



**Item #16-11-4
Action**

Land Use & Natural Resource Committee

October 27, 2016

Adopt Results from the Reasonably Available Control Measure Analysis for Inclusion in the 8-Hour Ozone State Implementation Plan

Issue: Should SACOG adopt findings of the analysis of reasonably available control measures (RACM) for inclusion in the update of the 8-Hour Ozone State Implementation Plan (SIP)?

Recommendation: That the Land Use & Natural Resources Committee recommend to the SACOG Board of Directors the adoption of the RACM findings for the 8-Hour Ozone SIP.

Discussion: Control measures are sometimes needed to meet the region's federal air quality control standards. For transportation related measures, SACOG is required to conduct an analysis to identify reasonably available control measures, which must meet the following criteria:

- The control measure is technologically feasible;
- The control measure is economically feasible;
- The control measure does not cause "substantial widespread and long-term adverse impacts";
- The control measure is not "absurd, unenforceable, or impracticable";
- Control measures, considered collectively, advance the attainment date by at least one year.

SACOG conducted a RACM analysis, pulling candidate measures from several sources, including: the adopted 8-Hour Ozone SIP, the adopted MTP/SCS, and control measures from surrounding MPOs. In addition, SACOG included in this RACM analysis measures from the update of the California Air Resources Board Scoping Plan, the implementation guide to statewide achievement of AB32 goals, which have the potential to reduce Ozone in addition to GHG emissions.

SACOG contracted with Sierra Research to help in the analysis, which looked at nearly 100 transportation related measures and roughly 1,500 projects in the MTP. Of those, only about 20 TCMs were identified as candidate measures, and none of those were determined to meet the criteria for RACM. The full analysis and conclusions are found in Attachment A.

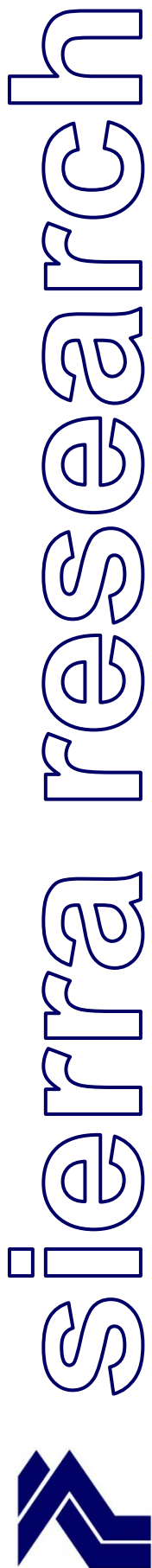
Although no measures are found to meet RACM criteria, the SIP can contain measures that improve emissions. SACOG staff, working with local Air Districts, will identify measures to include in the SIP. Those measures will be brought to the SACOG Board for adoption next month.

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Attachment

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Reasonably Available Control Measures Analysis for the Sacramento Area Council of Governments

prepared for:

Sacramento Area Council of Governments

November 12, 2015

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**REASONABLY AVAILABLE CONTROL MEASURES ANALYSIS
FOR THE SACRAMENTO AREA COUNCIL OF GOVERNMENTS**

prepared for:

Sacramento Area Council of Governments

November 12, 2015

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REASONABLY AVAILABLE CONTROL MEASURES ANALYSIS FOR THE SACRAMENTO AREA COUNCIL OF GOVERNMENTS

Table of Contents

	<u>Page</u>
1. Introduction.....	1
2. RACM Requirements.....	2
3. TCM Identification Process	5
4. TCMs Recommended for RACM.....	10
5. RACM Evaluation	21
5.1 Economic Feasibility.....	21
5.2 Advancement of Attainment.....	22
5.3 Implementation Authority	23
6. Conclusion	25

List of Tables

<u>Table</u>	<u>Page</u>
Table 3-1 1997 8-Hour Ozone Standard Nonattainment Areas Reviewed for RACM.....	7
Table 3-2 Adopted California Statewide and Regional Transportation Control Measures	8
Table 4-1 Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis	11
Table 5-1 RACM: Economic Feasibility	21
Table 5-2 RACM: Advancement of Attainment.....	22
Table 5-3 RACM: Implementation Authority	23

1. INTRODUCTION

On March 27, 2008, the U.S. Environmental Protection Agency (EPA) issued a final rule¹ revising the primary and secondary 8-hour National Ambient Air Quality Standards (NAAQS) for ozone to 0.075 ppm. Then, in a May 21, 2012 final rule, EPA designated the Sacramento region as severe nonattainment for the 2008 8-hour ozone NAAQS, which became effective 60 days later, on July 20, 2012. For a severe nonattainment area, the attainment deadline is 15 years after the effective date of designation, which means the Sacramento region must attain the 2008 standards by the end of 2027. However, EPA's March 2015 Ozone Implementation Rule² shifted the Sacramento region's 2008 8-hour ozone NAAQS attainment date from December 31, 2027, to July 20, 2027. And, since EPA requires three full years of clean data to demonstrate attainment, a new attainment year of 2026 must be modeled and addressed in both conformity and RFP demonstrations. The requirement to assess Reasonably Available Control Measures (RACM) per Clean Air Act (CAA) Section 172(c)(1) must be met as part of the SIP development process for an ozone nonattainment area. The CAA mandates that RACM analysis must be conducted in order to show that the Sacramento region has adopted all RACM to achieve attainment of the 2008 8-hour ozone standard as expeditiously as practicable.

This report provides a preliminary RACM analysis that Sierra understands will be completed by the Sacramento Area Council of Governments (SACOG) in consultation with the Sacramento Metropolitan Air Quality Management District (SMAQMD) in order to meet the 8-hour ozone standard state implementation plan (SIP) requirements. Specifically, this draft report summarizes ozone SIP RACM requirements, documents the transportation control measure (TCM) identification process, and also provides preliminary RACM determination specific to SACOG.

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¹ EPA, 2008. National Ambient Air Quality Standards for Ozone. Final Rule. U.S. Environmental Protection Agency. Federal Register Vol. 73. No. 60. March 27, 2008.

² EPA, 2015. Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements. Final Rule. U.S. Environmental Protection Agency. Federal Register Vol. 80. No. 44. March 6, 2015.

2. RACM REQUIREMENTS

In order to demonstrate attainment of the federal ozone standard as expeditiously as practicable as required by the CAA, nonattainment areas “should consider all available measures, including those being implemented in other areas, and ... must adopt measures for an area only if those measures are economically and technologically feasible and will advance the attainment date or are necessary for RFP.”³

This RACM analysis focuses on transportation control measures (TCMs) or strategies that reduce travel and thereby achieve air quality benefits and that are specifically identified in a State Implementation Plan (SIP). Once TCMs are included in a SIP, SACOG is legally bound to implement these measures in order to satisfy timely implementation demonstration requirements as part of the transportation planning process. If funds programmed for TCMs do not become available or if the schedule identified in a SIP cannot be met, the agency faces serious consequences, one of which could be a nonconforming Metropolitan Transportation Plan (MTP).

The criteria for identifying TCM projects and the requirements for timely implementation of these projects are defined in the EPA’s Transportation Conformity Rule, 40 CFR Part 93:

A TCM is any measure that is specifically identified and committed to in the applicable implementation plan, including a substitute or additional TCM that is incorporated into the applicable SIP through the process established in CAA section 176(c)(8), that is either one of the types listed in CAA section 108, or any other measure for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions. Notwithstanding the first sentence of this definition, vehicle technology-based, fuel-based, and maintenance-based measures which control the emissions from vehicles under fixed traffic conditions are not TCMs for the purposes of this subpart.

³ EPA, 2015. Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements. Final Rule. U.S. Environmental Protection Agency. Federal Register Vol. 80. No. 44. March 6, 2015.

Furthermore, Clean Air Act Section 108(f)(1)(A) specifically identifies the following measures as TCMs for consideration in the RACM analysis:

- i. Programs for improved use of public transit;
- ii. 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;
- iii. 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;
- iv. Programs to control extended idling of vehicles;
- v. Programs to reduce motor vehicle emissions, consistent with Title II of the Clean Air Act, which are caused by extreme cold start conditions;
- vi. Employer-sponsored programs to permit flexible work schedules;
- vii. 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;
- viii. Programs for new construction and major reconstruction of paths, tracks, or areas solely for the use by pedestrian or other non-motorized means of transportation, when economically feasible and in the public interest;
- ix. 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;
- x. Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;
- xi. Employer-based transportation management plans, including incentives;
- xii. Trip-reduction ordinances;
- xiii. Traffic flow improvement programs that achieve emission reductions;
- xiv. Fringe and transportation corridor parking facilities, serving multiple occupancy vehicle programs or transit service;
- xv. Programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration, particularly during periods of peak use; and
- xvi. Programs for the provision of all forms of high-occupancy, including shared-ride services.

According to the EPA ozone RACM guidance,⁴ fulfillment of the RACM requirement is dependent on the selection of candidate control measures, assessment of their applicability to the region, and expedience of their implementation. More specifically, the measures must meet the following criteria:

- Be technologically feasible;
- Be economically feasible;
- Not cause “substantial widespread and long-term adverse impacts,” or be “absurd, unenforceable, or impracticable”; and
- If considered collectively, advance the attainment date by at least one year.

In addition, measures identified by EPA in any related guidance documents and measures that have been suggested during a public comment period must be considered. TCMs may be voluntary or market-based programs, as long as they produce surplus, quantifiable, permanent and enforceable emission reductions (i.e., are SIP-creditable).

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⁴ Seitz, John S., Office of Air Quality Planning and Standards, Guidance on the Reasonably Available Control Measures (RACM) Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas, 1999. Available at www.epa.gov/ttn/oarpg/t1/memoranda/revracm.pdf.

3. TCM IDENTIFICATION PROCESS

To meet the RACM requirements described above, this analysis was performed using the following steps. First was the assembly of a comprehensive list of control measures recently implemented in other California ozone nonattainment areas, as well as in other states. Measures identified in this review were then organized according to the 16 categories specified in Section 108(f)(1)(A) of the CAA. The next step was to identify candidate RACM by contrasting the list of TCMs with measures implemented in the Sacramento region, as well as any new projects that qualify as TCMs in SACOG's 2016 Draft MTP. TCMs committed to in the Sacramento 2009 Ozone SIP were also reviewed, with a focus on their current implementation status. The last step was to provide a justification addressing the above-mentioned criteria for any of the TCMs that cannot be implemented in Sacramento.

Candidate RACM strategies were identified through a comprehensive review of implemented TCMs in California, as well as in other states. Table 3-1 lists SIPs developed in response to the 1997 8-hour ozone NAAQS for moderate, serious, and severe nonattainment areas that were reviewed as part of this RACM analysis. Although the revised 8-hour ozone standard of 0.075 ppm was promulgated by EPA in 2008, the SIPs to meet this standard are still generally under development and not available for review at this time.⁵

In addition to the SIPs listed in Table 3-1, measures and strategies committed to in the Sacramento region's 2008 Ozone SIP were reexamined in the context of their implementation status. This list of control measures was then contrasted with programs already being implemented in the Sacramento region, and with projects included in the Draft 2016 MTP that fit the above TCM description.

Additional measures were sought through a public outreach process. Several meetings were held in conjunction with MTP/SCS outreach to receive comments and suggestions. These meetings were held throughout the region and included the following:

- Thursday, October 29; 6:30-7:30 p.m. Folsom Community Center
- Wednesday, November 4; 6:30-7:30 p.m. Lincoln City Council Chamber
- Thursday, November 5; 6:30-7:30 p.m. Yolo County Board Chambers
- Tuesday, November 10; 6:30-7:30 p.m. SACOG Offices

⁵ On October 1, 2015, EPA further strengthened the primary and secondary 8-hour ozone NAAQS to 0.070 ppm. Non-attainment designations are not yet available.

Statewide and air district mobile source measures were also reviewed for this RACM analysis. Although SACOG does not have funding authority to implement statewide or regional measures, they are discussed below for completeness. Table 3-2 shows on-road and off-road TCMs and mobile source measures that were adopted by the California Air Resources Board (CARB) and the SMAQMD that are currently being implemented in the Sacramento region.

Table 3-1 1997 8-Hour Ozone Standard Nonattainment Areas Reviewed for RACM		
Region	Designation	Applicable SIP
South Coast, CA (including Riverside and W. Mojave Desert)	Severe/ Extreme	Air Quality Management Plan, South Coast Air Quality Management District, 2012
San Joaquin Valley, CA	Extreme	San Joaquin Valley 2007 Ozone Plan
Ventura, CA	Serious	Ventura County Air Quality Management Plan, 2007
Washington DC	Moderate	State Implementation Plan for 8-Hour Ozone Standard for the Washington DC-DV-MA Nonattainment Area, 2007
Baltimore, MD	Serious	Baltimore Serious Nonattainment Area 0.08 ppm 8- Hour Ozone Implementation Plan, 2013
Maricopa, Arizona	Moderate	MAG Eight-Hour Ozone Resignation Request and Maintenance Plan for the Maricopa Nonattainment Area, February, 2009
Denver-Boulder, Colorado	Marginal	Denver Metro Area & North Front Range Ozone Action Plan Including Revisions to the State Implementation Plan, 2008
Boston-Manchester, NH	Moderate	Revision to the New Hampshire State Implementation Plan Request for Redesignation of the Boston- Manchester-Portsmouth (SE), NH 8-Hour Ozone (1997 Standard) Nonattainment Area, 2012
Philadelphia- Wilmington, PA	Moderate	State Implementation Plan Revision: Attainment Demonstration and Base Year Inventory Bucks, Chester, Delaware, Montgomery and Philadelphia Counties located in the Philadelphia-Wilmington-Atlantic City, PA-NJ-DE Eight-Hour Ozone Nonattainment Area, 2007
Houston-Galveston, TX	Severe	Houston-Galveston-Brazoria Reasonable Further Progress State Implementation Plan Revision for the 1997 Eight-Hour Ozone Standard, 2010
Dallas-Fort Worth, TX	Serious	Dallas-Fort Worth 1997 Eight-Hour Ozone Standard Nonattainment Area Plan, 2011
New York-New Jersey, NY	Moderate	New Jersey Department of Environmental Protection State Implementation Plan (SIP) Revision for the Attainment and Maintenance of Ozone NAAQS, 2007

**Table 3-2
Adopted California Statewide and Regional Transportation
Control Measures**

Transportation Control Measure	Implementing Agency	Implemented in SACOG?
Urban Forest Air Quality Development Program	SMAQMD	Yes
California Diesel Fuel Regulation	ARB	Yes
On-Road Heavy-Duty Diesel Vehicles Regulation	ARB	Yes
California Reformulated Gasoline	ARB	Yes
Advanced Clean Cars (Low Emission Vehicle Standards III)	ARB	Yes
Transportation Refrigeration Unit ATCM	ARB	Yes
Light Duty Early Retirement	SMAQMD	Yes
School Bus Idling ATCM	ARB	Yes
Fleet Rule for Transit Agencies	ARB	Yes
Drayage Truck Regulation	ARB	Yes
Hybrid Truck and Bus Voucher Incentive Program	ARB	Yes
Clean Vehicle Rebate Project	ARB	Yes
Solid Waste Collection Vehicle Rule	ARB	Yes
Heavy-Duty Vehicle Inspection Program	ARB/BAR	Yes
Periodic Smoke Inspection Program	ARB/BAR	Yes
Spare the Air Program	SMAQMD	Yes
SECAT Program	SMAQMD	Yes
School Bus Retrofit Program	ARB/ SMAQMD	Yes
Goods Movement Program/Proposition 1B	ARB/CTC/ SMAQMD	Yes
Portable Diesel Engines ATCM	ARB	Yes
In-Use Off-Road Diesel Equipment Regulation	ARB	Yes
Railyard Emission Reduction and Fuel Use Program	ARB/ SMAQMD	Yes
In-Use Off-Road Mobile Agricultural Equipment Regulation	ARB	Yes
Cargo Handling Equipment Regulation	ARB	Yes
Ocean-Going Vessels and Commercial Harborcraft Regulations	ARB	Yes
Airport Ground Support Equipment	ARB/ SMAQMD	Yes

**Table 3-2
 Adopted California Statewide and Regional Transportation
 Control Measures**

Transportation Control Measure	Implementing Agency	Implemented in SACOG?
Off-Road Large Spark-Ignition Equipment Regulation	ARB	Yes
Off-Road CI Incentive Program	SMAQMD	Yes
Zero-Emission Lawn and Garden Equipment	SMAQMD	Yes

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4. TCMS RECOMMENDED FOR RACM

Out of nearly 100 control measures, programs and strategies identified in the course of the TCM review and 1,500 projects programmed in the draft 2016 MTP, only those strategies that are not currently implemented in the Sacramento region were selected for further RACM analysis.

The analysis produced only a small number of measures that are not being implemented in Sacramento. Reasoned justification was provided for not implementing a given measure based on the criteria identified in the EPA RACM guidance. The guidance indicates that measures could be rejected as not reasonably available based on local conditions. However, valid justification for rejecting a measure must be provided, which may include factors such as technological or economic infeasibility, or inability to advance the attainment date.

Table 4-1 shows a complete listing of the measures evaluated for RACM determination, and includes both current SACOG TCMS as well as additional measures identified as part of this RACM analysis, with a brief justification provided if a control measure cannot be implemented. Additional details on the reasoning for not implementing a RACM strategy are provided in the next section.

Although there is no formal guidance on how to organize TCMS, measures shown in Table 4-1 are grouped into the 16 categories identified in Section 108(f)(1)(A) of the CAA.

**Table 4-1
Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
	<i>i. Improved Public Transit</i>			
1.1	Public transit facility improvements/operating assistance	Construct and/or improve bus and rail terminals, stations, and maintenance facilities	Yes	NA
1.2	Expansion of public transportation services	Provide additional rail and bus service	Yes	NA
1.3	Light rail and other transit access to airports	Expand rail and bus service to airports	Yes	
1.4	Free transit during special events	Provide free alternative transportation to special events	No	Not economically feasible; will not advance attainment
1.5	Accelerated bus retrofit	Accelerate installation of retrofits on diesel-powered buses	Yes	
1.6	Transit service improvement including parking management	Install park-and-ride facilities near transit stations, improve bicycle and pedestrian access, install lights and real-time information systems	Yes	
1.7	Clean fuel buses	Purchase of alternative fuel buses	Yes	
1.8	Free rail-to-bus/bus-to-rail transfers	Vanpool and shuttle services at non-intermodal centers	No	Not economically feasible; will not advance attainment
1.9	Bus queue jumps	Installing special lanes and signals to allow transit to get ahead in traffic	No	No implementation authority
1.10	Transit voucher programs	Provide transit vouchers to certain population groups (e.g., elderly, minorities, homeless) to reduce transit costs	Yes	

**Table 4-1
Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
1.11	Intermodal centers	Improve travel connection of various transportation modes	Yes	
<i>ii. Limit Access to Roads in Metro Area to Non-Vehicular Use</i>				
2.1	Establish Auto Free Zones and Pedestrian Malls	Self-explanatory	Yes	
2.2	Close streets for special events for use by bikes and pedestrians when/where appropriate	Self-explanatory	Yes	
2.3	Close roads for use of non-motorized traffic	Convert roadways to bike/pedestrian paths	No	Not economically feasible; will not advance attainment
2.4	Bus and carpool lanes on arterials	Provide fixed lanes for buses and carpools on arterial streets	No	No implementation authority
2.5	Express toll lanes/HOT lanes	Construct toll lanes to reduce congestion	No	No implementation authority
<i>iii. Bicycle Facilities</i>				
3.1	Regional bike parking	Construct bike parking facilities at transit centers	Yes	
3.2	Free bikes	Provide free bikes to transit users	No	Not economically feasible
3.3	Bike racks on buses	South Coast, San Joaquin Valley, Washington DC	Yes	
3.4	Mandatory bike racks for worksites	Mandate that employers install bike racks at businesses	No	No implementation authority

**Table 4-1
Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
3.5	Bicycle facility improvements	Construct bike lanes, off-street bikeways, multi-use trails, route lighting, and street signage	Yes	
<i>iv. Control Extended Idling of Vehicles</i>				
4.1	Truck stop electrification	Self-explanatory	No	Not economically feasible
4.2	Idle reduction	Prohibit idling at schools	Yes; Implemented through Safe Routes to School	
4.3	Reduce idling at drive-throughs, parking lots, and in traffic	Self-explanatory	No	Will not advance attainment; not economically feasible nor easily enforceable; difficult to quantify
<i>v. Reduce Extreme Cold-Start Emissions</i>				
5.0	Not Applicable			
<i>vi. Employer-Sponsored Flexible Work Schedules</i>				
6.1	Compressed work weeks/flexible work schedules	Encourage employers to implement alternate work schedules to reduce travel	Yes; Implemented through TDM Funding Program	
6.2	Telecommuting	Encourage employers to allow employees to work from home	Yes; Implemented through TDM Funding Program	

**Table 4-1
Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
<i>vii. Planning and Development Efforts to Reduce SOV Travel</i>				
7.1	Traffic reduction strategies	Public awareness and education programs to encourage carpooling and the use of public transportation	Yes	
7.2	Pay-As-You-Drive Insurance	Charge insurance fees based on driving patterns	No	No implementation authority; would require changes to state law
7.3	Bike share program	Implement bike share system and provide planning efforts for potential regional expansion of a Bike Share pilot program	Yes	
7.4	Spare the air program	Voluntary no-drive days during high ozone season	Yes	
7.5	Blueprint vision	Implementation and technical assistance with programs to encourage land-use patterns and development near transit centers that decrease urban sprawl and reduce overall travel	Yes; implemented through Sustainable Communities Strategy	
7.6	Development of rural-urban connections strategy and create best practices toolkit	Develop best practices to promote environmentally sustainable land use in economically viable rural areas for land owners and local governments	Yes	
<i>viii. Construction/Reconstruction of Paths for Non-Motorized Use</i>				
8.1	Bicycle/pedestrian overpasses	Construct bike and pedestrian bridges and/or tunnels over major highways	Yes	
8.2	Bicycle/pedestrian facilities	Construct sidewalks, curbs, gutters, landscaping, lighting for bike and pedestrian pathways	Yes	

**Table 4-1
Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
<i>ix. Pre-1980 Model-Year Vehicle Scrappage</i>				
9.1	Accelerate retirements of trucks/buses	Replace high mileage trucks and buses	Yes	
<i>x. Transit-Only or High Occupancy Vehicle Lanes</i>				
10.1	Express busways/dedicated bus lanes	Construct bus-only lanes	No	No implementation authority
10.2	HOV lanes	Construct additional high occupancy vehicle (HOV) lanes; allow use by alternative fuel vehicles	Yes	
<i>xi. Employer-Based Plans and Incentives</i>				
11.1	Satellite work centers	Employers open new remote offices near employees' residences	No	No implementation authority
11.2	Proximity job swap	Encourage employers to give incentives to employees to move close to worksite	Yes; Implemented through TDM Funding Program	
11.3	Bike to work month	Encourage biking to work during April bike awareness month	Yes	
11.4	Preferential parking for carpools and vanpools	Encourage employers to provide preferential parking for carpools and vanpools to reduce SOV trips	Yes; Implemented through TDM Funding Program	
11.5	Promote business closure on high ozone days	Self-explanatory	No	Not economically feasible

**Table 4-1
Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
11.6	Purchase vans for vanpools	Encourage employers to purchase vans for employee commute travel	Yes; Implemented through TDM Funding Program	
11.7	Income tax credit to telecommuters	Self-explanatory	No	No implementation authority
11.8	Employee parking fees/parking study	Study to gauge benefits from increased parking fees at employment centers	Yes; Implemented through TDM Funding Program	
<i>xii. Trip-Reduction Ordinances</i>				
12.0	The state law prohibits mandatory employer-based trip reduction programs (California Health & Safety Code §40717.6). Instead, SACOG is involved in and provides funds for educational and outreach programs to educate employers of the environmental benefits of a variety of employer-based trip reduction options through the Transportation Demand Measure Funding Program.			
<i>iii. Traffic Flow Improvements</i>				
13.1	Intelligent Transportation Systems	Install ITS on freeways and arterials to increase traffic operations efficiency	Yes	
13.2	Roundabouts at low traffic intersections	Construct roundabouts and remove stop sign as appropriate	Yes	
13.3	Speed limit reduction	Reduce freeway speed limit to 55mph	No	No implementation authority
13.4	One-way streets	Redesignate streets as one-way to improve traffic	Yes	
13.5	Intersection Improvements	Installation of turn lanes, curbs, traffic signals	Yes	

**Table 4-1
Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
13.6	Eco-driving educational program	Education program to improve vehicle efficiency by improving driving habits	No	Minimal air quality benefits; will not advance attainment; difficult to quantify
13.7	Ramp-Metering	Ventura, South Coast, San Joaquin Valley	Yes	
13.8	Land-use strategies	South Coast, San Joaquin Valley	Yes	
13.9	Real-Time Transit Information Systems	Provide real-time information to transit riders to increase ridership and system efficiency	Yes	
13.10	Freeway Service Patrol	Emergency services to clean up motor accidents in a timely fashion	Yes	
13.11	Traffic Signal Synchronization/Traffic Signal Improvements	Install synchronized traffic signals, median dividers, turn lanes, and grade separations	Yes	
13.12	Truck only lanes	Construct or convert lanes for use by heavy-duty trucks only	No	No implementation authority
	<i>xiv. Fringe and Transportation Corridor Parking Facilities for Vanpools/Transit</i>			
14.1	Preferential parking for vanpools, carpools	Self-explanatory	Yes	
14.2	Free parking near transit facilities	Self-explanatory	Yes	
14.3	Park-and-ride facilities	Construct park-and-ride lots near transit centers and transfer stations	Yes	

**Table 4-1
Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
14.4	Rail grade separation	Adjust road surface heights in line with rail to improve traffic flow	Yes	
<i>xv. Limit or Restrict Vehicle Use in Downtown Areas</i>				
15.1	Removal of on-street parking	Self-explanatory	No	No implementation authority
15.2	Graduate parking fees	Charge the most for parking in central business districts	Yes	
15.3	Increase parking fees	Self-explanatory	Yes	
15.4	Transit-oriented/sustainable development	Encourage land-use planning that promote development near transit centers	Yes; implemented through Sustainable Communities Strategy	
15.5	Reversible lanes	Change direction of travel during special events or during congestion periods	No	Minimal air quality benefits; not advance attainment; difficult to quantify
15.6	Off-peak goods movement	Require trucks to operate during off-peak hours	No	No implementation authority
15.7	Encourage students to bike or walk to school	Self-explanatory	Yes; implemented though Safe Routes to School	
15.8	Central business district vehicle restrictions	Restrict vehicle use in downtown areas	No	Minimal air quality benefits; will not advance attainment; difficult to quantify

**Table 4-1
Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
	<i>xvi. High-Occupancy and Ridesharing Programs</i>			
16.1	Rideshare program	Provide rideshare service	Yes	
16.2	Transit voucher program	Provide transit vouchers to certain population groups (elderly, minorities, homeless) to reduce transit costs	Yes	
16.3	Vanpool program	Provide vanpool service for certain communities; purchase new vans	Yes	
16.4	Rideshare information systems and marketing	Self-explanatory	Yes	
16.5	“Guaranteed Ride Home” program	Provide vanpool service in emergency situations to transit riders	Yes	
16.6	Station cars	Provide vanpool service from transit stations to parking lots	Yes	
16.7	Cash incentives for carpoolers	Self-explanatory	No	No implementation authority
16.8	Paratransit service	Self-explanatory	Yes	
	<i>OTHER</i>			
17.1	Divert trucks from nonattainment areas	Require pass-through trucks to choose routes away from Sacramento region	No	No implementation authority
17.2	Programs to encourage goods movement by rail	Self-explanatory	Yes	

**Table 4-1
 Transportation Control Measures for Consideration in Sacramento Area Council of Governments RACM Analysis**

TCM #	TCM	Description	Implemented in Sacramento?	Justification for Not Implementing
17.3	Buy parking lots and convert to land use	Self-explanatory	Yes; implemented through Sustainable Communities Strategy	

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5. RACM EVALUATION

A small number of control measures identified in the course of the TCM review, which were not yet implemented in the Sacramento region, were advanced for further RACM analysis and assessed based on the criteria specified in the 2015 Ozone Implementation Rule and EPA’s RACM guidance. Factors considered included technical and economic feasibility, enforceability, local applicability, and ability to provide emission reductions before attainment deadline (advancement of attainment). These measures are discussed in more detail below.

5.1 Economic Feasibility

TCMs listed below, although technologically feasible, were disqualified based on their high costs in lieu of the relatively minor emission reductions they would produce. Specifically, measures that offer free transit services or transportation equipment were viewed as not cost-effective. For instance, a “free bikes” TCM is not deemed economically feasible because such a program would need to be extended to a large population group to provide significant emission benefits thereby resulting in high costs. In addition, enforcement and quantification of emission benefits would not be possible given that bikes could be resold for profit, stolen, or not used by the public. Table 5-1 shows measures that were deemed economically infeasible and provides a detailed explanation of why they could not be implemented in the Sacramento region.

Table 5-1 RACM Analysis: Economic Feasibility		
TCM	Measure Description	Justification
Free transit during special events	Provide free alternative transportation to special events	Not cost-effective. SACOG cannot mandate that Transit Agencies provide free service.
Free rail-to-bus/bus-to-rail transfers	Vanpool and shuttle services at non-intermodal centers	Not cost-effective. SACOG cannot mandate that Transit Agencies provide free service.

Table 5-1 RACM Analysis: Economic Feasibility		
TCM	Measure Description	Justification
Close roads for use of non-motorized traffic	Convert roadways to bike/pedestrian paths	Not cost-effective. The same emission reductions could be achieved with Complete Streets planning through road widening to create new bike and pedestrian paths and appropriate landscaping to provide a safe active transportation environment.
Free bikes	Provide free bikes to transit users	Not cost-effective. This voluntary measure does not guarantee emission reductions. Consumers could sell bikes for profit.
Truck Stop Electrification	Self-explanatory	Very costly to implement. Would require state or federal subsidies. Cost-effectiveness >\$34,000/ton
Promote business closure on high ozone days	Self-explanatory	Would impact economic activity in the region and would not be socially and economically acceptable.
Cash incentives for carpoolers	Self-explanatory	Not cost-effective. SACOG's TDM Funding Program will address this with employers through education and outreach.

5.2 Advancement of Attainment

Control measures that passed the economic feasibility test were advanced to the next step. TCMs shown in Table 5-2 were viewed as not capable of advancing attainment due to the small emission benefits they would generate. Measures with emission reductions that would be difficult or impossible to quantify were also included in this grouping.

Table 5-2 RACM Analysis: Advancement of Attainment		
TCM	Measure Description	Justification
Reduce idling at drive-throughs, parking lots and in traffic	Self-explanatory	No clear demonstration of air quality benefits; not easily enforceable; difficult to quantify.

Table 5-2 RACM Analysis: Advancement of Attainment		
TCM	Measure Description	Justification
Reversible lanes	Change direction of travel during special events or during congestion periods	Will not advance attainment due to minimal emission reductions from this episodic strategy; difficult to quantify
Central Business District vehicle restrictions	Restrict vehicle use in downtown areas	Minimal air quality benefits that will not advance attainment; difficult to quantify
Eco-driving educational program	Education program to improve vehicle efficiency by improving driving habits	Minimal air quality benefits that will not advance attainment; not enforceable; difficult to quantify.

5.3 Implementation Authority

The set of measures discussed in this section were not considered to be RACM because SACOG and its jurisdictions do not have the implementation authority needed to deploy and enforce them. In some cases, implementation would require changes to state law. If a transportation agency does not have the authority to implement and enforce a TCM, it cannot be credited in a SIP, and therefore cannot be considered as RACM. Table 5-3 lists these measures including reasoned justification for not implementing them in the Sacramento region at this time.

Table 5-3 RACM Analysis: Implementation Authority		
TCM	Measure Description	Justification
Bus and carpool lanes on arterials	Provide fixed lanes for buses and carpools on arterial streets	No implementation authority; would require state agency authority and funds (Caltrans and CTC)
Bus queue jumps	Installing special lanes and signals to allow transit to get ahead in traffic	No implementation authority; would require county or state agency authority and funds (Counties/Caltrans)
Express toll lanes/HOT lanes	Construct toll lanes to reduce congestion	No implementation authority; would require state agency authority and funds (Caltrans and CTC)

**Table 5-3
RACM Analysis: Implementation Authority**

TCM	Measure Description	Justification
Mandatory bike racks for worksites	Mandate that employers install bike racks at businesses	No implementation authority; CA HSC §40717.6 prohibits mandatory employer-based trip reduction programs
Pay-As-You-Drive Insurance	Charge insurance fees based on driving patterns	No implementation authority; would require changes to state insurance practices and regulations
Express Busways/Dedicated Bus Lanes	Construct bus-only lanes	No implementation authority; would require state agency authority and funds (Caltrans and CTC)
Income tax credit to telecommuters	Self-explanatory	No implementation authority; would require changes to California tax law
Speed limit reduction	Reduce freeway speed limit to 55mph	No implementation authority; would require changes to California Vehicle Code
Off-peak goods movement	Require trucks to operate during off-peak hours	No implementation authority; would not be economically or socially acceptable
Truck only lanes	Construct or convert lanes for use by heavy-duty trucks only	No authority to implement; would require state agency authority and funds (Caltrans and CTC)
Divert Trucks from Nonattainment Areas	Require pass-through trucks to choose routes away from the Sacramento region	No authority to implement; would require state agency authority and funds (ARB, Caltrans, and CTC)
Satellite Work Centers	Work centers set-up closer to where employers live	No authority to implement; CA HSC §40717.6 prohibits mandatory employer-based trip reduction programs
Removal of on-street parking	Self-explanatory	No implementation authority

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6. CONCLUSION

Out of the approximately 20 candidate TCMs identified as candidate RACM, none were found to meet the criteria for RACM implementation. Based on a comprehensive review of TCM projects in other nonattainment areas, it was determined that the TCMs being implemented in the Sacramento region represent all RACM. None of the candidate measures reviewed herein and determined to be infeasible meet the criteria for RACM implementation.

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