Air Quality Conformity

TTP220
S. Handy
4/25/16
The 4-Step Model

**INPUTS?**
- Land use data
- Network

**4- STEPS?**
- Trip Generation
- Trip Distribution
- Mode Split
- Assignment

**OUTPUTS?**
- Volumes
- LOS

**Population, income, autos by zone**
**Employment by type by zone**
**Represented as nodes and links**
**Travel times from zone to zone**

- # trips from zones - Ps
- # trips to zones - As
- # trips between each pair of zones
- % of trips between zones by each mode
- driving trips assigned to routes
Demands on models have changed!

- New kinds of projects and policies, e.g. biking
  - What variables are in the model?
- New kinds of criteria, e.g. environmental justice
  - What outputs does the model produce?
- Requirements for public involvement
  - How transparent is the model and its application?
- Greater recognition of relationships with LU
  - How do models account for these relationships?
Challenges to Forecasts

“A federal court sided with the organization in a suit against WisDOT that challenged the traffic data used to justify the $146 million widening [from 2 to 4 lanes] of Highway 23... According to the ruling, the Wisconsin DOT failed to justify the amount of traffic it projected as likely to use the road in the future. The Court ruled that the project is ineligible for federal funding until documented accurate traffic forecasts can be made that justify expanding the highway.”

– 1000 Friends of Wisconsin, 5/28/15

See also: “White Elephant Watch: Vol. 3”

Challenges to Forecasts

“State departments of transportation all over the country use spurious traffic projections to justify hugely expensive road widening projects. That’s how you end up with the graph on the right — showing how DOTs continued to forecast traffic growth year after year, even as driving stagnated.”
– 1000 Friends of Wisconsin

“Beyond certain procedural and design requirements, states have unfettered discretion to determine what to build, which often results in projects that fail to provide clear benefits or to advance national transportation policy objectives.”
– Center for American Progress

New Transportation Planning

Goals
- Congestion Reduction
- Environment - Air Quality
- Environment Equity
- Accessibility

Measures
- V/C Level-of-Service
- Pollutant Emissions
- ???

Forecasts
- Travel Demand Model
- Travel Demand Model + Emissions Model
GOAL
Air Quality Legislation

- State Clean Air Act (1969, 1988)
Air Quality Agencies

- Environmental Protection Agency (EPA)
- California Air Resources Board (CARB)
- Air Quality Management Districts (AQMDs) and Air Pollution Control Districts (APCDs)
# Health-based NAAQS

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Primary/Secondary</th>
<th>Averaging Time</th>
<th>Level</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>primary</td>
<td>8 hours</td>
<td>9 ppm</td>
<td>Not to be exceeded more than once per year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 hour</td>
<td>35 ppm</td>
<td></td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>primary and secondary</td>
<td>Rolling 3 month average</td>
<td>0.15 μg/m³ (1)</td>
<td>Not to be exceeded</td>
</tr>
<tr>
<td>Nitrogen Dioxide (NO₂)</td>
<td>primary</td>
<td>1 hour</td>
<td>100 ppb</td>
<td>98th percentile of 1-hour daily maximum concentrations, averaged over 3 years</td>
</tr>
<tr>
<td></td>
<td>primary and secondary</td>
<td>1 year</td>
<td>53 ppb (2)</td>
<td>Annual Mean</td>
</tr>
<tr>
<td>Ozone (O₃)</td>
<td>primary and secondary</td>
<td>8 hours</td>
<td>0.070 ppm (3)</td>
<td>Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years</td>
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<tr>
<td>Particle Pollution (PM)</td>
<td>PM₂.₅</td>
<td>primary</td>
<td>1 year</td>
<td>12.0 μg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>secondary</td>
<td>1 year</td>
<td>15.0 μg/m³</td>
</tr>
<tr>
<td></td>
<td>primary and secondary</td>
<td>24 hours</td>
<td>35 μg/m³</td>
<td>98th percentile, averaged over 3 years</td>
</tr>
<tr>
<td></td>
<td>PM₁₀</td>
<td>primary and secondary</td>
<td>24 hours</td>
<td>150 μg/m³</td>
</tr>
<tr>
<td>Sulfur Dioxide (SO₂)</td>
<td>primary</td>
<td>1 hour</td>
<td>75 ppb (4)</td>
<td>99th percentile of 1-hour daily maximum concentrations, averaged over 3 years</td>
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<tr>
<td></td>
<td>secondary</td>
<td>3 hours</td>
<td>0.5 ppm</td>
<td>Not to be exceeded more than once per year</td>
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</tbody>
</table>

Source: https://www.epa.gov/criteria-air-pollutants/naaqs-table
State standards stricter than federal standards

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Time</th>
<th>California Standards</th>
<th>Federal Standards</th>
<th>Method 3 (,4)</th>
<th>Method 5 (,6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ozone ((O_3))</td>
<td>1 Hour</td>
<td>0.09 ppm (150 (\mu g/m^3))</td>
<td>0.12 ppm (235 (\mu g/m^3))</td>
<td>Ultraviolet Photometry</td>
<td>Same as Primary Standard</td>
</tr>
<tr>
<td></td>
<td>8 Hour</td>
<td>—</td>
<td>0.08 ppm (157 (\mu g/m^3))</td>
<td>—</td>
<td>Ultraviolet Photometry</td>
</tr>
<tr>
<td>Respirable Particulate Matter (PM2.5)</td>
<td>24 Hour</td>
<td>50 (\mu g/m^3)</td>
<td>150 (\mu g/m^3)</td>
<td>Granulometric or Beta Attenuation</td>
<td>Same as Primary Standard</td>
</tr>
<tr>
<td></td>
<td>8 Hour</td>
<td>—</td>
<td>59 (\mu g/m^3)</td>
<td>—</td>
<td>Inertial Separation and Granulometric Analysis</td>
</tr>
<tr>
<td>Five Particulate Matter (PM10)</td>
<td>24 Hour</td>
<td>No Separate State Standard</td>
<td>65 (\mu g/m^3)</td>
<td>Granulometric or Beta Attenuation</td>
<td>Same as Primary Standard</td>
</tr>
<tr>
<td></td>
<td>8 Hour</td>
<td>—</td>
<td>15 (\mu g/m^3)</td>
<td>—</td>
<td>Inertial Separation and Granulometric Analysis</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>8 Hour</td>
<td>9.0 ppm (10 mg/m(^3))</td>
<td>9 ppm (10 mg/m(^3))</td>
<td>Non-Dispersive Infrared Photometry (NDIR)</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1 Hour</td>
<td>26 ppm (23 mg/m(^3))</td>
<td>35 ppm (40 mg/m(^3))</td>
<td>—</td>
<td>Non-Dispersive Infrared Photometry (NDIR)</td>
</tr>
<tr>
<td></td>
<td>8 Hour (Lake Tahoe)</td>
<td>6 ppm (7 mg/m(^3))</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>Nitrogen Dioxide (NO(_2))</td>
<td>1 Hour</td>
<td>—</td>
<td>0.053 ppm (100 (\mu g/m^3))</td>
<td>—</td>
<td>Gas Phase Chemiluminescence</td>
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<tr>
<td></td>
<td>24 Hour</td>
<td>0.26 ppm (470 (\mu g/m^3))</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sulfur Dioxide (SO(_2))</td>
<td>24 Hour</td>
<td>0.14 ppm (105 (\mu g/m^3))</td>
<td>—</td>
<td>—</td>
<td>Spectrophotometry (Farassante Method)</td>
</tr>
<tr>
<td></td>
<td>3 Hour</td>
<td>—</td>
<td>0.14 ppm (38 (\mu g/m^3))</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1 Hour</td>
<td>0.25 ppm (655 (\mu g/m^3))</td>
<td>—</td>
<td>0.5 ppm (1300 (\mu g/m^3))</td>
<td>—</td>
</tr>
<tr>
<td>Lead (^9)</td>
<td>30-Day Average</td>
<td>1.5 (\mu g/m^3)</td>
<td>1.5 (\mu g/m^3)</td>
<td>—</td>
<td>High Volume Sampler and Atomic Absorption</td>
</tr>
<tr>
<td>Visibility Reducing Particles</td>
<td>8 Hour</td>
<td>Extraction coefficient of 0.23 per kilometer — visibility of four miles or more for Lake Tahoe due to particles when relative humidity is less than 70 percent. Method Beta Attenuation and Transmittance through filter tape.</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sulfates</td>
<td>24 Hour</td>
<td>25 (\mu g/m^3)</td>
<td>—</td>
<td>Ion Chromatography</td>
<td></td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>1 Hour</td>
<td>0.03 ppm (42 (\mu g/m^3))</td>
<td>—</td>
<td>Ultraviolet Fluorescence</td>
<td></td>
</tr>
<tr>
<td>Vinyl Chloride (^8)</td>
<td>24 Hour</td>
<td>0.01 ppm (26 (\mu g/m^3))</td>
<td>—</td>
<td>Gas Chromatography</td>
<td></td>
</tr>
</tbody>
</table>

California Air Resources Board (7/9/03)

See footnotes on next page...
PROBLEM

See the American Lung Association’s “State of the Air 2016”
http://www.lung.org/our-initiatives/healthy-air/sota/
Progress!

Comparison of Growth Areas and Emissions, 1970-2014

- Gross Domestic Product: 238%
- Vehicle Miles Travelled: 172%
- Population: 56%
- Energy Consumption: 45%
- CO₂ Emissions: 27%
- Aggregate Emissions (Six Common Pollutants): -69%
Counties Designated "Nonattainment"
for Clean Air Act's National Ambient Air Quality Standards (NAAQS) *

Legend **
- County Designated Nonattainment for 6 NAAQS Pollutants
- County Designated Nonattainment for 5 NAAQS Pollutants
- County Designated Nonattainment for 4 NAAQS Pollutants
- County Designated Nonattainment for 3 NAAQS Pollutants
- County Designated Nonattainment for 2 NAAQS Pollutants
- County Designated Nonattainment for 1 NAAQS Pollutant

Guam - Piti and Tanguisson Counties are designated nonattainment for the SO2 NAAQS
* The National Ambient Air Quality Standards (NAAQS) are health standards for Carbon Monoxide, Lead (1976 and 2008), Nitrogen Dioxide, 3-hour Ozone (2000), Particulate Matter (PM-10 and PM-2.5 (1977, 2006 and 2012), and Sulfur Dioxide (1971 and 2010)

** Included in the counts are counties designated for NAAQS and revised NAAQS pollutants. Revoked 1-hour (1979) and 8-hour Ozone (1997) are excluded. Partial counties, those with part of the county designated nonattainment and part attainment, are shown as full counties on the map.

https://www3.epa.gov/airquality/greenbook/mapnpoll.html
Counties Designated "Nonattainment" or "Maintenance" for Clean Air Act’s National Ambient Air Quality Standards (NAAQS) *

Legend **
- County Designated Nonattainment or Maintenance for 8 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 7 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 6 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 5 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 4 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 3 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 2 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 1 NAAQS Pollutants

Guam - Piti and Tanguisson Counties are designated nonattainment for the SO2 NAAQS

* The National Ambient Air Quality Standards (NAAQS) are health standards for Carbon Monoxide, Lead (1978 and 2008), Nitrogen Dioxide, 8-hour Ozone (2008), Particulate Matter (PM-10 and PM-2.5 (1971, 2006 and 2012), and Sulfur Dioxide.(1971 and 2010)

** Included in the counts are counties designated for NAAQS and revised NAAQS pollutants. Revoked 1-hour (1979) and 8-hour Ozone (1997) are excluded. Partial counties, those with part of the county designated nonattainment and part attainment, are shown as full counties on the map.

https://www3.epa.gov/airquality/greenbook/mapnmpoll.html
Population Density in Non-Attainment Areas

2005 Population per Square Mile in Counties above any NAAQS in 2007
- 0 - 25
- 26 - 75
- 76 - 250
- 250 - 500
- 500 -

http://www.epa.gov/airtrends/2008/dl_graph.html
Number of people living in non-attainment counties (2007)

In 2016 “more than half of all Americans—166 million people—live in counties where they are exposed to unhealthful levels of these pollutants.” – ALA SOTA
Ozone $= (\text{VOCs} + \text{NO}_x + \text{heat} + \text{sun})$

- Formed in atmosphere by photochemical reactions
- Colorless and odorless at low concentrations
- Strong lung, throat, and eye irritant
- Decreases lung function
- Increases respiratory problems, asthma, hospitalization, and contributes to heart disease
- Contributes to 80,000 premature deaths/year in CA
Sources of Emissions

http://www.epa.gov/airtrends/2008/graphics/Figure1.gif

"On-Road Mobile Sources"
CONFORMITY DEFINED
Intergovernmentalism in Transportation Planning

Federal

$ with strings attached

State

Regional

Local

State System

Regional System

Local System

Proposed projects
Congestion Management/Air Quality

- $2.3-2.5 billion per year under FAST Act
- Apportionment to states:
  - Previously: based on population and severity of AQ problem
- No direct suballoaction to MPOs. States decide.
- 25 percent of $ must be for PM 2.5 non-attainment.
- Projects must...
  - reduce congestion & emissions: ozone, PM-10, CO
  - help reach “AQ attainment”
  - control VMT/capita
  - e.g. bicycle coordinator, traffic signal coordination
- Newly eligible under FAST Act: vehicle-to-infrastructure communications equipment, EV and natural gas infrastructure
What Is Transportation Conformity?

Transportation Conformity Reference Guide
Revised 2010

Transportation conformity is a way to ensure that Federal funding and approval are given to those transportation activities that are consistent with air quality goals. It ensures that these transportation activities do not worsen air quality or interfere with the "purpose" of the State Implementation Plan (SIP), which is to meet the NAAQS. Meeting the NAAQS often requires emissions reductions from mobile sources.

What Is Transportation Conformity?

Conformity

- Air Quality Planning
- Transportation Planning

State Implementation Plan (SIP)
Air Quality Management Districts
California Air Districts and Counties

Air Districts are delineated by Bold Black Text Labels and Grey Boundary Lines.
Counties are delineated by Smaller Text Labels and Black Boundary Lines.

1 Shasta County
2 Butte County
3 Sacramento area
4 San Francisco Bay area
5 San Joaquin County
6 Stanislaus County
7 Merced County
8 Monterey Bay area
9 Fresno County
10 San Luis Obispo County
11 Tulare County
12 Kern County
13 Santa Barbara County
14 Southern California
15 San Diego County

Figure S.1—Metropolitan Planning Organizations in California

California Environmental Protection Agency
Air Resources Board
What Is Transportation Conformity?

• The following must “conform to the purpose of the SIP”:
  – Long Range Plan (LRP / RTP / MTP)
  – Short-term Transp. Improvement Program (TIP)
  – Projects with FHWA, FTA funding and/or approval
What Is Transportation Conformity?

• Conforming to the purpose of the SIP means that such activities will not:
  – Cause or contribute to any new violations of the national ambient air quality standards (NAAQS)
  – Increase the frequency or severity of NAAQS violations
  – Delay timely attainment of the NAAQS or any required interim milestone
What does it apply to?

On-road mobile sources and their pollutants

Non-Attainment and Maintenance Areas
CONFORMITY PROCESS
## Who does what?

<table>
<thead>
<tr>
<th>Agency</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Adopts State Implementation Plan</td>
</tr>
<tr>
<td>MPO</td>
<td>Does conformity analysis for plans, TIPs</td>
</tr>
<tr>
<td>FHWA, FTA</td>
<td>Makes conformity determination</td>
</tr>
<tr>
<td>EPA</td>
<td>Provides guidance</td>
</tr>
</tbody>
</table>

*Note: Project-level conformity determination in NEPA process*
How does one get a conformity determination?

- Regional emissions analysis *more momentarily*
- Latest planning assumptions and emissions model
- Timely implementation of transportation control measures (TCMs) in an approved SIP
- Interagency consultation

*conformity ≠ meeting air quality standards*
Exhibit 3-1
Transportation Control Measures

i. programs for improved public transit;
ii. restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high-occupancy vehicles (HOV);
iii. employer-based transportation management plans, including incentives;
iv. trip-reduction ordinances;
v. traffic flow improvement programs that achieve emissions reductions;
vi. fringe and transportation corridor parking facilities serving multiple-occupancy vehicle programs or transit service;
vii. programs to limit or restrict vehicle use in downtown areas or other areas of emissions concentration particularly during periods of peak use;
viii. programs for the provision of all forms of high-occupancy, shared-ride services;
ix. programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;
x. programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;
xii. programs to control extended idling of vehicles;
xiii. programs to reduce motor vehicle emissions which are caused by extreme cold-start conditions;
xiv. employer-sponsored programs to permit flexible work schedules;
xv. programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;
xvi. programs for new construction and major reconstruction of paths, tracks, or areas solely for use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest. For purposes of this clause, the Administrator shall also consult with the Secretary of the Interior; and
xvi. programs to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks.*

*Note: Excluded from CMAQ Funding under Title 23 U.S.C. Section 149

SIPs are **not single documents**. They are a **compilation** of new and previously submitted **plans, programs** (such as monitoring, modeling, permitting, etc.), **district rules, state regulations and federal controls**. Many of California's SIPs rely on the **same core set of control strategies**, including **emission standards** for cars and heavy trucks, **fuel regulations** and limits on emissions from consumer products. State law makes ARB **the lead agency** for all purposes related to the SIP. **Local air districts** and other agencies, such as the Bureau of Automotive Repair and the Department of Pesticide Regulation, prepare SIP elements and submit them to ARB for review and approval. ARB forwards SIP revisions to the **U.S. Environmental Protection Agency (U.S. EPA)** for approval and publication in the Federal Register. The Code of Federal Regulations Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items which are included in the California SIP. At any one time, several California submittals are pending U.S. EPA approval.

Source: [http://www.arb.ca.gov/planning/sip/background.htm](http://www.arb.ca.gov/planning/sip/background.htm) (2009)
## Table 1-3
### Summary of New Regional and Local Proposed Control Measures
Sacramento Nonattainment Area

<table>
<thead>
<tr>
<th>Control Measure Name</th>
<th>2018 Emission Reductions (TPD)</th>
<th>VOC</th>
<th>NOx</th>
</tr>
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<tbody>
<tr>
<td><strong>Regional Non-regulatory Measures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Mobile Incentive Program – On-road</td>
<td>&lt;0.1</td>
<td>0.9</td>
<td></td>
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<tr>
<td>Regional Mobile Incentive Program – Off-road</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
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</tr>
<tr>
<td>Spare The Air Program</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
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</tr>
<tr>
<td>SACOG Transportation Control Measures</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Urban Forest Development Program</td>
<td>0-0.2</td>
<td>-</td>
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<tr>
<td><strong>Total Regional Non-regulatory Measures</strong></td>
<td>0.1</td>
<td>0.9</td>
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<tr>
<td><strong>Local Regulatory Measures</strong></td>
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<tr>
<td>Indirect Source Rule - Construction</td>
<td>-</td>
<td>0.1</td>
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<tr>
<td>Indirect Source Rule - Operational</td>
<td>0-&lt;0.1</td>
<td>0-0.1</td>
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<tr>
<td>Architectural Coating</td>
<td>1.5</td>
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<tr>
<td>Automotive Refinishing</td>
<td>0.2</td>
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<tr>
<td>Degreasing/Solvent Cleaning</td>
<td>1.4</td>
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<tr>
<td>Graphic Arts</td>
<td>na</td>
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</tr>
<tr>
<td>Miscellaneous Metal Parts and Products</td>
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<tr>
<td>Natural Gas Production and Processing</td>
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<td></td>
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<tr>
<td>Asphalt Concrete</td>
<td>-</td>
<td>0.1</td>
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<tr>
<td>Boilers, Steam Generator, and Process Heaters</td>
<td>-</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>IC Engines</td>
<td>-</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Large Water Heaters and Small Boilers</td>
<td>-</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td><strong>Total Local Regulatory Measures</strong></td>
<td>3.2</td>
<td>1.8</td>
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<tr>
<td><strong>Total Reductions</strong>*</td>
<td>3.4</td>
<td>3.1</td>
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Notes: Numbers are truncated to one decimal place. na = not available
*Total reductions are summed from untruncated values. See summary table in Appendix C – Proposed Control Measures.
Table 1-4  
Summary of SACOG Transportation Control Measures  
New and Continuing Projects and Funding Programs

<table>
<thead>
<tr>
<th>TCM Name and (ID)</th>
<th>Implementing Agency</th>
<th>Implement or Completion Date</th>
<th>VOC Reduction (Tons/Day)</th>
<th>NOx Reduction (Tons/Day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligent Transportation Systems (ITS) Projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arden Way Smart Corridor (ITS-1)</td>
<td>City of Sac - Dept of Transportation</td>
<td>2008</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Sacramento Traffic Operations Center (ITS-2)</td>
<td>City of Sac - Dept of Transportation</td>
<td>2009</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Watt Ave Phase 3 Smart Corridor (ITS-3)</td>
<td>Sac County - Dept of Transportation</td>
<td>2009</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>STARNET Implementation (ITS-4)</td>
<td>SACOG</td>
<td>2009</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Park and Ride Lots / Transit Centers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>El Dorado Central Park and Ride Facility (TF-1)</td>
<td>El Dorado County Transit</td>
<td>2009</td>
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<tr>
<td>Improvements to Loomis Multimodal Center (TF-2)</td>
<td>Town of Loomis – Dept of Public Works</td>
<td>2010</td>
<td>---</td>
<td>---</td>
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<tr>
<td>13th and 16th St Light Rail Station Improvements (TF-3)</td>
<td>Sac Regional Transit District</td>
<td>2009</td>
<td>---</td>
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</tr>
<tr>
<td>Transit Service Funding Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transit Vehicle Acquisitions (TR-1)</td>
<td>Various Agencies</td>
<td>Various Dates</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Transit Operations (TR-2)</td>
<td>Various Agencies</td>
<td>Various Dates</td>
<td>---</td>
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<tr>
<td>Other Specific Funding Programs</td>
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</tr>
<tr>
<td>Freeway Service Patrol (AQ-1)</td>
<td>Sac Transportation Authority</td>
<td>Through 2018</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>SECAT Program (AQ-2)</td>
<td>SMAQMD</td>
<td>Through 2018</td>
<td>...^a</td>
<td>...^a</td>
</tr>
<tr>
<td>Spare The Air Program (AQ-3)</td>
<td>SMAQMD</td>
<td>Through 2018</td>
<td>...^b</td>
<td>...^b</td>
</tr>
<tr>
<td>MTP Regional Funding Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Quality Funding Program (FP-1)</td>
<td>Various Agencies</td>
<td>Through 2018</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Bicycl and Pedestrian Funding Program (FP-2)</td>
<td>Various Agencies</td>
<td>Through 2018</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Transportation Demand Management Funding Program (FP-3)</td>
<td>Various Agencies</td>
<td>Through 2018</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Community Design Funding Program (FP-4)</td>
<td>Various Agencies</td>
<td>Through 2018</td>
<td>---</td>
<td>---</td>
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<tr>
<td>Miscellaneous Projects</td>
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<tr>
<td>Light Rail Grade Separation at Watt Ave and Folsom Blvd (M-2)</td>
<td>Sac County – Dept of Transportation</td>
<td>2009</td>
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<td>---</td>
</tr>
</tbody>
</table>

*SECAT emission reductions are assumed to be included in SMAQMD mobile source control measure CNMS-HD-1.  
^aSpare The Air emission reductions are assumed to be included in SMAQMD control measure TCM-CNMS-ED-1.
Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan (2008)

Table 1-6
Proposed New Motor Vehicle Emissions Budgets*
Sacramento Nonattainment Area

<table>
<thead>
<tr>
<th></th>
<th>ROG</th>
<th>NOx</th>
</tr>
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<tbody>
<tr>
<td>2011 Emissions Budgets (EMFAC2007) – Tons per Day</td>
<td>38</td>
<td>78</td>
</tr>
<tr>
<td>2014 Emissions Budgets (EMFAC2007) – Tons per Day</td>
<td>32</td>
<td>61</td>
</tr>
<tr>
<td>2017 Emissions Budgets (EMFAC2007) – Tons per Day</td>
<td>29</td>
<td>48</td>
</tr>
<tr>
<td>2018 Emissions Budgets (EMFAC2007) – Tons per Day</td>
<td>24</td>
<td>34</td>
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</tbody>
</table>

*All motor vehicle emission budget years include regional incentive benefits. State control measure reductions are only included in 2018.

**Budget test:** estimated emissions for LRP and TIP are less than or equal to budget for each pollutant or precursor.
Conformity Failures

• **Conformity Lapse** (e.g. Atlanta, Sacramento)  
  – Conformity determination is 12 months beyond expiration, or failure to implement control strategies  
  – Can’t go forward with federally funded projects except for TCMs in SIP

• **Conformity Freeze** (e.g. NJ)  
  – Disapproval of SIP by EPA  
  – Can’t approve new LRP or TIP
Transportation Conformity

Due to litigation in other parts of the country, the Federal Highway Administration has become sensitive to the issue of applying the most current vehicle fleet information to a region’s transportation conformity analysis. The current SIP’s fleet information is about 10 years old. The Sacramento Area Council of Governments (SACOG) is the agency responsible for demonstrating transportation conformity in our region. SACOG estimates that applying the most recent fleet data to our existing models would result in a conformity lapse.

The state Air Resources Board, SACOG, U.S.EPA and FHWA have negotiated approval to use the 1994 vehicle fleet data through December 31, 2002. After that time, conformity findings can be made only if the new fleet data is used. This means that the transportation plans and transportation improvement programs now in place for our region, as well as 21 other air districts in the state, cannot be changed until the region has a new clean air plan. The Sacramento region, unlike others in the state, is not required to update the SIP before the 8-hour ozone plans are due in 2006. However, since a conformity lapse began October 4, 2004, an expedited process to prepare a plan is underway.

Source: http://www.airquality.org/cleanairplan/index.shtml#transpconf
April 7, 2006

Mr. Gene K. Fong, Division Administrator  
U.S. Federal Highway Administration  
980 Ninth Street, Suite 400  
Sacramento, CA 95814-3724

Mr. Leslie Rogers, Regional Administrator  
Federal Transit Administration, Region IX  
201 Mission St. Suite 2210  
San Francisco, CA 94105

Ms. Lisa Hans, Chief  
Mobile Sources Section  
U.S. Environmental Protection Agency  
75 Hawthorne Street  
San Francisco, CA 94105

Ms. Jody Jones, District Director  
Caltrans District 03  
P.O. Box 911  
Marysville, CA 95901

Re: Transmittal of the Air Quality Conformity Determinations on the 2006 Metropolitan Transportation Plan (MTP) and 2006-08 Metropolitan Transportation Improvement Program (MTIP) for the Sacramento Ozone (ROG and NOx) Nonattainment Area, Carbon Monoxide (CO) Maintenance Area, and Particulate Matter (PM-10) Moderate Nonattainment Area.

Dear Messrs. Fong and Rogers and Ms. Hans and Jones:

The following air quality conformity determinations on the 2006 MTP (Attachment A), and the 2006-08 MTIP (Attachment B) for the Sacramento Ozone (ROG and NOx) Nonattainment Area, Carbon Monoxide (CO) Maintenance Area, and Particulate Matter (PM-10) Moderate Nonattainment Area are hereby transmitted to you for your review and approval. The SACOG Board of Directors approved the attached conformity determinations at its March 16, 2006, meeting.

The attached air quality conformity determinations have been prepared in accordance with the conformity requirements as published in the federal register on August 15, 1997, and in accordance with USDOT's January 2, 2002, guidance, Revised Guidance for Implementing the March 1999 Circuit Court Decision Affecting Transportation Conformity (93-109).

Source: http://www.sacog.org/publications/Air%20Quality%20Conformity%20Determinations,%202006%20MTP%20and%202006-08%20MTIP.pdf
The 2006 MTP, which was adopted March 16, 2006, will be in effect until the MTP2030 is adopted in 2007. It restores many projects that could not be implemented while the region was in an air quality conformity lapse.
Implications

• Sanctions for not…
  – Doing air quality plans
  – Doing required conformity tests

• No sanctions for not meeting NAAQS!
EMFAC – used in California
MOVES – used elsewhere in U.S.
LEVEL 3: AIR-QUALITY ESTIMATES

Travel-Demand Estimation Model
Vehicle Miles of Travel and Average Speeds

MOBILE Model
Emissions Rates by Speed and Vehicle Type

On-Road Mobile Emissions Estimates
Volatile Organic Compounds, Carbon Monoxide, Nitrogen Oxides, and Primary Particulate Matter

Dispersion Model
Air-Quality Model Emissions by Grid and Time of Day

Carbon Monoxide Concentrations
Ozone and Particulate Concentration Levels by Time and Location

Biogenics
Non-Road Mobile
Area Source
Stationary Source
Meteorology Input Data

Uses:
SIP Demonstration of Attainment
National Environmental Policy Act/Evaluation of Major Capital Investments
CO, \(O_3\), and Particulate-Concentration Evaluation

LEVEL 4: HEALTH IMPACTS ESTIMATES

On-Road Mobile Emissions Estimates
Volatile Organic Compounds, Carbon Monoxide, Nitrogen Oxides, and Primary Particulate Matter

Dispersion Model
Air-Quality Model Emissions by Grid and Time of Day

Carbon Monoxide Concentrations
Ozone and Particulate-Concentration Levels by Time and Location

Exposure/Response Model
Distribution of Sensitivity to Exposure

Exposure Model
Population Characteristics by Exposure and Time

Health Impacts

Uses: Assessment of health impacts

1.2.1 MOBILE6 Input Parameters

- Calendar year
- Month (January, July)
- Hourly Temperature
- Altitude (high, low)
- Weekend/weekday
- Fuel characteristics (Reid vapor pressure, sulfur content, oxygenate content, etc.)
- Humidity and solar load
- Registration (age) distribution by vehicle class
- Annual mileage accumulation by vehicle class
- Diesel sales fractions by vehicle class and model year
- Average speed distribution by hour and roadway
- Distribution of vehicle miles traveled by roadway type
- Engine starts per day by vehicle class and distribution by hour
- Engine start soak time distribution by hour
- Trip end distribution by hour
- Average trip length distribution
- Hot soak duration
- Distribution of vehicle miles traveled by vehicle class
- Full, partial, and multiple diurnal distribution by hour
- Inspection and maintenance (I/M) program description
- Anti-tampering inspection program description
- Stage II refueling emissions inspection program description
- Natural gas vehicle fractions
- HC species output
- Particle size cutoff
- Emission factors for PM and HAPs
- Output format specifications and selections
VOC Emissions (Exhaust and Evap) from On-Highway Vehicles
MOBILE5 vs. Draft MOBILE6

Source: http://www.epa.gov/otaq/models/mobile6/trng5day/sldday1.pdf
Intergovernmentalism in Transportation Planning

Federal

$ with strings attached

State

Regional

Local

State System

Regional System

Local System

Proposed projects
The California Global Warming Solutions Act of 2006

80% reduction of GHG from 1990 levels by 2050

AB32

http://www.arb.ca.gov/cc/scopingplan/meetings/070808/slides_julyspworkshops.pdf
SB375
Sustainable Communities Planning Act of 2008

Targets for per capita GHG emissions reduction from cars and trucks for metropolitan areas, by reducing vehicle-miles-traveled (VMT)

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacramento</td>
<td>7%</td>
<td>16%</td>
</tr>
<tr>
<td>Bay Area</td>
<td>7%</td>
<td>15%</td>
</tr>
<tr>
<td>LA region</td>
<td>8%</td>
<td>13%</td>
</tr>
<tr>
<td>San Diego</td>
<td>7%</td>
<td>13%</td>
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</table>
Sustainable Communities Strategies in conjunction with RTPs
Table 5B.2
Total Vehicle Miles Traveled in SACOG Region, 2008 and MTP/SCS

<table>
<thead>
<tr>
<th>County</th>
<th>2008</th>
<th>2020 MTP/SCS</th>
<th>2035 MTP/SCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Dorado</td>
<td>4,421,000</td>
<td>4,726,800</td>
<td>5,328,200</td>
</tr>
<tr>
<td>Placer</td>
<td>8,846,500</td>
<td>10,559,400</td>
<td>12,743,900</td>
</tr>
<tr>
<td>Sacramento</td>
<td>33,848,800</td>
<td>37,366,300</td>
<td>43,133,000</td>
</tr>
<tr>
<td>Sutter</td>
<td>2,543,500</td>
<td>2,785,700</td>
<td>3,268,300</td>
</tr>
<tr>
<td>Yolo</td>
<td>5,711,500</td>
<td>6,477,500</td>
<td>7,413,800</td>
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<tr>
<td>Yuba</td>
<td>1,859,500</td>
<td>2,104,100</td>
<td>2,420,100</td>
</tr>
<tr>
<td>SACOG Region</td>
<td>57,230,800</td>
<td>64,039,800</td>
<td>74,308,300</td>
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</tbody>
</table>

Total VMT per Capita

<table>
<thead>
<tr>
<th></th>
<th>25.8</th>
<th>25.4</th>
<th>24.1</th>
</tr>
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</table>

Annual Average Growth Rates, from 2008

<table>
<thead>
<tr>
<th>County</th>
<th>2008</th>
<th>2020</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Dorado</td>
<td>n/a</td>
<td>+0.6%</td>
<td>+0.7%</td>
</tr>
<tr>
<td>Placer</td>
<td>n/a</td>
<td>+1.5%</td>
<td>+1.4%</td>
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<tr>
<td>Sacramento</td>
<td>n/a</td>
<td>+0.8%</td>
<td>+0.9%</td>
</tr>
<tr>
<td>Sutter</td>
<td>n/a</td>
<td>+0.8%</td>
<td>+0.9%</td>
</tr>
<tr>
<td>Yolo</td>
<td>n/a</td>
<td>+1.1%</td>
<td>+1.0%</td>
</tr>
<tr>
<td>Yuba</td>
<td>n/a</td>
<td>+1.0%</td>
<td>+1.0%</td>
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<tr>
<td>SACOG Region</td>
<td>n/a</td>
<td>+0.9%</td>
<td>+1.0%</td>
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Total VMT per Capita

<table>
<thead>
<tr>
<th></th>
<th>n/a</th>
<th>-0.1%</th>
<th>-0.3%</th>
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Population Growth Rate

<table>
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<tr>
<th></th>
<th>n/a</th>
<th>+1.1%</th>
<th>+1.2%</th>
</tr>
</thead>
</table>

1 Roadway VMT is tallied based on the location of the roadway on which the VMT is forecasted to occur. It is comparable to the VMT reported in "California Public Road Data" reports; however, the CPRD reports average daily VMT, while this table reports typical weekday VMT. Typical weekday traffic is on average 5 percent higher than average daily traffic.

2 Tahoe Basin roadways are excluded from this tabulation.

Source: SACOG, September 2011.
Figure 5B.2
Weekday Vehicle Miles Traveled per Capita in the SACOG Region, Historic Trends and Projected MTP/SCS

Historic based on CPRD reports. MTP/SCS based on SACOG forecasts. 2008 MTP from SACOG, A Creative New Vision for Transportation in the Sacramento Region, April 2008. 2002 MTP from SACOG, A Bold First Step for Mobility in the Sacramento Region, 2002, with adjustments to allow for comparison to more current VMT estimates.

Source: SACOG, September 2011.
“By implementing the transportation and land use components of the MTP/SCS, and including measures from the Scoping Plan, 2020 emissions are forecasted to be 17.34 MMtCO$_2$e for the region in 2020. This is 12 percent below the target set by AB 32.”
“The per capita GHG pounds per day emissions for the region were 23.0 in 2005, which sets the benchmark for SB 375 reduction. Based on the development in the MTP/SCS, GHG per capita emissions reduce to 20.8 pounds per day in 2020. This is a 9.6 percent reduction from 2005 to 2020, well below the 7 percent reduction set by ARB.”

Table 7.8
MTP/SCS Plan Area CO2 Equivalent Emission Estimates for 2005, 2020 and 2035

<table>
<thead>
<tr>
<th>Year</th>
<th>CO₂e per Capita (lbs. per day)</th>
<th>Modeled CO₂ Reductions</th>
<th>Off-Model Reductions</th>
<th>Total Reductions from 2005</th>
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</thead>
<tbody>
<tr>
<td>2005</td>
<td>23.0</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2020</td>
<td>20.8</td>
<td>-9%</td>
<td>-1%</td>
<td>-10%</td>
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<tr>
<td>2035</td>
<td>19.7</td>
<td>-14%</td>
<td>-2%</td>
<td>-16%</td>
</tr>
</tbody>
</table>

1 Off model reductions account for effects of TSM, ITS, and TDM projects not accounted for in SACSIM

Source: SACOG, 2011
Figure 7.7
Greenhouse Gas Emissions per Capita from On-Road Sources
SacOG 2011
- High: >32
- Mean: 12.4
- Low: <12
State Implementation Plan (SIP)

- **AREA SOURCES**
- **STATIONARY SOURCES**
- **MOBILE SOURCES**
  - Emissions standards
  - Transportation Control Measures (TCMs)
    - Land use strategies

City and County General Plans
Key Points

• Top-down efforts to push regional (and local) transportation (and land use) policy
  – Has it made any difference...?

• Use of models to assess whether plan meets the goals
  – Has it made any difference...?
Next Up

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Wednesday, 4/27</td>
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</tr>
<tr>
<td>Monday, 5/2</td>
<td>Project Development</td>
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<tr>
<td>Wednesday, 5/5</td>
<td>Local Government</td>
</tr>
<tr>
<td>Monday, 5/9</td>
<td>MPO Critique</td>
</tr>
<tr>
<td>Wednesday, 5/11</td>
<td>MPO Presentations</td>
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</tbody>
</table>

Followed by evaluation of strategies!
Pick topics on 5/11