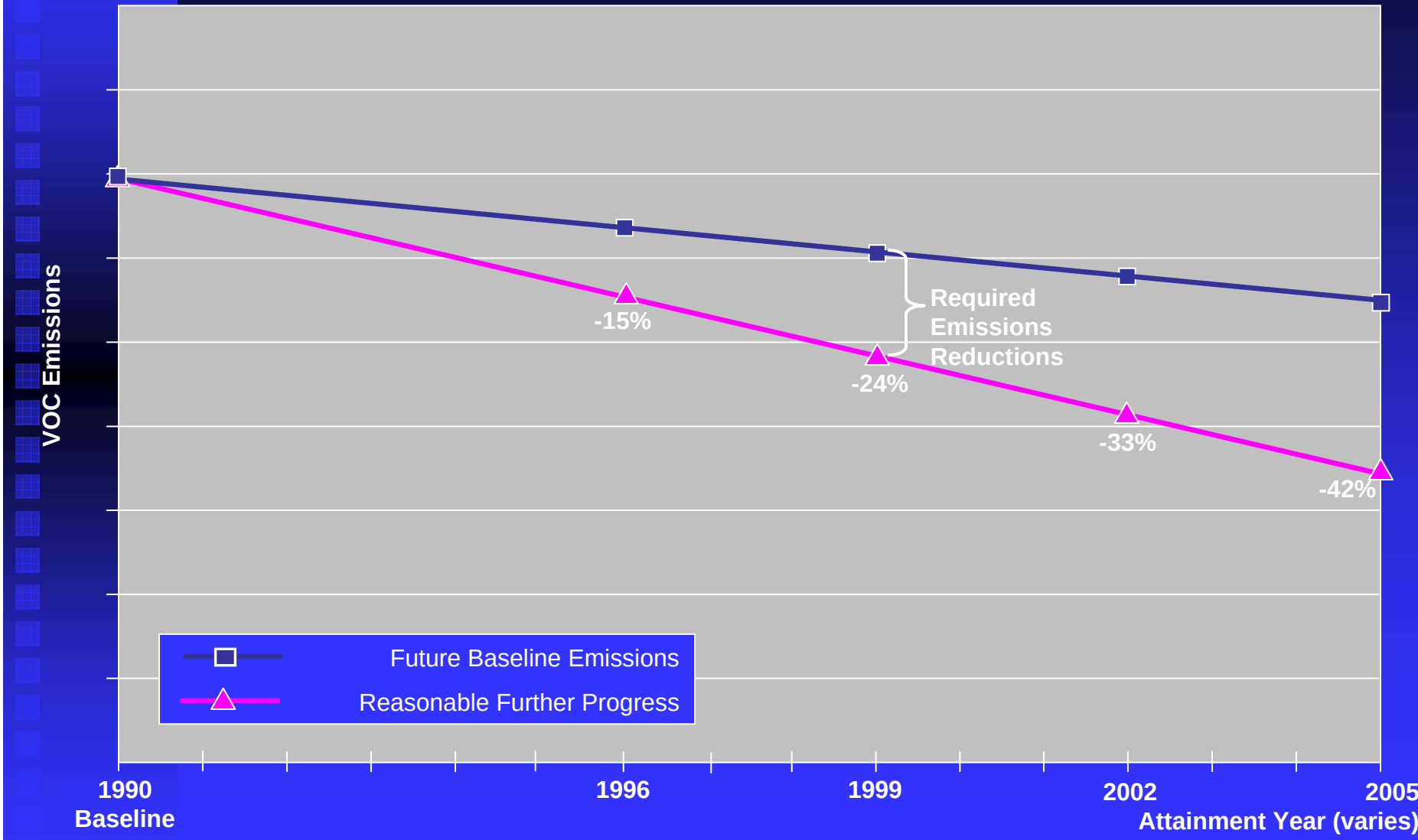
Emissions Estimation Process: On-Road Mobile Sources



Types of SIP Emissions Inventories

- Base year
- Periodic
- Rate of progress (ROP)/reasonable further progress (RFP)
- Modeling (attainment demonstration)

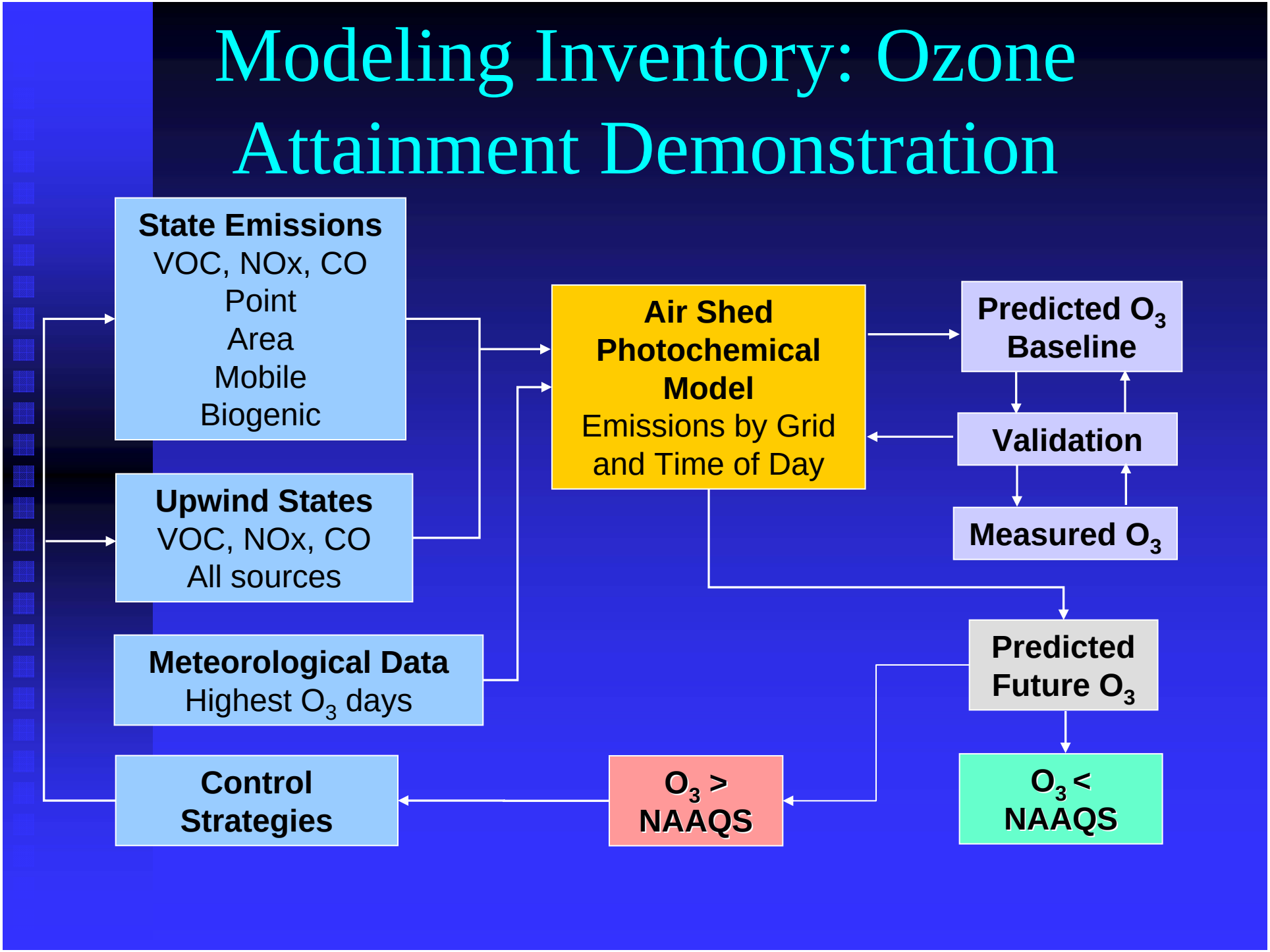
Ozone SIPs: RFP



SIP Modeling Inventory

- Required for developing ozone attainment demonstration
- Includes emissions from upwind areas determined by States
- Requires coordination between States to address pollution transport problem
- Emissions are temporally & spatially distributed

Modeling Inventory: Ozone Attainment Demonstration



The Air Quality Planning Process

- Steps in SIP Development
- Preparation and Use of SIP Emissions Inventories
- **Implementation of Control Measures**
- Motor Vehicle Emissions Budgets

What are Control Measures?

Control measures are equipment, processes or actions used to reduce air pollution

SIP Control Measures

- Federal, State, & local control measures
- On stationary sources:
  - Point
  - Area
- On mobile sources (vehicles & fuels):
  - Road
  - Non-road

Control Measures

Federal
Motor Vehicle Emissions Standards
National Standards for Trucks, Trains, Planes, Ships, and other off-road equipment
Fuel Standards
Consumer Products

Local/Regional
HOV Lanes
Transit Investments
Stationary Source Rules
Transportation Strategies
Pedestrian/Bicycling Improvements
Congestion Pricing Market Incentives

SIP Components

State
Inspection/Maintenance Programs
Stationary Source Controls
Limited Control of Fuels & Motor Vehicle Standards
Consumer Products, Pesticides
Market Measures

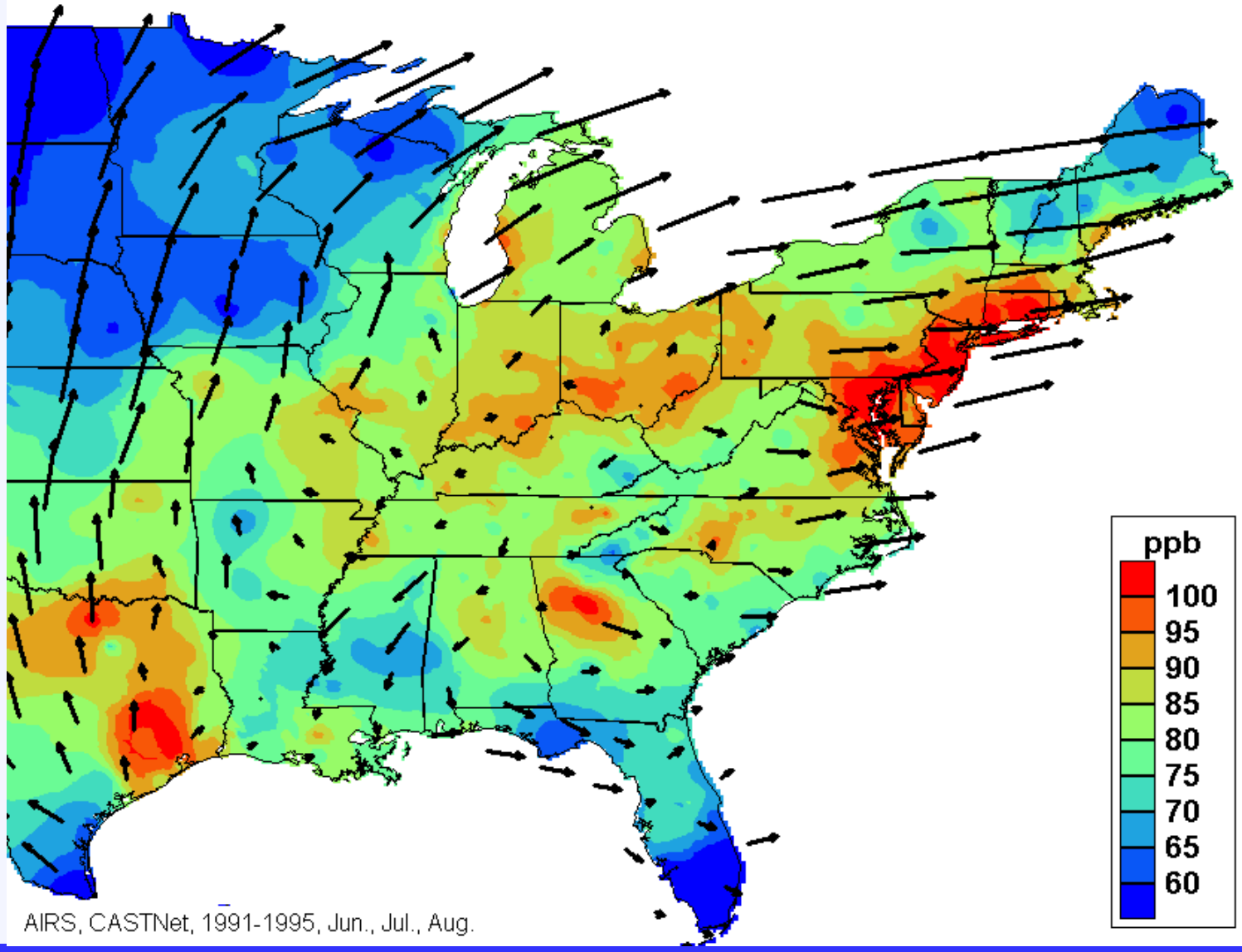
Control Measures: State Air Agency Role

- Identify State/local controls to provide needed Emissions reductions beyond Federal measures
- Evaluate cost-effectiveness & technological feasibility
- Consult with other agencies, selected officials, interest groups & public
- Propose control measures for inclusion in SIP

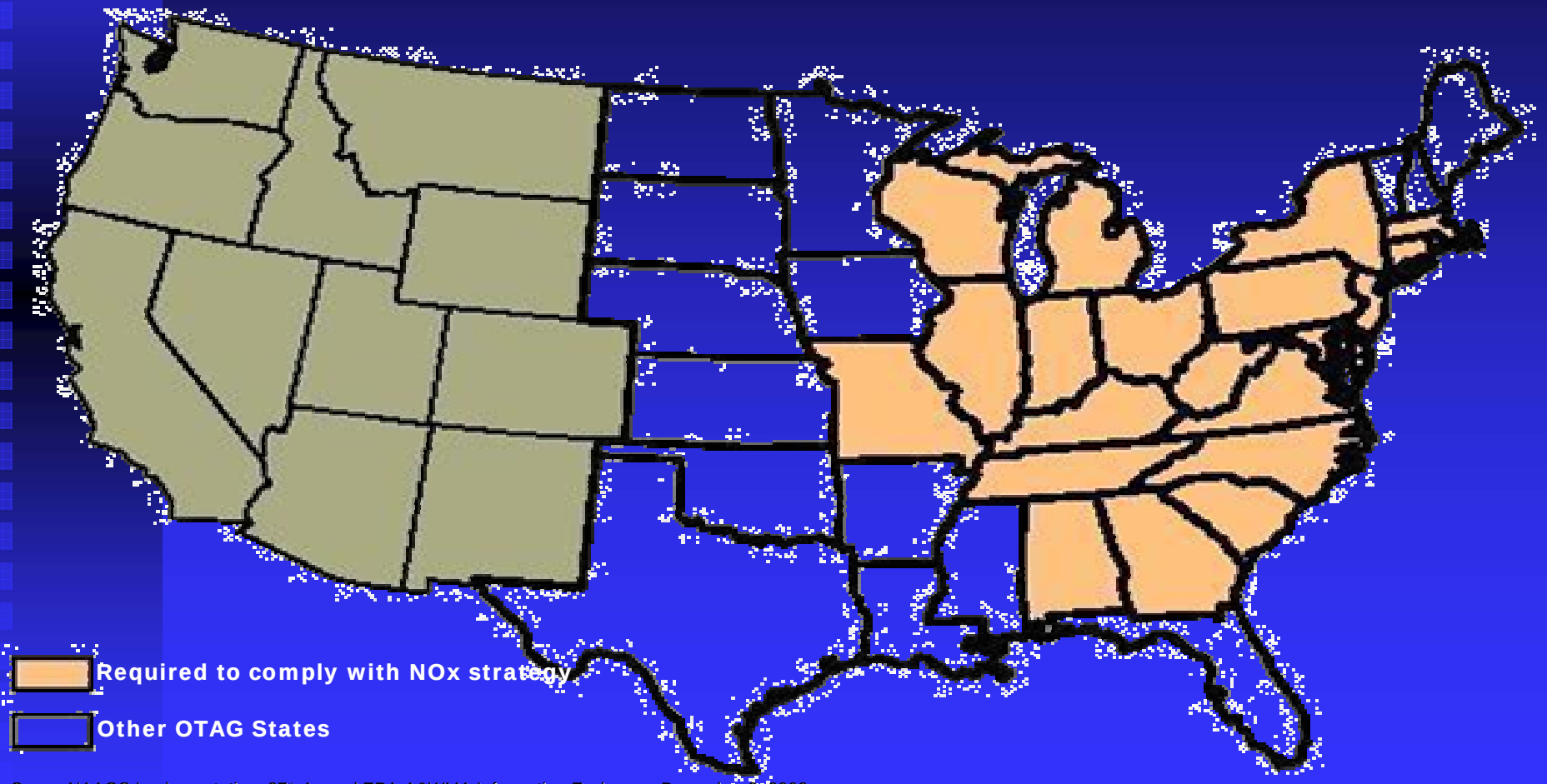
Federal Control Measures: Stationary Sources

- Prevention of Significant Deterioration (PSD) requirements
- EPA NOx SIP call
  - Aimed at ozone transport
  - Reduced NOx from utilities in eastern States

Transport Effects on O_3 Levels

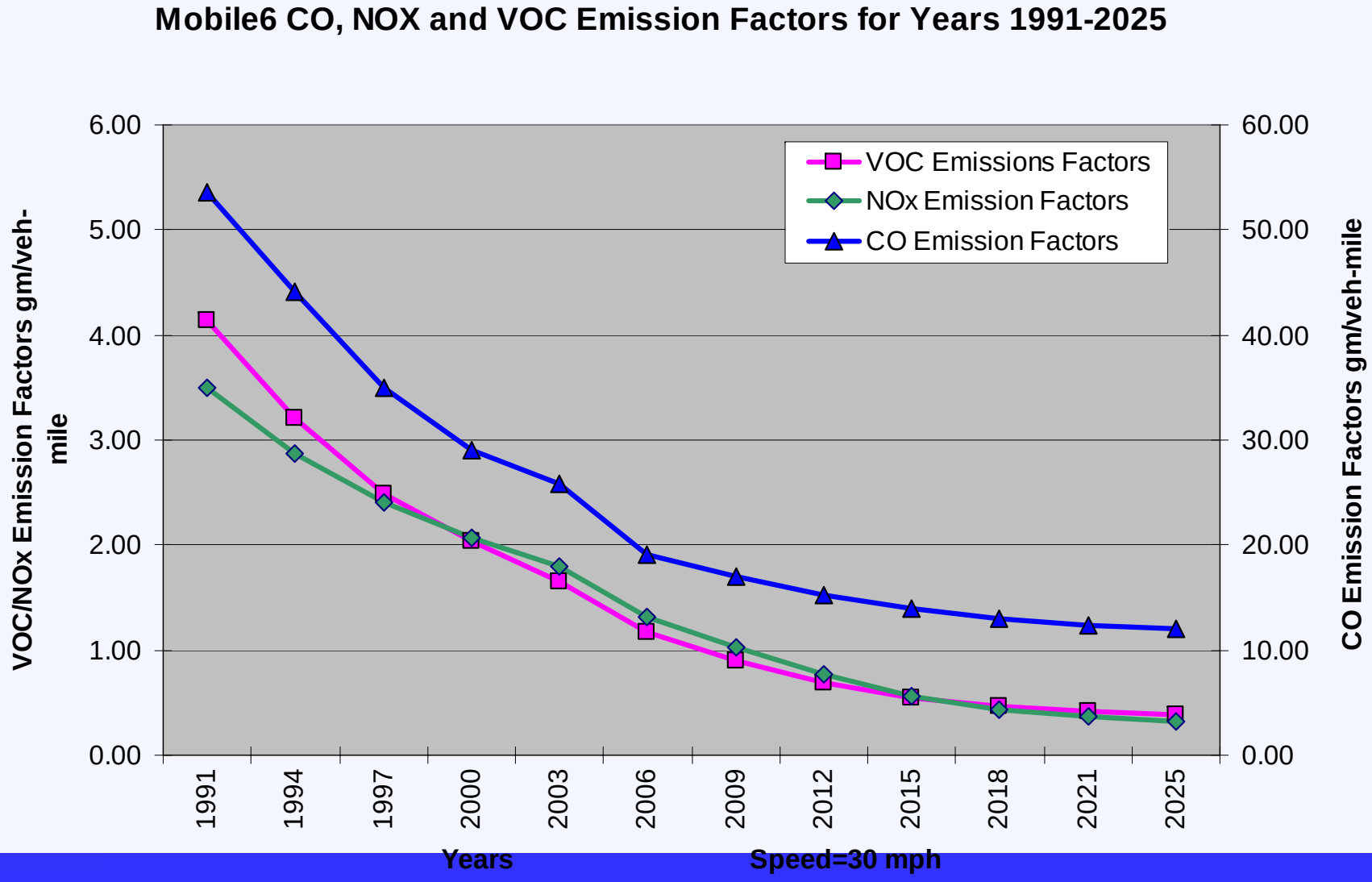


Ozone Transport

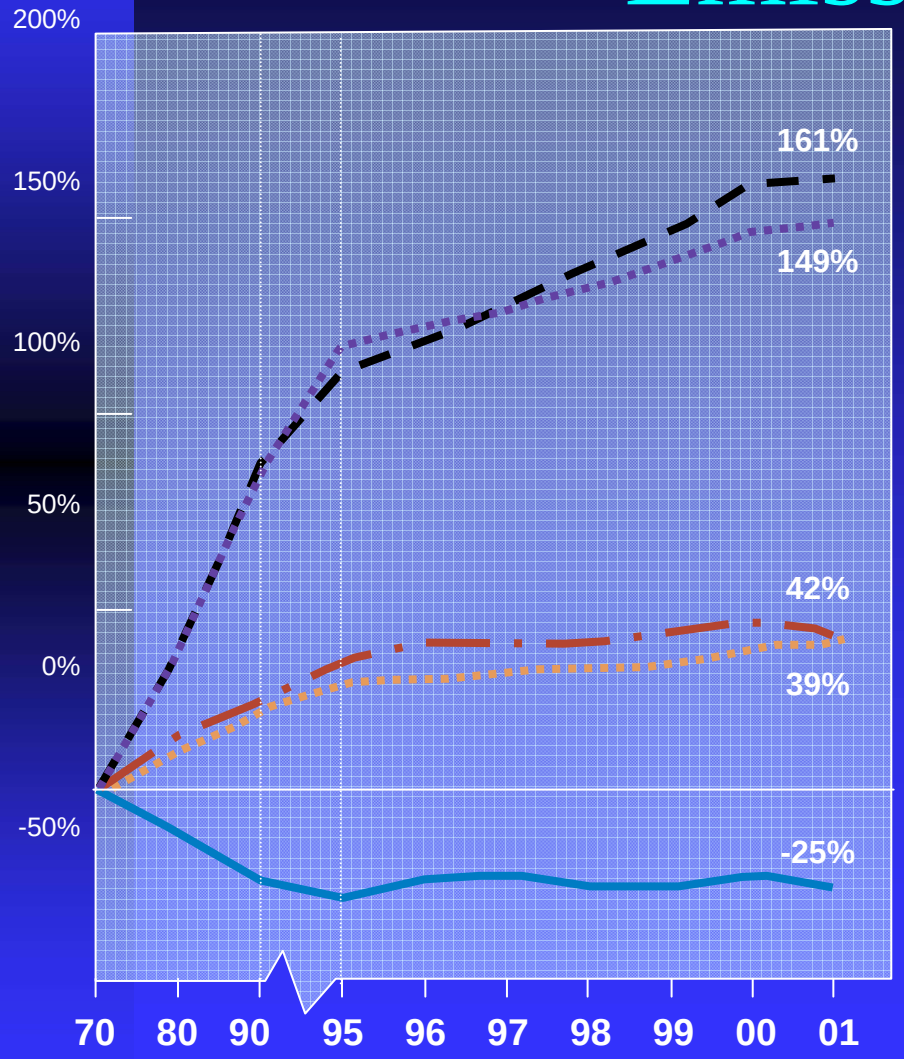


Ozone NAAQS Implementation. 27th Annual EPA-A&WMA Information Exchange. December 3, 2002.

Federal Tier 2: Combined Clean Vehicle & Fuel Control Measures



Comparison of Growth Areas & Emissions



Gross Domestic Product

Vehicle Miles Traveled

Energy Consumption

U.S. Population

Aggregate Emissions (Six Principal Pollutants)

U.S. DOT, Federal Highway Administration. Transportation Air Quality: Selected Facts and Figures. January 2002.

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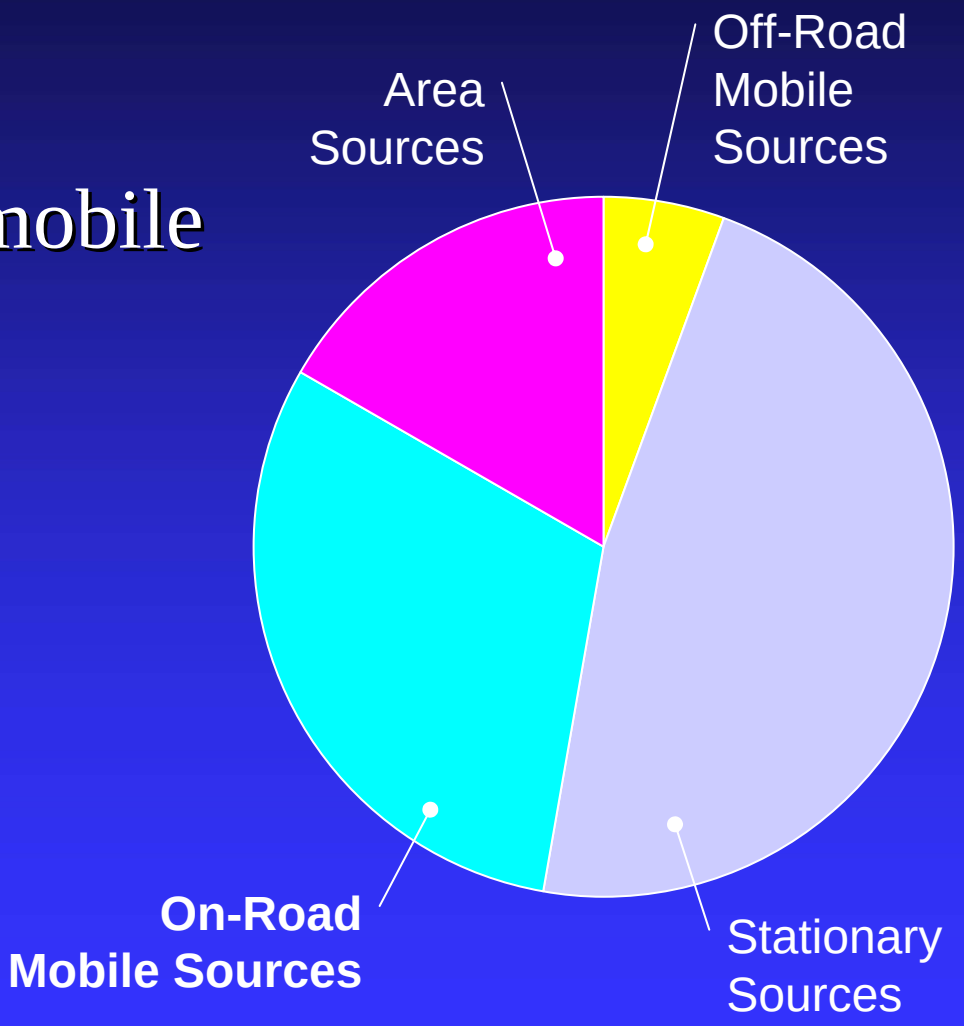
- **Motor Vehicle Emissions Budgets**

Motor Vehicle Emissions Budgets

- A ceiling on emissions for the planned transportation system
- Total allowable emissions for motor vehicles consistent with SIP purpose
  - RFP (milestone years)
  - Attainment
  - Outyears (optional)
  - Maintenance (last year)
- Established in the SIP as a legal limit

Motor Vehicle Emissions Budgets

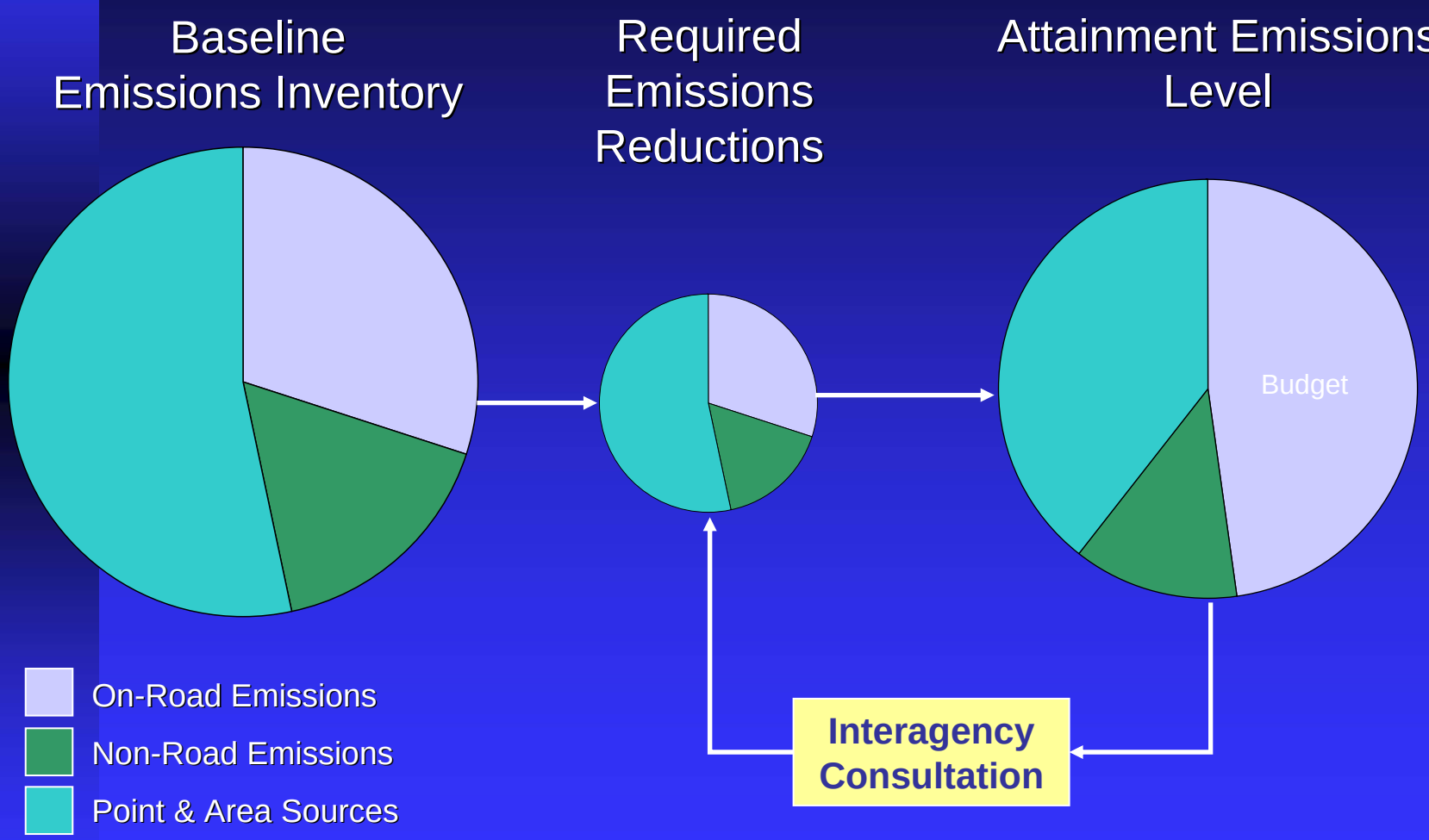
- Covers on-road mobile sources
- One piece of SIP emissions pie



Pollutants Addressed in Motor Vehicle Emissions Budget

- Criteria pollutants CO, NO_2, PM10 & precursors
  - CO in CO areas
  - NOx in NO_2 areas
  - NOx and/or VOC in ozone areas
  - NOx, VOC, PM10 in PM10 areas
  - NOx, VOC, PM2.5, in PM2.5 areas

Determining a Budget



Budget Adequacy

- EPA must find SIP budgets adequate (before they can be used in conformity demonstrations)
- EPA generally applies same criteria in approving a SIP budget as in approving entire SIP

Criteria for an Adequate Budget

- Identified & quantified in the SIP
- Consistent with SIP emissions inventory
- Consistent with emissions reductions from SIP control measures
- SIP must show schedule of emissions reductions to attainment
- SIP must contain agency commitments to transportation-related actions

EPA's Budget Adequacy Process

- State submits SIP with budget to EPA
- 90-day process, with public comment period
- EPA finds budget adequate or inadequate for conformity purposes