

# Revised CMAQ Methodologies

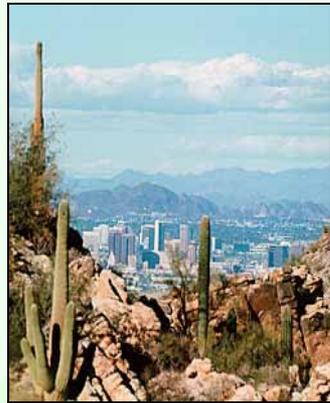
**Air Quality Technical Advisory Committee**

**November 30, 2010**

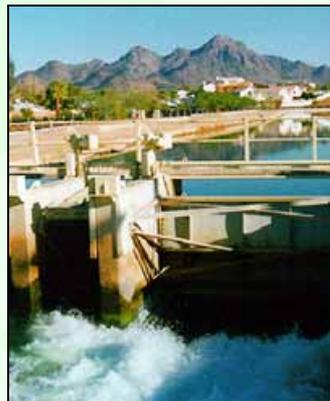




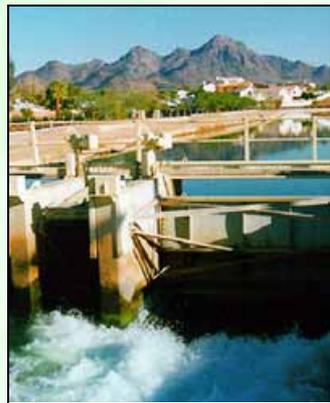
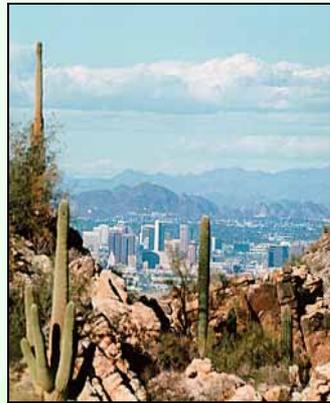
# Congestion Mitigation and Air Quality Improvement (CMAQ) Program



- n Established by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)
- n Continued under the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21)
- n Reauthorized by the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU)
  - | \$8.6B authorized over the period 2005-2009



**Purpose** - *To fund transportation projects or programs that will contribute to attainment or maintenance of the National Ambient Air Quality Standards for ozone, carbon monoxide and particulate matter*



# CMAQ Funding

## I Apportionment to Arizona

- n Based on Maricopa County's designation as a carbon monoxide maintenance area and an ozone nonattainment area
- n Maricopa County 2000 Census population x factor (1.0) for CO maintenance areas x factor (1.0) for ozone nonattainment areas x factor (1.2) for both CO and ozone

## I Arizona was apportioned ≈ \$54M in FY 2010

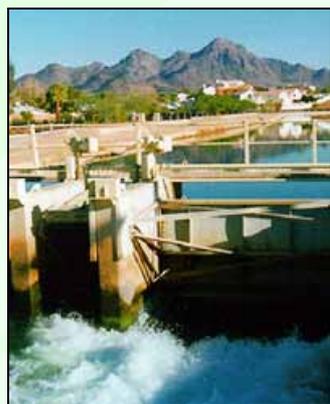
- n Represents about 2% of annual federal CMAQ appropriation plus increase due to "equity bonus"
- n Obligation authority limits how much of the apportionment may be spent

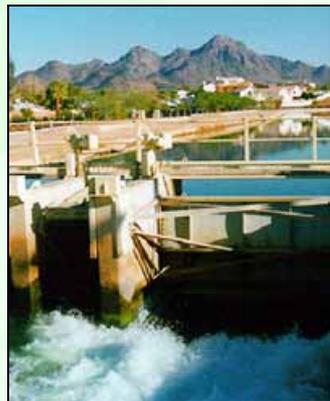
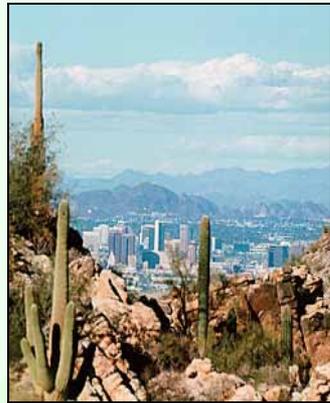
## I The MAG region receives the CMAQ funds allocated to Arizona



# CMAQ Project Selection Process

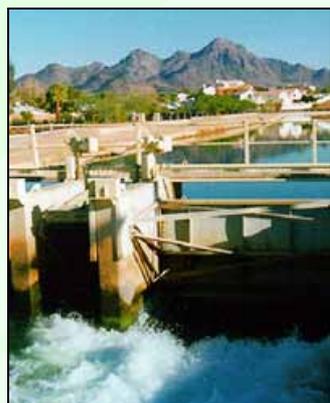
- n **All proposals for CMAQ funding must include:**
  - l Precise project/program description
    - n Size, scope, location and timetable
  - l An assessment of expected emission benefits
    - n Quantify emission benefits (reductions) and disbenefits (increases)
      - l For all pollutants for which the area is in nonattainment or maintenance, including precursor emissions
    - n Ensure that the benefits are credible and based on reproducible and logical analytical procedures
    - n If impossible to quantify the benefits, a qualitative assessment is acceptable
      - l Based on a reasoned and logical determination that the project decreases emissions and contributes to attainment or maintenance of the NAAQS





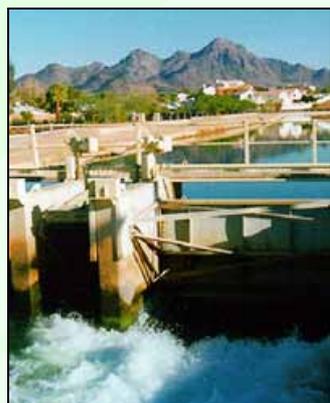
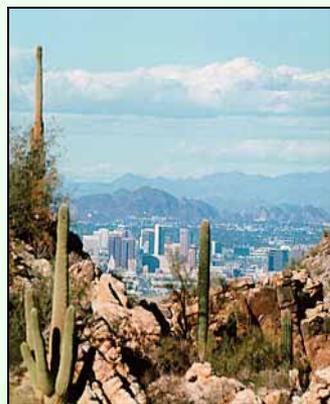
# MAG CMAQ Methodologies

- n **Federal CMAQ guidance, October 20, 2008**
  - | Analytical procedures are needed to quantify the emission benefits and disbenefits of proposed CMAQ projects and programs
- n **MAG Quantitative Measures**
  - | Emission reductions or increases (in kilograms per day)
  - | Cost-effectiveness (in dollars per metric ton of emission reduced annually)
- n **Analytical procedures are described in the MAG “Methodologies for Evaluating Congestion Mitigation and Air Quality Improvement Projects”**
  - | First published in 1999; last updated in April 2009
  - | Latest draft, dated November, 2010, was included in the transmittal packet for this meeting



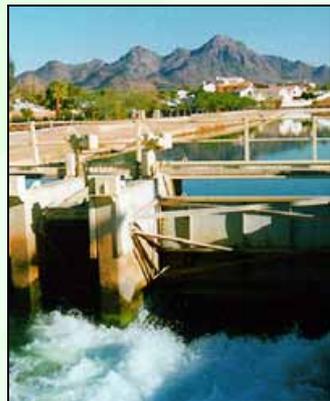
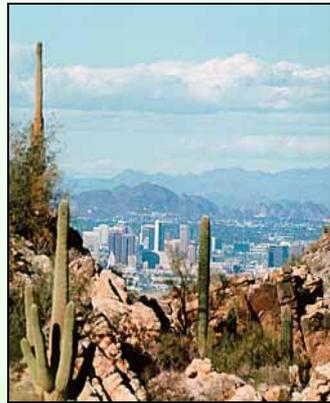
# MAG CMAQ Methodologies

- n **MAG guidance on CMAQ project eligibility**
  - | Provided in Appendix C of the MAG Transportation Programming Guidebook
  - | [www.mag.maricopa.gov/detail.cms?item=11431](http://www.mag.maricopa.gov/detail.cms?item=11431)
  
- n **Typically, the MAG CMAQ methodologies are applied each year to evaluate**
  - | CMAQ-eligible projects proposed for the last year of a new Transportation Improvement Program (TIP)
  - | CMAQ-eligible projects proposed for Fiscal Year-End Closeout funds
  - | PM-10 certified street sweepers proposed for purchase
  - | Proposed projects to pave unpaved roads, alleys and shoulders
  - | Projects implemented with CMAQ funds in the prior calendar year for the annual report required by FHWA



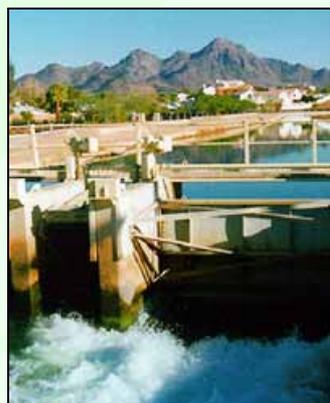
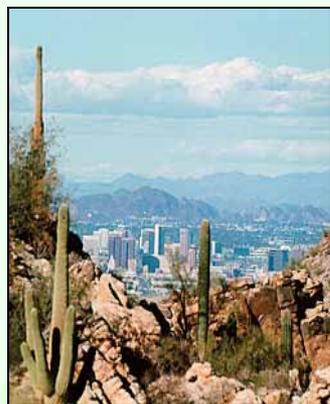
# MAG CMAQ Methodologies

- n **Project types** (key factors used to quantify emission reductions)
  - | **Bicycle and pedestrian facilities** (vehicles and VMT reduced)
  - | **Bus and rail projects** (vehicles and VMT reduced)
  - | **Diesel retrofits** (new vs old technology emission factors) and **Anti-idling programs** (idling reduced)
  - | **Intersection improvements** (delay reduced)
  - | **Park and ride facilities** (vehicles and VMT reduced)
  - | **Paving projects** (unpaved vs paved road emission factors)



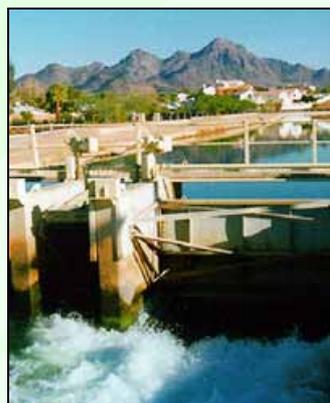
# MAG CMAQ Methodologies

- n **Project types** (key factors used to quantify emission reductions)
  - | **PM-10 certified street sweepers** (emission factors before and after sweeping)
  - | **Rideshare programs** (vehicles and VMT reduced)
  - | **Telework program** (vehicles and VMT reduced)
  - | **Traffic signal coordination** (speed increase)
  - | **Intelligent Transportation Systems** projects (speed increase)
  - | **Trip reduction program** (vehicles and VMT reduced)
  - | **Vanpool vehicles** (vehicles and VMT reduced)



# MAG CMAQ Methodologies

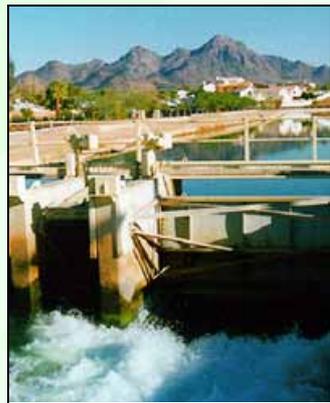
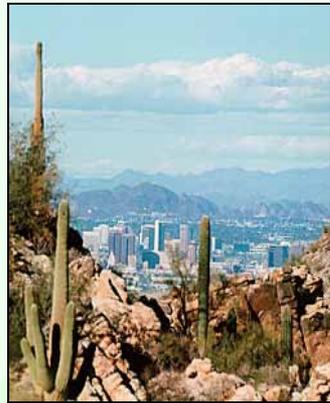
- n In 2008, Sierra Research compared MAG CMAQ methodologies with other western communities
- n **Conclusions**
  - | The MAG methodologies adequately address the key issues in the latest transportation legislation (i.e., SAFETEA-LU) with respect to:
    - n Evaluation and prioritization of diesel retrofit projects
    - n Prioritization of projects based on cost-effectiveness
    - n Allows funding of transportation systems management and operations projects that mitigate congestion and improve air quality
  - | **“Overall, the methods established by MAG for computing the cost-effectiveness of proposed CMAQ projects are still the most sophisticated of the states and communities surveyed, particularly for fugitive dust emission calculations.”**



# MAG CMAQ Methodologies

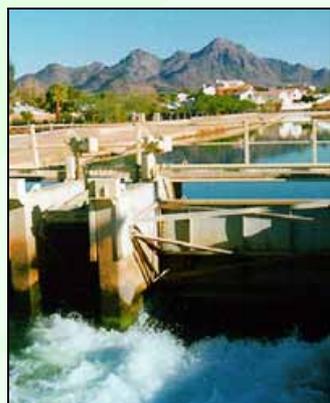
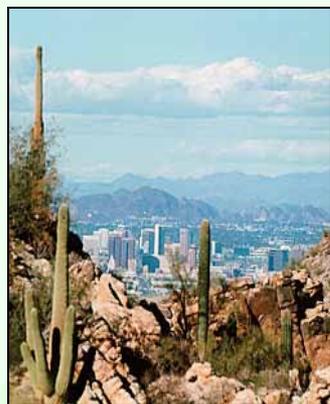
## n **Sierra Recommendations**

- | Update the methodologies to be consistent with assumptions in the 2007 MAG Ozone and PM-10 Plans
- | Review and update activity rates from local sources (e.g., On Board Bus and Household Travel Surveys, MAG Congestion Studies, Travel Demand Management Surveys, Trip Reduction Reports)
- | Continue to use a weight of zero for carbon monoxide in the cost-effectiveness calculation
- | Review more-detailed techniques developed by the Texas Transportation Institute to quantify control measures for the Texas SIP
- | Consider providing project sponsors with on-line access to the CMAQ methodologies



# MAG CMAQ Methodologies

- n **Revisions to the 2010 CMAQ methodologies**
  - l Emission factors are derived from the new EPA mobile source emissions model - MOVES2010a
    - n Network vs. off-network emission factors
    - n PM-10 emissions are now sensitive to changes in speeds
    - n Speed curves have changed
  - l Activity rates have been updated to reflect the latest available local transit and TDM studies
  - l Priority weights on PM-10 and ozone precursor emissions (TOG and NO<sub>x</sub>) are now equivalent
    - n Set equal to one
    - n CO weight is still zero
  - l The ITS methodology has been revised to incorporate recommendations from Lee Engineering/Texas Transportation Institute



# MAG CMAQ Methodologies

## n **Cost-effectiveness**

- | The more emissions reduced per CMAQ dollar spent, the higher the ranking of the CMAQ project

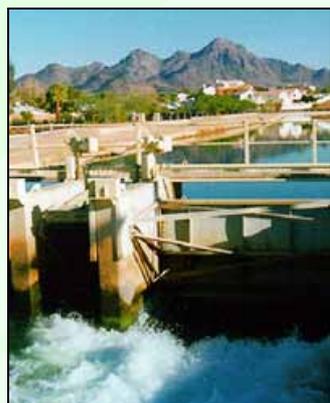
## n **Time constraints on calculations**

- | Typically, about two weeks are available to apply the methodologies, calculate cost-effectiveness, and rank all CMAQ project requests

# MAG CMAQ Methodologies

## n **Cost-effectiveness for example projects (\$/metric ton)**

- | Purchase a PM-10 certified sweeper - \$469
- | Telework Program - \$987
- | Pave unpaved road with curb and gutter - \$1,507
- | Trip reduction program - \$4,252
- | Regional rideshare program - \$4,837
- | Bike lane with shoulder paving - \$5,753
- | Park and ride lot - \$8,664
- | Intelligent Transportation System project - \$16,899
- | Truck stop electrification project - \$23,782
- | New light rail service - \$28,115
- | Purchase one vanpool vehicle - \$52,642
- | Retrofit diesel vehicles w/catalysts & particulate traps -\$59,836
- | Auxiliary power units on diesel buses - \$67,995
- | Traffic signal coordination project - \$84,144
- | Bike lane without shoulder paving - \$371,393
- | New diesel bus for a new route - \$440,548
- | Roundabout - \$561,690
- | Add turning lanes - \$946,849



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For more information

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