MEMORANDUM

May 18, 2010 File Number 8000130

TO: Lynn Terry, Deputy Executive Officer, California Air Resources Board

FROM: Steve Heminger, Executive Director, Bay Area Metropolitan Transportation Commission (MTC)
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SUBJECT: Preliminary Report on Metropolitan Planning Organization (MPO)/Air Resources Board (ARB) Senate Bill 375 (SB 375) Target Setting Analysis

Introduction

The report of the Regional Targets Advisory Committee (RTAC) recommends that the process for setting greenhouse gas (GHG) targets under SB 375 should center on collaboration among the state's MPOs and ARB with support from Caltrans and the California Transportation Commission (CTC) regarding modeling and regional transportation plan guidance. The RTAC report recommends a seven-step process for the target setting analysis with the final step being the adoption of targets by the ARB by September 30, 2010 (see Attachment 1, excerpted from RTAC report, dated September 29, 2009).

Following the completion of the RTAC report, the executive directors of the four large MPOs (MTC, SCAG, SACOG, and SANDAG) along with the executive director of the San Joaquin Council of Governments (who agreed to serve as a liaison to the executive directors of the other MPOs in the Central Valley), met to discuss the process by which the initial target setting analysis should be prepared. These executive directors decided that three working groups would be formed:

- A planning working group made up of planning directors, staff members, and consultants for the MPOs, along with key staff members from ARB and Caltrans
- A modeling working group made up of senior modeling staff members from the MPOs
- A legal working group made up of staff attorneys and consulting attorneys for the MPOs

These executive directors also agreed that they would continue to meet periodically to evaluate the progress being made in the target setting analysis process and to provide direction regarding interpretations of the procedures laid out in SB 375 and the RTAC report. Senior staff members from ARB and Caltrans also were invited to participate in these meetings. In addition, staff members from the MPOs and Caltrans who were working with CTC staff on the update to the CTC's Regional Transportation Plan (RTP) Guidelines were asked to monitor both processes to ensure that there was consistency between the RTP Guidelines and the target setting analysis.

Since January 2010, the planning and modeling working groups have met on a regular basis to coordinate preparation of the analyses called for in the RTAC report, the results of which have been reviewed periodically with the executive directors. At the same time, the legal working group has provided advice to the executive directors regarding provisions of SB 375 that have required legal interpretations.

The following is a brief summary of the work that has been completed for the first five of the seven steps laid out in the RTAC report. In addition, the report provides a brief summary of the results of the analysis conducted so far, including a comparison of results among the four largest MPOs. Finally, the report describes the next steps in the target setting process.

Overview of SB 375 Target Setting Analysis Process

This portion of the report provides a brief summary of each of the first four steps in the target setting process and discusses how the MPOs and ARB staff have addressed each step in relation to the process recommended in the RTAC report.

Step 1–Individual MPO Analysis of Existing RTPs

In this step, each of the 18 MPOs prepared an analysis of its adopted, fiscally constrained RTP, including estimates of per capita GHG emissions for the 2005 base year and for the years 2020 and 2035. The MPO staffs worked with ARB staff to ensure that the analysis was based on consistent, long-range planning assumptions to the degree practicable, including:

- Existing and forecasted fuel prices and auto operating costs
- Assumptions about fleet mix and auto fuel efficiency standards provided by ARB
- Updated population forecasts which reflect both demographic trends, as well as reflecting the results of the recent economic downturns which have affected various aspects of forecasted growth
- Adjustments to transportation assumptions to reflect observed transportation operation funding shortfalls between plan adoption and present
- Assumptions contained within existing RTPs regarding the interaction of goods movement-related travel demand with that of passenger vehicles

In addition, it was determined that these calculations should exclude "external trips" (those trips that begin and end outside of a region), consistent with the RTAC recommendation. The results of this analysis are contained in Attachment 2.

Step 2–ARB Staff Analysis of Existing RTP Base Cases for all MPOs

In this step, ARB staff obtained the results of the analysis described in Step 1 above, reviewed it, and has distributed it for public review.

Step 3–Preparation of Alternative Scenarios

In this step, the MPO staffs worked with ARB staff to identify various measures that could lead to reduced GHG emissions in the "passenger vehicle" sector and to develop methods for estimating the results of those measures. In support of this effort, ARB staff compiled a preliminary report listing possible measures to be considered by the MPOs in their analysis. This report was reviewed and discussed with MPO staffs and was used as the basis for identification of specific measures to be tested.

It was agreed that the alternative scenarios to be tested by the MPOs should be organized into certain categories that would allow for bundling of measures with common characteristics in order to facilitate comparison of results obtained by the individual MPOs. The following broad categories were identified:

- Transportation Demand Management (TDM) and Transportation Systems Management (TSM) measures
- Transportation System Improvements (public transit, bicycle facilities, and pedestrian facilities)
- Land Use measures
- Pricing measures

Each MPO identified a set of specific measures that appeared to be technically feasible within their region within each category (recognizing that certain "technically feasible" measures might not be feasible from a policy standpoint) and determined the most appropriate method for testing it (either using its travel demand model or making "post-processing" calculations of results).

The MPO staffs discussed the feasibility of developing and analyzing performance measures for factors other than those related to GHG emissions (as discussed in the RTAC report, page 11). However, it was determined that it would not be practical to identify a common set of performance measures and to have each MPO perform the analysis of these non-GHG performance measures within the timeframes called for in the RTAC report.

Step 4–Analysis of Alternative Scenarios by MPOs

In this step, the MPOs analyzed the alternative scenarios that were formulated in Step 3 and compiled the results. These results were shared among the MPO staffs, along with ARB staff, and the scenarios were refined and retested. Once the preliminary analysis was completed, the MPO staffs met and discussed the best way in which to report the results. It was decided that the staffs for the four large MPOs would prepare a set of comparison tables that would explain the results of the target setting analysis performed to date. These results were discussed with the staffs of the MPOs and ARB staff during a meeting held on May 11, and it was agreed that this report should be forwarded to RTAC for its review and discussion at its meeting on May 25.

It should be emphasized that the results being reported for consideration by RTAC at its meeting on May 25 are continuing to be reviewed and refined, and that additional results may be submitted by the MPOs to ARB staff during late May and early June. In addition, it also should be noted that several of the 14 other MPOs will be producing results and will be submitting those results to ARB separately.

It also should be noted here that the RTAC report had recommended that during Step 4, "ARB staff should prepare a preliminary draft uniform statewide target for public review and comment." It is our understanding that, based on knowledge gained through the collaborative process with MPOs in conducting this target setting process, ARB staff has decided that it would not be productive to issue such a preliminary draft target.

Summary of Results Obtained to Date by the Four Large MPOs:

The results of the target setting analysis performed by each of the four large MPOs are documented in a series of tables and charts (Attachment C). The following is a brief summary of those results.

1. Comparison of Overall GHG Reduction Results: Existing RTP versus "Most Ambitious Scenario"

Table 1 and Chart 1 provide a comparison of the GHG reduction results of the most ambitious, individual scenario that was tested by each of the large MPOs, with the exception of SACOG, for which the results are for a "hybrid scenario" which contains measures from each of the three individual categories that were tested. (It should be noted that SANDAG staff plans to prepare a hybrid scenario based on direction received from its Board of Directors on May 14.)

2. Comparison of Existing RTP Expenditure Categories

Table 2 and Chart 2 provide a comparison of the categories of expenditures that are contained in each of the adopted RTPs of the four large MPOs, along with the percentages for each of these categories. This comparison illustrates the large percentage of total RTP expenditures in each of the regions that is allocated to maintenance and operations costs, as well as the way in which expenditures for system expansion are currently allocated.

3. Comparison of Pricing Scenarios

Table 3 and Chart 3 provide a comparison of the pricing scenarios that were tested by each of the four large MPOs, including the specific measures that were tested, as well as the overall results.

4. Comparison of Land Use Scenarios

Table 4 and Chart 4 provide a comparison of the land use scenarios that were tested by each of the four MPOs and how they compare to land use forecasts used in the adopted RTPs. The measures of comparison include overall growth rate, compactness (percentage of total housing on small, single-family lots and percentage of housing units in attached products), proximity to existing and planned transit service, and jobs-housing balance.

5. Comparison of Transportation System Characteristics of Scenarios

Table 5 and Charts 5A to 5F provide a comparison of the transportation system characteristics of the scenarios tested by the four large MPOs, including measures of system capacity, as well as trips by mode.

6. Comparison of TDM/TSM Scenarios

Table 6 provides a comparison of the specific TDM and TSM measures that were tested by the four large MPOs.

Next Steps

As noted above, the MPO staffs plan to continue to review and refine their analysis over the next few weeks in order to provide ARB staff with any information that it will find useful in formulating draft targets by the June 30 deadline.

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Attachments:

A. Excerpts from RTAC report
B. Table Summarizing Results of Step 1–Existing RTP Analysis
C. MPO Comparison Tables and Charts:
   - Tables 1–6
   - Charts 1–4; 5A–5F
D. Appendices (reports from each large MPO summarizing results of individual target setting analysis, along with other supporting materials):
   Appendix 1–MTC
   Appendix 2–SANDAG
   Appendix 3–SACOG (to be mailed separately)
   Appendix 4–SCAG

Excerpt from
"Recommendations of the Regional Targets Advisory Committee (RTAC) Pursuant to Senate Bill 375: A Report to the California Air Resources Board"

A. Target Setting Process

1. MPO/ARB Interaction

SB 375 encourages a high level of ARB interaction with key stakeholders throughout the target setting process as evidenced by the representation on the Committee as well as specific direction for ARB to exchange technical data with MPOs and the affected air districts. The success of the target setting process, therefore, is described best through the collaborations that must continue to occur. Interaction with local governments, the public, air districts, other state agencies, and transportation and land use experts is important as discussed elsewhere in this report. The interactions between ARB and the MPOs are particularly critical given that the planning requirements of SB 375 fall to the MPOs to carry out.

The proposed process for setting greenhouse gas emission targets under SB 375 should center on collaboration among the MPOs and ARB, with support from Caltrans and the California Transportation Commission regarding modeling and regional transportation plan guidance. Technical input may also be solicited from other agencies, such as the Federal Highway Administration, Federal Transit Administration, and U.S. Environmental Protection Agency.

The target setting process will also require direct participation and buy-in from local jurisdictions, county transportation commissions (particularly for the SCAG region), affected air districts, and other major stakeholders. The MPO/ARB interactions and the emission reduction target setting process will be greatly enhanced by what the Committee has described as a "bottom-up" process. Transparency is also key to this process. The Committee recommends that all data, analyses and documents be available for public review at every step in the process.

To ensure effective and efficient communication between ARB and the MPOs between now and September 2010, the Committee recommends the following process as a way to set the level of expectation about how that interaction could occur.

Step 1 MPOs prepare an analysis of their adopted fiscally constrained RTP, which includes its assessment of the location and intensity of future land use that is reasonably expected to occur. The analysis would include estimates of respective regional 2005 base year, 2020 and 2035 greenhouse gas emission levels (e.g., for defined "No Project" and "Project" alternatives included in a RTP EIR or other related assessment), using their existing models. MPOs would work together with ARB to ensure that this analysis uses consistent long-range planning assumptions statewide, to the degree practicable, including, but not limited to:

- Existing and forecasted fuel prices and auto operating costs
- Reasonably available federal and state revenues
- Assumptions about fleet mix and auto fuel efficiency standards provided by ARB
- Demographic forecasts (e.g., aging of population and changes to household income and cost of living)
- Assumptions about goods movement-related travel impacts (e.g., heavy-duty trucks, rail, seaports and airport)

Each MPO's analysis would be made available to the public.

Step 2 ARB uses the results from Step 1 to compile greenhouse gas emission estimates for each of the MPOs individually in the base year of 2005 and the target years of 2020 and 2035. ARB staff would then meet with the MPOs to share those results, and make them available to the public for review. ARB staff would also compare baseline greenhouse gas emission estimates with MPO fuel use data for comparison. To the extent that there are differences, ARB will attempt to understand them. This would result in a greenhouse gas emissions "baseline" against which further reductions from regional strategies developed in Step 3 and 4 can be compared.

Step 3 Using a bottom up approach with input from regional and local officials and stakeholders, the MPOs would work with ARB to develop parameters for preparing sensitivity analyses and multiple scenarios to test the effectiveness of various approaches that would help identify the most ambitious achievable greenhouse gas emission reduction strategies for 2020 and 2035. ARB and MPOs are encouraged to coordinate and develop comparable packages across the regions. The policies and practices that could be incorporated into these alternative scenarios include, but are not limited to, those identified in the BMP list and may include:

- Increased transportation funding and system investments in modes that will reduce greenhouse gas emissions, such as public transit, rail transportation, and non-motorized transportation
- Improved integration between land use and transportation policies, through means such as funding for supportive local infrastructure near public transit and funding for regionally coordinated preservation of natural areas
- Inclusion of policies that promote infill, higher densities, mixed uses, improved pedestrian and bicycle connections, and open space preservation
- Increased use of transportation demand management measures to reduce single-occupant vehicle (SOV) travel demand
- Increased use of transportation systems management measures that will improve system efficiency
- Including pricing options, such as express lanes, parking, and various fuel taxes
- Accelerated integration of more fuel efficient and clean fuels automobiles into the fleet mix than what is already required by adopted state vehicles and fuels programs
- Increased funding for and/or supply of housing affordable to the local workforce

In this step, the MPOs and ARB would also identify the data inputs and outputs that should be obtained from existing or new scenario assessments developed with existing travel demand and land use models, off-model tools, sketch planning analyses, or the BMP spreadsheet tool. The Committee recommends that the data outputs be related to the performance indicators discussed in the performance monitoring section later in this report and should be comparable from region-to-region, to the extent feasible.

Outputs may include those listed in the Performance Monitoring section, and may include:

- Greenhouse gas levels at target years
- Transportation performance measures
- Economic performance measures
- Other environmental performance measures
- Social equity performance measures
- Housing production performance measures

In identifying the measures to be used in developing these alternative scenarios, MPO staffs and ARB staff would use information from existing scenario assessments and cost-effectiveness studies wherever possible.

The list of measures, alternative scenarios and data outputs identified for each MPO will be made available for public comment.

Step 4 MPOs analyze the alternative scenarios using a sketch planning tool, BMP spreadsheet tool, or other acceptable means, and forward the results to ARB and make them available to the public, explaining the reasons for any difference in key outputs resulting from the various methodologies used to analyze scenarios. ARB would compile the results, and, combined with its review of empirical studies and other relevant information that relates to passenger vehicle and light truck greenhouse gas emissions (including new auto fuel efficiency standards and clean fuels), prepare a preliminary draft uniform statewide target for public review and comment.

At this time, an MPO may also submit a proposed regional target pursuant to provisions of SB 375.

Step 5 ARB considers feedback from MPOs and other stakeholders on the preliminary draft uniform statewide target, as well as any formal regional target submittals received as part of Step 4, to assess whether any region's target should be adjusted either above or below the preliminary draft uniform statewide target. Such revisions would be subject to a "reasonably tough test" and would ensure that each region's target is the most ambitious achievable (see page 6).

Step 6 ARB staff recommends draft targets to its Board.

Step 7 ARB, MPOs and others continue to exchange technical information and modeling results prior to final target setting by September 2010.

MPO and ARB shall encourage public participation in formulating alternative scenarios and determining outputs within the timelines noted below.

The process outlined above will require a significant effort by all participants within a relatively short period of time in order to allow ARB staff to submit draft targets to its Board by June 30, 2010 and final targets by September 30, 2010 in accordance with SB 375. Therefore, it is recommended that a specific schedule be developed by the participants, based on the following key milestones:

- Steps 1 through 4 should be completed as close to March 1, 2010 as possible (April 30, 2010 for the SCAG region);
- Steps 5 and 6 should be completed by June 30, 2010; and,
- Step 7 will be completed by September 30, 2010.

Table 1: SB 375 Base Year Estimate

Weekday Vehicle Miles Traveled and Weekday Carbon Dioxide are reported from Emfac2007 for LDA, LDT1, LDT2, and MDV vehicle classifications.

		Metropolitan Planning Organization									
		SCAG[2]	MTC/ABAG	SANDAG	SACOG[3]	Fresno[4]	Kern[5]	AMBAG	SJCOG[6]	StanCOG[6]	Tulare[6]
Base Year Scenario (2005)											
Total Weekday Vehicle Miles Traveled (000s)		420,815	157,440	81,605	58,531	21,146	22,619	16,076	15,730	11,124	9,636
SB 375 Weekday Vehicle Mile Traveled (000s)		387,688	147,245	77,379	46,702	17,687	16,107	16,076	13,618	9,475	8,250
Internal	I-I	344,035	127,934	65,290	35,460	13,130	10,309	8,703	-	-	-
Interregional	X-I, I-X	40,707	16,312	11,698	9,716	2,297	938	6,271	-	-	-
Through	X-X	2,946	2,999	391	1,526	2,260	4,860	1,102	-	-	-
Percentage of Total Vehicle Miles Travelled		92.1%	93.5%	94.8%	79.8%	83.6%	71.2%	100.0%	86.6%	85.2%	85.6%
Caltrans HPMS Vehicle Miles Traveled Estimate[1]		422,473	166,186	78,015	56,219	21,832	22,263	16,968	18,008	11,301	9,634
MPO Estimate Percent Difference		(0.4%)	(5.3%)	4.6%	4.1%	(3.1%)	1.6%	(5.3%)	(12.7%)	(1.6%)	0.0%
Weekday Carbon Dioxide (tons = 2000lbs)		190,540	74,641	39,649	23,640	8,402	8,410	-	6,652	4,754	4,021
Internal	I-I	169,085	64,852	33,455	17,949	6,237	5,430		-	-	-
Interregional	X-I, I-X	20,007	8,269	5,994	4,918	1,091	450		-	-	-
Through	X-X	1,448	1,520	200	772	1,074	2,530		-	-	-
DOF Estimated Population		18,111,759	7,094,881	3,053,111	2,188,098	888,873	765,750	738,394	660,057	508,281	413,609
MPO Estimated Population (if avail)		18,122,791	7,094,823	3,034,388	2,056,894	897,416	765,600	740,048	650,458	511,617	390,950
Difference		0.1%	(0.0%)	(0.6%)	(6.0%)	1.0%	(0.0%)	0.2%	(1.5%)	0.7%	(5.5%)
SB 375 Weekday Per Capita Carbon Dioxide (lbs)		21.0	21.0	26.1	23.0	18.7	22.0	-	20.5	18.6	20.6
Internal	I-I	18.7	18.3	22.1	17.5	13.9	14.2	-	-	-	-
Interegional	X-I, I-X	2.2	2.3	4.0	4.8	2.4	1.2	-	-	-	-
Through	X-X	0.2	0.4	0.1	0.8	2.4	6.6	-	-	-	-

[1] Caltrans HPMS VMT estimate includes all vehicle classifications. SB 375 is only concerned with automobiles and light duty trucks. VMT reported by MPOs only includes vehicle classifications ARB considers subject to SB 375.

Source:
HPMS: 2005 California Public Road Data. Table 6. <http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2005PRD.pdf>

Population: State of California, Department of Finance, California County Population Estimates and Components of Change by Year, July 1, 2000-2009. Sacramento, California, December 2009. <http://www.dof.ca.gov/research/demographic/reports/estimates/e-2/2000-09/documents/E-2_Report.xls>

[2] the data report herein are extracted from SCAG 08 RTP and are subject to change once observed data is available.

[3] SACOG bases travel modeling on household transportation; group quartered population is not explicitly modeled, and assumed to be captured more in the employment (i.e. staff at retirement homes, prisons, etc.).

[4] The above numbers only reflect travel within Fresno County. Inter-regional traveling outside of Fresno County boundaries is yet to be included in the calculation. Some transportation measures such as carpool/Vanpool, ITS & ramp metering are not included either.

[5] Kern is unusual because of it's size and geography. Travel through Kern on I-5, 99 and 58 averages 70 miles per one-way trip accounting for 30% of all passenger travel in the region. In addition, Kern is twice the area of LA county with less than 1/20th the population. 2/3rds of Kern's population and employment reside in 5% of the 8,200 sq. mi. modeling area, and 2/3rds of employment growth is outside that area in strategic rural employment areas such as wind/solar energy areas, agriculture/dairy/ranching, food processing, distribution centers, oil production, military, aerospace testing, prisons, recreation, etc. These activities are not conducive for infill areas but are vital to the state's economy and the small environmental justice communities in these outlying areas.

[6] Although the 6 Valley MPOs (Kings, Madera, Merced, StanCOG, San Joaquin COG, Tulare) have submitted data with this request, the 6 Valley MPOs will submit final results to ARB separately from this submittal.

Table 1: SB 375 Base Year Estimate

Weekday Vehicle Miles Traveled and Weekday Carbon Dioxide are reported from Emfac2007 for LDA, LDT1, LDT2, and MDV vehicle classifications.

		Metropolitan Planning Organizations								
		SBCAG[7]	SLOCOG	**Merced**[6]	BCAG	Shasta (2030)	**Kings**[6]	**Madera**[6]	Tahoe	Total[8]
Base Year Scenario (2005)										
Total Weekday Vehicle Miles Traveled (000s)		9,605	-	7,153	-	5,395	3,571	4,555	1,268	830,193
SB 375 Weekday Vehicle Mile Traveled (000s)		8,313		5,425	-	4,366	2,632	3,730	1,151	749,769
Internal	I-I	6,987	-	-	-	2,680	-	-	318	
Interregional	X-I, I-X	1,174	-	-	-	1,275	-	-	464	
Through	X-X	152	-	-	-	410	-	-	369	
Percentage of Total Vehicle Miles Travelled		86.5%		75.8%		80.9%	73.7%	81.9%	90.8%	90.3%
Caltrans HPMS Vehicle Miles Traveled Estimate[1]		10,123	7,931	7,150	4,926	5,327	3,687	4,079	976	837,274
MPO Estimate Percent Difference		(5.1%)	0.0%	0.0%	0.0%	1.3%	(3.1%)	11.7%	29.9%	(0.8%)
Weekday Carbon Dioxide (tons = 2000lbs)		3,574	-	2,606	-	1,950	1,284	1,793	620	372,536
Internal	I-I	3,004	-	-	-	1,197	-	-	171	
Interregional	X-I, I-X	505	-	-	-	570	-	-	250	
Through	X-X	65	-	-	-	183	-	-	199	
DOF Estimated Population		418,965	262,928	243,043	215,599	178,724	146,690	141,929	-	34,813,770
MPO Estimated Population (if avail)		417,500	-	243,000	-	165,430	145,463	146,101	41,211	34,683,642
Difference		(0.3%)		(0.0%)		(7.4%)	(0.8%)	2.9%		(0.4%)
SB 375 Weekday Per Capita Carbon Dioxide (lbs)		17.1	-	21.4	-	23.6	17.7	24.5	30.1	21.5
Internal	I-I	14.4	-	-	-	14.5	-	-	8.3	-
Interegional	X-I, I-X	2.4	-	-	-	6.9	-	-	12.1	-
Through	X-X	0.3	-	-	-	2.2	-	-	9.7	-

[1] Caltrans HPMS VMT estimate includes all vehicle classifications. SB 375 is only concerned with automobiles and light duty trucks. VMT reported by MPOs only includes vehicle classifications ARB considers subject to SB 375.

[6] Although the 6 Valley MPOs (Kings, Madera, Merced, StanCOG, San Joaquin COG, Tulare) have submitted data with this request, the 6 Valley MPOs will submit final results to ARB separately from this submittal.

[7] Santa Barbara used the adopted 2007 Regional Growth Forecast as basis for estimates in this table. The current RTP (adopted 2009), is based on the 2002 Regional Growth Foreca

[8] Statewide summations only include MPO's where Weekday CO_2 emission are available.

Source:
HPMS: 2005 California Public Road Data. Table 6. <http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2005PRD.pdf>

Population: State of California, Department of Finance, California County Population Estimates and Components of Change by Year, July 1, 2000-2009. Sacramento, California, December 2009. <http://www.dof.ca.gov/research/demographic/reports/estimates/e-2/2000-09/documents/E-2_Report.xls>

Table 2: SB 375 2020 Estimate

Weekday Vehicle Miles Traveled and Weekday Carbon Dioxide are reported from Emfac2007 for LDA, LDT1, LDT2, and MDV vehicle classifications.

		Metropolitan Planning Organization									
Bold=Normalized Auto Operating Cost Assumptions		**SCAG[2]**	**MTC/ABAG**	**SANDAG**	**SACOG[3]**	**Fresno[4]**	**Kern[5]**	AMBAG	**SJCOG[6]**	**StanCOG[6]**	**Tulare[6]**
Base Year Scenario (2020)											
Total Weekday Vehicle Miles Traveled (000s)		485,794	175,517	99,840	73,848	27,263	30,223	-	19,896	14,156	13,237
SB 375 Weekday Vehicle Mile Traveled (000s)		444,476	164,574	92,655	64,345	22,818	21,821	-	17,315	12,038	11,314
Internal	I-I	378,605	141,781	79,035	51,887	16,069	13,792	-	-	-	-
Interregional	X-I, I-X	61,827	19,253	13,157	10,585	3,273	1,174	-	-	-	-
Through	X-X	4,045	3,540	463	1,873	3,476	6,855	-	-	-	-
Percentage of Total Vehicle Miles Travelled		91.5%	93.8%	92.8%	87.1%	83.7%	72.2%		87.0%	85.0%	85.5%
Weekday Carbon Dioxide (tons = 2000lbs)		213,078	79,710	46,430	30,220	10,699	11,140	-	8,175	5,940	5,396
Internal	I-I	181,500	68,590	39,605	24,369	7,534	7,080	-	-	-	-
Interregional	X-I, I-X	29,639	9,393	6,593	4,971	1,535	560	-	-	-	-
Through	X-X	1,939	1,727	232	880	1,630	3,500	-	-	-	-
DOF Estimated Population		21,416,262	7,975,241	3,550,714	2,767,408	1,201,792	1,086,113	847,914	965,094	699,144	599,117
MPO Estimated Population (if avail)		21,462,750	8,018,008	3,635,855	2,733,500	1,131,430	1,010,800	840,366	809,685	632,623	547,423
Difference		0.2%	0.5%	2.4%	(1.2%)	(5.9%)	(6.9%)	(0.9%)	(16.1%)	(9.5%)	(8.6%)
SB 375 Weekday Per Capita Carbon Dioxide (lbs)		19.9	19.9	25.5	22.1	18.9	22.0	-	20.2	18.8	19.7
Internal	I-I	16.9	17.1	21.8	17.8	13.3	14.0	-	-	-	-
Interegional	X-I, I-X	2.8	2.3	3.6	3.6	2.7	1.1	-	-	-	-
Through	X-X	0.2	0.4	0.1	0.6	2.9	6.9	-	-	-	-

Source:
HPMS: 2005 California Public Road Data. Table 6. <http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2005PRD.pdf>

Population: State of California, Department of Finance, California County Population Estimates and Components of Change by Year

[2] the data report herein are extracted from SCAG 08 RTP and are subject to change once observed data is available.

[3] SACOG bases travel modeling on household transportation; group quartered population is not explicitly modeled, and assumed to be captured more in the employment (i.e. staff at retirement homes, prisons, etc.).

[4] The above numbers only reflect travel within Fresno County. Inter-regional traveling outside of Fresno County boundaries is yet to be included in the calculation. Some transportation measures such as carpool/Vanpool, ITS & ramp metering are not included either.

[5] Kern is unusual because of it's size and geography. Travel through Kern on I-5, 99 and 58 averages 70 miles per one-way trip accounting for 30% of all passenger travel in the region. In addition, Kern is twice the area of LA county with less than 1/20th the population. 2/3rds of Kern's population and employment reside in 5% of the 8,200 sq. mi. modeling area, and 2/3rds of employment growth is outside that area in strategic rural employment areas such as wind/solar energy areas, agriculture/dairy/ranching, food processing, distribution centers, oil production, military, aerospace testing, prisons, recreation, etc. These activities are not conducive for infill areas but are vital to the state's economy and the small environmental justice communities in these outlying areas.

[6] Although the 6 Valley MPOs (Kings, Madera, Merced, StanCOG, San Joaquin COG, Tulare) have submitted data with this request, the 6 Valley MPOs will submit final results to ARB separately from this submittal.

Table 2: SB 375 2020 Estimate

Weekday Vehicle Miles Traveled and Weekday Carbon Dioxide are reported from Emfac2007 for LDA, LDT1, LDT2, and MDV vehicle classifications.

		Metropolitan Planning Organizations								
Bold=Normalized Auto Operating Cost Assumptions		SBCAG[7]	SLOCOG	**Merced**[6]	BCAG	Shasta	**Kings**[6]	**Madera**[6]	Tahoe	Total[8]
Base Year Scenario (2020)										
Total Weekday Vehicle Miles Traveled (000s)		10,934	-	10,866	-	7,084	4,990	7,345	1,896	982,889
SB 375 Weekday Vehicle Mile Traveled (000s)		9,826	-	8,380	-	5,759	3,653	5,960	1,728	886,662
Internal	I-I	8,087	-	-	-	3,397	-	-	477	-
Interregional	X-I, I-X	1,552	-	-	-	1,801	-	-	697	-
Through	X-X	187	-	-	-	562	-	-	554	-
Percentage of Total Vehicle Miles Travelled		89.9%		77.1%		81.3%	73.2%	81.1%	91.1%	90.2%
Weekday Carbon Dioxide (tons = 2000lbs)		4,177	-	4,035	-	2,810	1,720	2,783	673	426,986
Internal	I-I	3,437	-	-	-	1,657	-	-	186	-
Interregional	X-I, I-X	660	-	-	-	879	-	-	271	-
Through	X-X	80	-	-	-	274	-	-	216	-
DOF Estimated Population		459,498	293,540	348,690	281,442	224,386	205,707	212,874	-	41,712,040
MPO Estimated Population (if avail)		459,600	-	331,000	-	214,734	205,914	224,567	48,042	41,465,931
Difference		0.0%		(5.1%)		(4.3%)	0.1%	5.5%		(0.6%)
SB 375 Weekday Per Capita Carbon Dioxide (lbs)		18.2	-	24.4	-	26.2	16.7	24.8	28.0	20.6
Internal	I-I	15.0	-	-	-	15.4	-	-	7.7	-
Interegional	X-I, I-X	2.9	-	-	-	8.2	-	-	11.3	-
Through	X-X	0.3	-	-	-	2.6	-	-	9.0	-

[6] Although the 6 Valley MPOs (Kings, Madera, Merced, StanCOG, San Joaquin COG, Tulare) have submitted data with this request, the 6 Valley MPOs will submit final results to ARB separately from this submittal.

[7] Santa Barbara used the adopted 2007 Regional Growth Forecast as basis for estimates in this table. The current RTP (adopted 2009), is based on the 2002 Regional Growth Foreca

[8] Statewide summations only include MPO's where Weekday CO_2 emission are available.

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Population: State of California, Department of Finance, California County Population Estimates and Components of Change by Year

Table 3: SB 375 2035 Estimate

Weekday Vehicle Miles Traveled and Weekday Carbon Dioxide are reported from Emfac2007 for LDA, LDT1, LDT2, and MDV vehicle classifications.

		Metropolitan Planning Organization									
Bold=Normalized Auto Operating Cost Assumptions		**SCAG[2]**	**MTC/ABAG**	**SANDAG**	**SACOG[3]**	**Fresno[4]**	**Kern[5]**	AMBAG	**SJCOG[6]**	**StanCOG[6]**	**Tulare[6]**
Base Year Scenario (2035)											
Total Weekday Vehicle Miles Traveled (000s)		551,423	199,378	111,678	87,775	34,561	41,758	25,679	24,375	17,438	18,627
SB 375 Weekday Vehicle Mile Traveled (000s)		501,358	187,291	103,858	75,617	29,312	30,916	25,679	21,266	14,863	15,465
Internal	I-I	413,470	160,993	87,760	61,408	20,311	20,321	12,173	-	-	-
Interregional	X-I, I-X	82,273	22,214	15,579	11,909	4,285	1,502	9,985	-	-	-
Through	X-X	5,615	4,084	519	2,300	4,716	9,093	3,521	-	-	-
Percentage of Total Vehicle Miles Travelled		90.9%	93.9%	93.0%	86.1%	84.8%	74.0%	100.0%	87.2%	85.2%	83.0%
Weekday Carbon Dioxide (tons = 2000lbs)		242,698	92,223	51,920	35,210	13,796	15,660	-	9,903	7,095	7,340
Internal	I-I	200,153	79,274	43,872	28,594	9,559	10,320		-	-	-
Interregional	X-I, I-X	39,827	10,938	7,788	5,545	2,017	710		-	-	-
Through	X-X	2,718	2,011	260	1,071	2,220	4,630		-	-	-
DOF Estimated Population		24,333,142	9,101,274	4,100,681	3,376,408	1,547,582	1,523,934	981,068	1,337,242	933,559	809,789
MPO Estimated Population (if avail)		24,049,676	9,073,700	3,984,753	3,349,000	1,418,887	1,321,000	920,714	989,774	767,836	700,840
Difference		(1.2%)	(0.3%)	(2.8%)	(0.8%)	(8.3%)	(13.3%)	(6.2%)	(26.0%)	(17.8%)	(13.5%)
SB 375 Weekday Per Capita Carbon Dioxide (lbs)		20.2	20.3	26.1	21.0	19.4	23.7	-	20.0	18.5	20.9
Internal	I-I	16.6	17.5	22.0	17.1	13.5	15.6	-	-	-	-
Interegional	X-I, I-X	3.3	2.4	3.9	3.3	2.8	1.1	-	-	-	-
Through	X-X	0.2	0.4	0.1	0.6	3.1	7.0	-	-	-	-

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[2] the data report herein are extracted from SCAG 08 RTP and are subject to change once observed data is available.

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[4] The above numbers only reflect travel within Fresno County. Inter-regional traveling outside of Fresno County boundaries is yet to be included in the calculation. Some transportation measures such as carpool/Vanpool, ITS & ramp metering are not included either.

[5] Kern is unusual because of it's size and geography. Travel through Kern on I-5, 99 and 58 averages 70 miles per one-way trip accounting for 30% of all passenger travel in the region. In addition, Kern is twice the area of LA county with less than 1/20th the population. 2/3rds of Kern's population and employment reside in 5% of the 8,200 sq. mi. modeling area, and 2/3rds of employment growth is outside that area in strategic rural employment areas such as wind/solar energy areas, agriculture/dairy/ranching, food processing, distribution centers, oil production, military, aerospace testing, prisons, recreation, etc. These activities are not conducive for infill areas but are vital to the state's economy and the small environmental justice communities in these outlying areas.

[6] Although the 6 Valley MPOs (Kings, Madera, Merced, StanCOG, San Joaquin COG, Tulare) have submitted data with this request, the 6 Valley MPOs will submit final results to ARB separately from this submittal.

Table 3: SB 375 2035 Estimate

Weekday Vehicle Miles Traveled and Weekday Carbon Dioxide are reported from Emfac2007 for LDA, LDT1, LDT2, and MDV vehicle classifications.

		Metropolitan Planning Organizations								
Bold=Normalized Auto Operating Cost Assumptions		SBCAG[7]	SLOCOG	**Merced**[6]	BCAG	Shasta (2030)	**Kings**[6]	**Madera**[6]	Tahoe	Total[8]
Base Year Scenario (2035)										
Total Weekday Vehicle Miles Traveled (000s)		11,442	9,127	16,153	6,920	8,234	6,464	9,465	2,858	1,157,676
SB 375 Weekday Vehicle Mile Traveled (000s)		10,271	9,127	12,564	5,986	6,775	4,759	7,705	2,614	1,039,747
Internal	I-I	8,214	4,893	-	4,456	3,966	-	-	722	
Interregional	X-I, I-X	1,826	3,777	-	1,276	2,142	-	-	1,054	
Through	X-X	231	457	-	254	668	-	-	838	
Percentage of Total Vehicle Miles Travelled		89.8%	100.0%	77.8%	86.5%	82.3%	73.6%	81.4%	91.5%	89.8%
Weekday Carbon Dioxide (tons = 2000lbs)		4,365	3,714	6,117	1,796	3,260	2,820	2,282	887	501,086
Internal	I-I	3,491	2,018	-	1,337	1,908	-	-	245	
Interregional	X-I, I-X	776	1,514	-	383	1,031	-	-	358	
Through	X-X	98	183	-	76	321	-	-	284	
DOF Estimated Population		497,647	327,514	489,116	361,278	260,179	274,576	309,327	-	49,583,248
MPO Estimated Population (if avail)		487,000	330,800	465,000	346,818	214,734	275,476	313,250	55,447	48,143,991
Difference		(2.1%)	1.0%	(4.9%)	(4.0%)	(17.5%)	0.3%	1.3%		(2.9%)
SB 375 Weekday Per Capita Carbon Dioxide (lbs)		17.9	22.5	26.3	10.4	30.4	20.5	14.6	32.0	20.8
Internal	I-I	14.3	12.2	-	7.7	17.8	-	-	8.8	
Interegional	X-I, I-X	3.2	9.2	-	2.2	9.6	-	-	12.9	
Through	X-X	0.4	1.1	-	0.4	3.0	-	-	10.2	

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[8] Statewide summations only include MPO's where Weekday CO_2 emission are available.

Source:
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Table 1 - Comparison of GHG Reductions for Large MPOs
(Average Weekday Pounds Per Capita CO2 Emissions from Passenger Vehicles)

				Change 2005 to 2020		Change 2005 to 2035		Change 2005 to 2020 Most Ambitious Scenario		Change 2005 to 2035 Most Ambitious Scenario	
Region	2005 Base Year	Current Plan (2020)	Current Plan (2035)	Numeric	Percent	Numeric	Percent	Most Ambitious (2020)	Percent	Most Ambitious (2035)	Percent
MTC	20.8	19.7	20.1	-1.1	-5%	-0.7	-3%	18.6	-11%	18.3	-12%
SCAG	21.2	20.1	20.4	-1.1	-5%	-0.8	-4%	19.0	-10%	18.6	-12%
SANDAG	26.0	23.2	23.4	-2.8	-11%	-2.6	-10%	21.4	-18%	21.8	-16%
SACOG	22.4	21.5	19.6	-0.9	-4%	-2.8	-13%	20.2	-10%	18.5	-17%

Notes:
"Most Ambitious Scenarios" by MPO are:
- MTC: Land Use + Pricing
- SCAG: Combinations of aggressive land use, TDM/TSM, Non-mortized transportation, transit, pricing/VMT fees, and network improvements.
- SANDAG: Scenario C - Pricing. Results for Current Plan 2020 were estimated rather than modeled. Note that results were updated following completion of the report contained in Appendix 2.
- SACOG: Scenario 6, which combines land use enhancements, expansion of transit service, more aggressive TSM/TDM programs, VMT fees, and congestion pricing.

Table 2 - Comparison of Expenditures for Large MPOs - Existing Fiscally Constrained RTPs (Expenditures as % of Total RTP Cost)

RTP Expenditures	MTC	SCAG	SANDAG	SACOG
Road Maintenance & Operations	30%	10%	20%	34%
Transit Maintenance & Operations	51%	31%	24%	28%
Road Expansion (HOV, HOT, ML)	2%	20%	16%	3%
Road Expansion (General Purpose)	1%	5%	23%	13%
Transit Expansion	14%	18%	14%	12%
Other	2%	16%	3%	10%

Notes:
SCAG Transit Maintenance & Operations percentage includes expenditures covered by farebox revenues. In the absence of such revenues, this figure would be 23%.

SANDAG Transit Maintenance and Operations percentage includes expenditures covered by farebox revenues. In the absence of such revenues, this figure would be 18%.

SACOG Road Expansion (General Purpose) percentage excludes in-kind developer-built roadways; SACOG excludes this to be consistent with other MPO reporting.

Table 3 - Comparison of Pricing Assumptions for Large MPOs

(expressed in Price Per Mile^ 2009$)

Region	2005 Base Year	2035 Adopted RTP (updated gas price)	Change from "2005 Base Year" to "2035 RTP (updated gas)"		2035 Most Ambitious (2005-2035)	Change from "2005 Base Year" to "2035 Most Ambitious"	
	Price	Price	Price	%	Price	Price	%
MTC							
Fuel	$0.141	$0.189	$0.048	34.3%	$0.189	$0.048	34.3%
Maintenance	$0.065	$0.107	$0.042	64.9%	$0.107	$0.042	64.6%
VMT Fee/Carbon Tax	$0.000	$0.000	$0.000	-	$0.069	$0.069	-
Congestion Pricing	$0.000	$0.000	$0.000	-	$0.425	$0.425	-
Parking Pricing**	$0.000	$0.000	$0.000	-	$0.364	$0.364	-
Other	$0.000	$0.000	$0.000	-	$0.000	$0.000	-
Total Cost/Mile	**$0.206**	**$0.297**	**$0.091**	**44.0%**	**$1.154**	**$0.948**	**460.3%**
SCAG							
Fuel	$0.141	$0.188	$0.048	33.8%	$0.188	$0.048	33.8%
Maintenance	$0.065	$0.107	$0.042	64.6%	$0.107	$0.042	64.6%
VMT Fee/Carbon Tax	$0.000	$0.000	$0.000	-	$0.027	$0.027	-
Congestion Pricing	$0.000	$0.000	$0.000	-	$0.000	$0.000	-
Parking Pricing	$0.000	$0.000	$0.000	-	$0.000	$0.000	-
Other	$0.000	$0.000	$0.000	-	$0.000	$0.000	-
Total Cost/Mile	**$0.206**	**$0.295**	**$0.090**	**43.6%**	**$0.322**	**$0.116**	**56.6%**
SANDAG							
Fuel	$0.174	$0.193	$0.019	11.1%	$0.193	$0.019	11.1%
Maintenance	$0.000	$0.058	$0.058	-	$0.058	$0.058	-
VMT Fee/Carbon Tax	$0.000	$0.000	$0.000	-	$0.080	$0.080	-
Congestion Pricing	$0.001	$0.002	$0.001	100.0%	$0.002	$0.001	100.0%
Parking Pricing*	$0.000	$0.000	$0.000	-	$0.077	$0.077	-
Other	$0.000	$0.000	$0.000	-	$0.000	$0.000	-
Total Cost/Mile	**$0.175**	**$0.253**	**$0.078**	**44.8%**	**$0.410**	**$0.235**	**134.6%**
SACOG							
Fuel	$0.130	$0.179	$0.049	37.7%	$0.179	$0.049	37.7%
Maintenance	$0.065	$0.107	$0.042	64.6%	$0.107	$0.042	64.6%
VMT Fee/Carbon Tax	$0.000	$0.000	$0.000	-	$0.030	$0.030	-
Congestion Pricing	$0.000	$0.000	$0.000	-	$0.063	$0.063	-
Parking Pricing	$0.000	$0.000	$0.000	-	$0.050	$0.050	-
Other	$0.000	$0.000	$0.000	-	$0.000	$0.000	-
Total Cost/Mile	**$0.195**	**$0.286**	**$0.091**	**46.7%**	**$0.429**	**$0.234**	**119.7%**

Notes:

^ Costs are based on a 22 mile round trip, except SACOG numbers, which are based on a 20 mile round trip.

* SANDAG parking pricing assumptions vary according to smart growth place type classifications.

** Does not account for existing parking charges in about 15 TAZs. We are still determing if there are enough trips that pay parking compared to a regional total to warrant consideration of a weighted parking cost average
The cost shown here represents an $1/hr surcharge for all trips assumed in our scenario analyses
converted to an average cost/mi based on an average RT length of 22 mi

Table 4. Land Use Scenario Comparison

Region	2005 Base Year Units (thousands)	2035 Current Plan Units-2035 (thousands)	Change 2005 to 2035 RTP: Numeric Change (thousands)	Change 2005 to 2035 RTP: Percent Change /5/	Change 2005 to 2035 Most Ambitious Scenario: Most Ambitious Scenario 2035 Horizon Year (thousands)	Change 2005 to 2035 Most Ambitious Scenario: Numeric Change (thousands)	Change 2005 to 2035 Most Ambitious Scenario: Percent Change /5/
MTC/ABAG							
Total Dwelling Units (thousands)	2,582	3,303	+721	+28%	3,340	+758	+29%
Attached DU's (thousands) /1/	945	1,276	+331	+35%	1,391	+446	+47%
Small Lot SF DU's (thousands) /2/	522	705	+183	+35%	768	+246	+47%
Attached Units Shares of Total Units	37%	39%	46%		42%	59%	
Small Lot SF Shares of Total Units	20%	21%	25%		23%	32%	
Compact Growth Shares of Total Units /3/	**57%**	**60%**	**71%**		**65%**	**91%**	
Dwellings in Transit Priority Areas (thousands) /4/	778	1,284	+506	+65%	1,657	+879	+113%
TPA Share of Total Units	**30%**	**39%**	**70%**		**50%**	**116%**	
Regional Jobs/Housing Ratio (Jobs/Dwellings)	**1.35**	**1.55**	**+0.19**	+14%	**1.53**	**+0.18**	+13%
SCAG							
Total Dwelling Units (thousands)	6,245	7,799	+1,554	+25%	7,799	+1,554	+25%
Attached DU's (thousands) /1/	2,561	3,291	+730	+29%	3,587	+1,026	+40%
Small Lot SF DU's (thousands) /2/	614	820	+206	+34%	905	+291	+47%
Attached Units Shares of Total Units	41%	42%	47%		46%	66%	
Small Lot SF Shares of Total Units	10%	11%	13%		12%	19%	
Compact Growth Shares of Total Units /3/	**51%**	**53%**	**60%**		**58%**	**85%**	
Dwellings in Transit Priority Areas (thousands) /4/	3,679	4,329	+650	+18%	4,525	+846	+23%
TPA Share of Total Units	**59%**	**56%**	**42%**		**58%**	**54%**	
Regional Jobs/Housing Ratio (Jobs/Dwellings) /6/	**1.32**	**1.32**	**+0.00**	+0%	**1.33**	**+0.01**	+0%
SANDAG							
Total Dwelling Units (thousands)	1,108	1,418	+310	+28%	1,418	+310	+28%
Attached DU's (thousands) /1/	388	624	+236	+61%	646	+258	+67%
Small Lot SF DU's (thousands) /2/	209	217	+8	+4%	217	+8	+4%
Attached Units Shares of Total Units	35%	44%	76%		46%	83%	
Small Lot SF Shares of Total Units	19%	15%	3%		15%	3%	
Compact Growth Shares of Total Units /3/	**54%**	**59%**	**79%**		**61%**	**86%**	
Dwellings in Transit Priority Areas (thousands) /4/	443	838	+395	+89%	861	+418	+94%
TPA Share of Total Units	**40%**	**59%**	**128%**		**61%**	**135%**	
Regional Jobs/Housing Ratio (Jobs/Dwellings)	**1.35**	**1.27**	**-0.08**	-6%	**1.27**	**-0.08**	-6%
SACOG							
Total Dwelling Units (thousands)	808	1,188	+380	+47%	1,188	+380	+47%
Attached DU's (thousands) /1/	245	374	+129	+53%	392	+147	+60%
Small Lot SF DU's (thousands) /2/	24	124	+100	+417%	137	+113	+470%
Attached Units Shares of Total Units	30%	31%	34%		33%	39%	
Small Lot SF Shares of Total Units	3%	10%	26%		12%	30%	
Compact Growth Shares of Total Units /3/	**33%**	**42%**	**60%**		**44%**	**68%**	
Dwellings in Transit Priority Areas (thousands) /4/	103	480	+377	+367%	555	+452	+440%
TPA Share of Total Units	**13%**	**40%**	**99%**		**47%**	**119%**	
Regional Jobs/Housing Ratio (Jobs/Dwellings)	**1.24**	**1.13**	**-0.11**	-9%	**1.13**	**-0.11**	-9%

Notes:

/1/ Includes all attached housing types: multi-family/apartments, condominiums, townhouses, etc.

/2/ Single family detached units on small lots (< 5,500 square fee)

/3/ Compact growth shares = sum of attached + small lot single family unit shares.

/4/ Transit priority areas are 1/2 mile from frequent (15-minute-or-less headway) peak transit service.

/5/ Omitted from these columns are "percent of percent" or "percent change in growth share" computations.

/6/ Based on other information, SCAG staff believes the 2035 jobs/housing ratio should be 1.29, not 1.32 or 1.33. SCAG staff will be working with local jurisdictions in the next RTP update to scale down total employment by about 250,000 jobs to result in a jobs/housing ratio of 1.29.

Table 5 - Transportation System Capacity Supply and Transportation Trips

	Mixed Flow Lane Miles					Mixed Flow Lane Miles per Capita		
	2005	2035 RTP	% Diff 2005	2035 Most Ambitious	% Diff RTP	2005	2035 RTP	2035 Most Ambitious
MTC/ABAG	13,946	14,535	4%	14,535	0%	1.97	1.60	1.60
SCAG	65,678	72,614	11%	72,757	0%	3.59	3.21	3.22
SANDAG	6,374	7,609	19%	7,818	3%	2.06	1.91	1.96
SACOG	7,285	9,531	31%	9,531	0%	3.41	3.09	3.09

	HOV/HOT Lane Miles					HOV/HOT Lane Miles per Capita		
	2005	2035 RTP	% Diff 2005	2035 Most Ambitious	% Diff RTP	2005	2035 RTP	2035 Most Ambitious
MTC/ABAG	380	790	108%	790	0%	0.05	0.09	0.09
SCAG	869	1,693	95%	1,702	1%	0.05	0.07	0.08
SANDAG	21	309	1371%	426	38%	0.01	0.08	0.11
SACOG	69	206	199%	206	0%	0.03	0.07	0.07

	Transit Seat Miles (weekday, in Thousands)					Transit Seat Miles per Capita		
	2005	2035 RTP	% Diff 2005	2035 Most Ambitious	% Diff RTP	2005	2035 RTP	2035 Most Ambitious
MTC/ABAG	38,041	46,763	23%	46,763	0%	5.36	5.15	5.15
SCAG	37,994	62,068	63%	89,728	45%	2.08	2.75	3.97
SANDAG	5,172	10,396	101%	10,396	0%	1.67	2.61	2.61
SACOG	2,640	7,109	169%	8,384	18%	1.23	2.31	2.72

	Transit Trips (daily, in Thousands)					Transit Trips per Capita		
	2005	2035 RTP	% Diff 2005	2035 Most Ambitious	% Diff RTP	2005	2035 RTP	2035 Most Ambitious
MTC/ABAG	1,106	2,007	81%	2,507	25%	0.16	0.22	0.28
SCAG	1,569	1,972	26%	2,259	15%	0.09	0.09	0.10
SANDAG	244	334	37%	745	123%	0.08	0.08	0.19
SACOG	101	269	166%	309	15%	0.05	0.09	0.10

	Auto Trips (daily, in Thousands)					Auto Trips per Capita		
	2005	2035 RTP	% Diff 2005	2035 Most Ambitious	% Diff RTP	2005	2035 RTP	2035 Most Ambitious
MTC/ABAG	17,611	23,267	32%	20,756	-11%	2.48	2.56	2.29
SCAG	51,166	67,156	31%	63,014	-6%	2.80	2.97	2.79
SANDAG	16,137	19,376	20%	18,374	-5%	5.32	4.81	4.56
SACOG	7,507	11,266	50%	11,185	-1%	3.51	3.66	3.63

Table 6 - TSM and TDM Strategies Used for Determining Regional Travel Impacts (Large MPOs)

Region & Categories	On-Model/ Off-Model	Adopted RTP Deployment (2030-35)	Proposed Deployment - Most Ambitous Scenario (2035)
MTC			
System Efficiency:			
Bottleneck relief/gap closure projects	On	x	x
Ramp Metering	On	x	x
Incident Management	On	x	x
Traveler Information/511	n/a		
Transportation Demand Management:			
Work-based Incentives: Telecommuting/flexible/alternative work schedules/transit passes	n/a		
Bus/Van/Carpool programs	n/a		
Safe routes to schools strategies	n/a		
Car-sharing Programs	n/a		
Total estimated % per capita reduction		**1% - 2%**	**1% - 2%**
SCAG			
System Efficiency:			
Bottleneck relief/gap closure projects	On	x	x
Ramp Metering	On	x	x
Incident Management	Off	x	x
Traveler Information/511	Off	x	x
Transportation Demand Management:			
Work-based Incentives: Telecommuting/flexible/alternative work schedules/transit passes	On	x	x
Bus/Van/Carpool programs	Off	x	x
Safe routes to schools strategies	Off	x	x
Car-sharing Programs	Off	x	x
Total Estimated % Per Capita Reduction		**NA**	**2%**
SANDAG			
System Efficiency:			
Bottleneck relief/gap closure projects	On	x	x
Ramp Metering	On	x	x
Incident Management			
Traveler Information/511			
Transportation Demand Management:			
Work-based Incentives: Telecommuting/flexible/alternative work schedules/transit passes	On	x	x
Bus/Van/Carpool programs	Off		x
Safe routes to schools strategies	Off		x
Car-sharing Programs			
Total Estimated % Per Capita Reduction		**NA**	**9 - 10%***
SACOG			
System Efficiency:			
Bottleneck relief/gap closure projects	On	x	x
Ramp Metering	On	x	x
Incident Management	Off	x	x
Traveler Information/511	Off	x	x
Transportation Demand Management:			
Work-based Incentives: Telecommuting/flexible/alternative work schedules/transit passes	Off	x	x
Bus/Van/Carpool programs	Off	x	x
Safe routes to schools strategies	n/a	x	x
Car-sharing Programs	Off	x	x
Total Estimated % Per Capita Reduction		**-0.5% for Off model only**	**-1.1% for Off model only**

* Results are for Scenario A (TDM/TSM alternative)

Chart 1: Comparison of GHG Reductions for Large MPOs

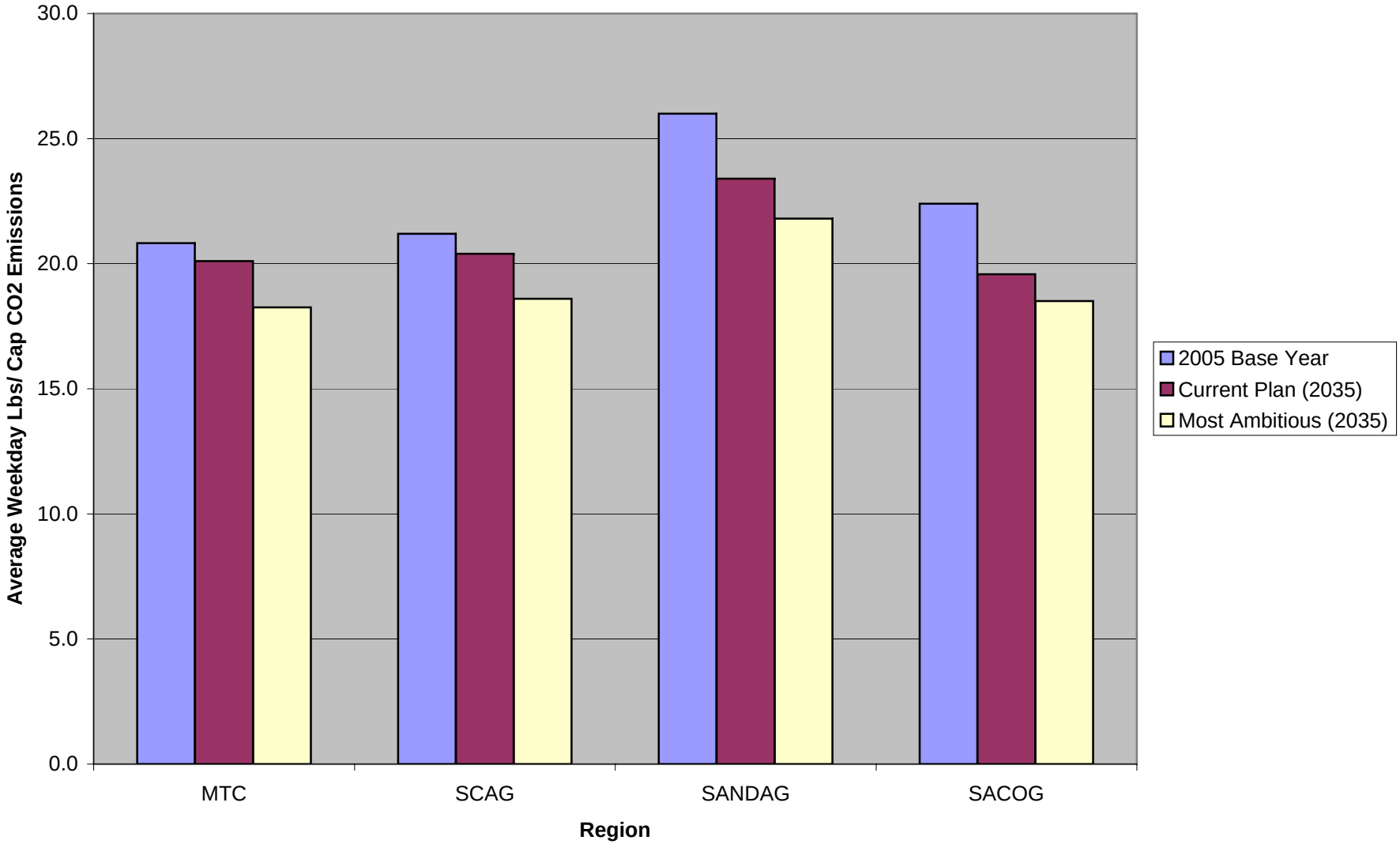


Chart 2: Comparison of RTP Expenditures
(Expenditures as % of total RTP cost)

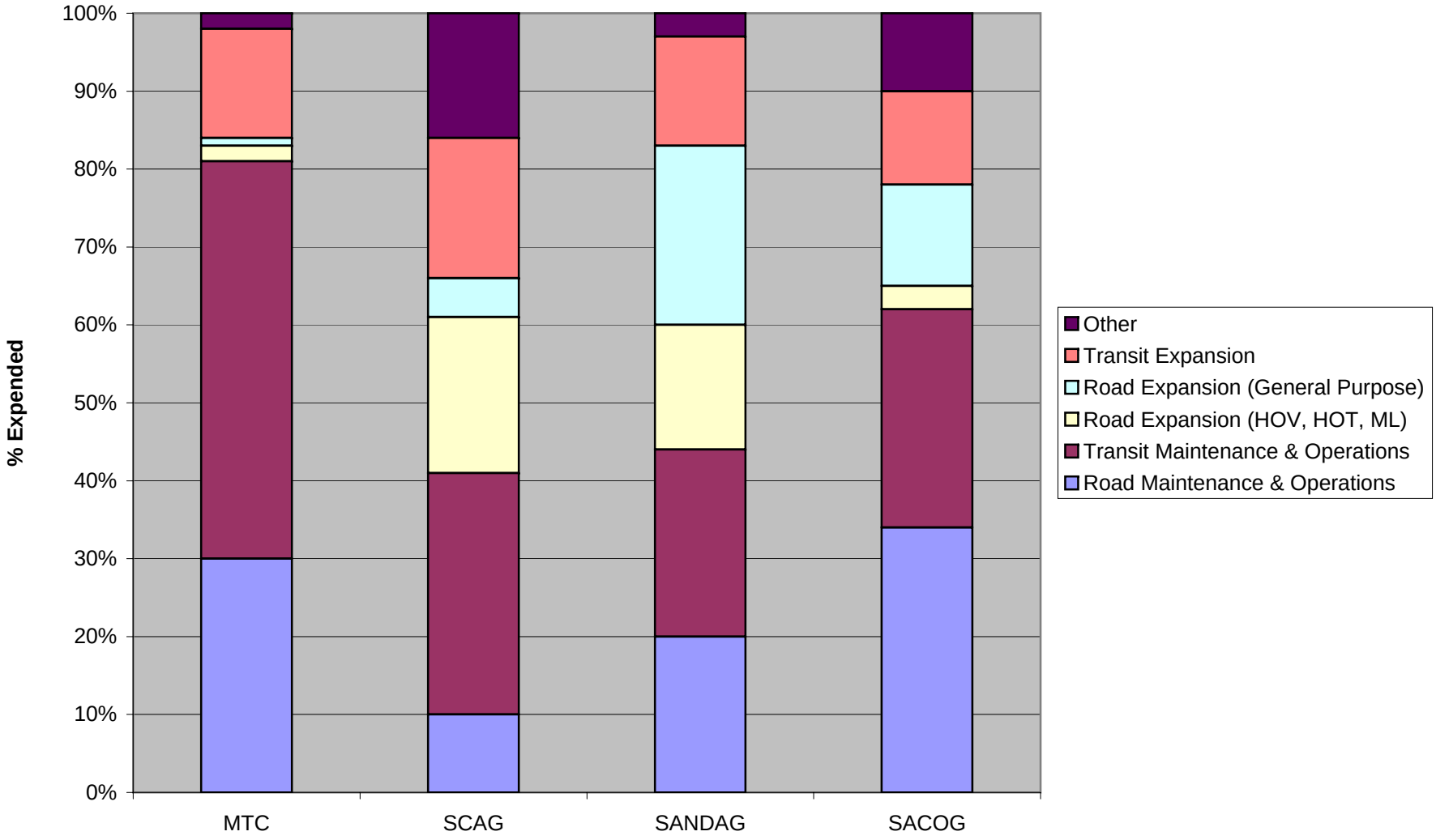


Chart 3: Comparison of Pricing Assumptions for Large MPOs

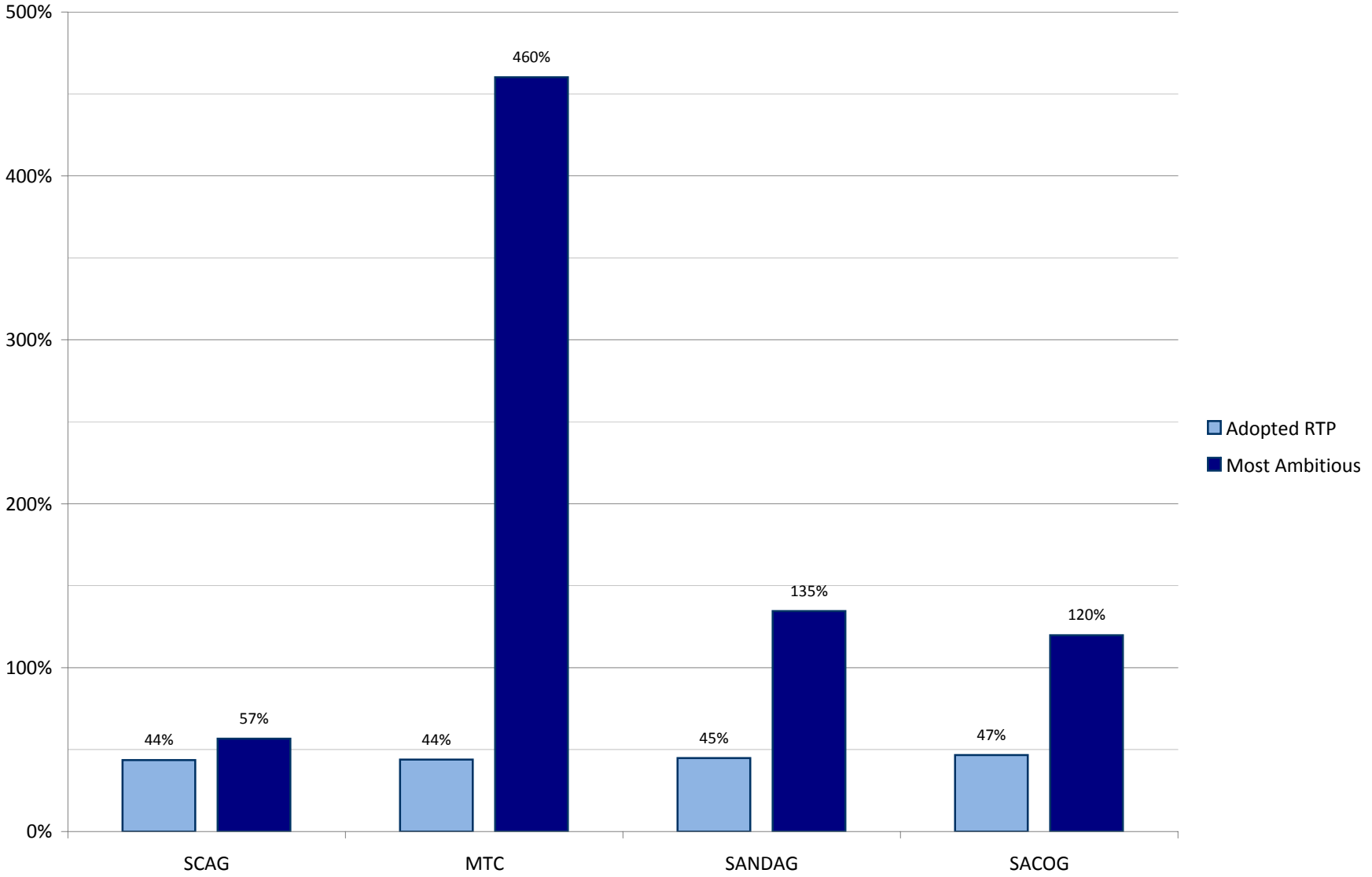


Chart 4: Comparison of Residential Product by MPO

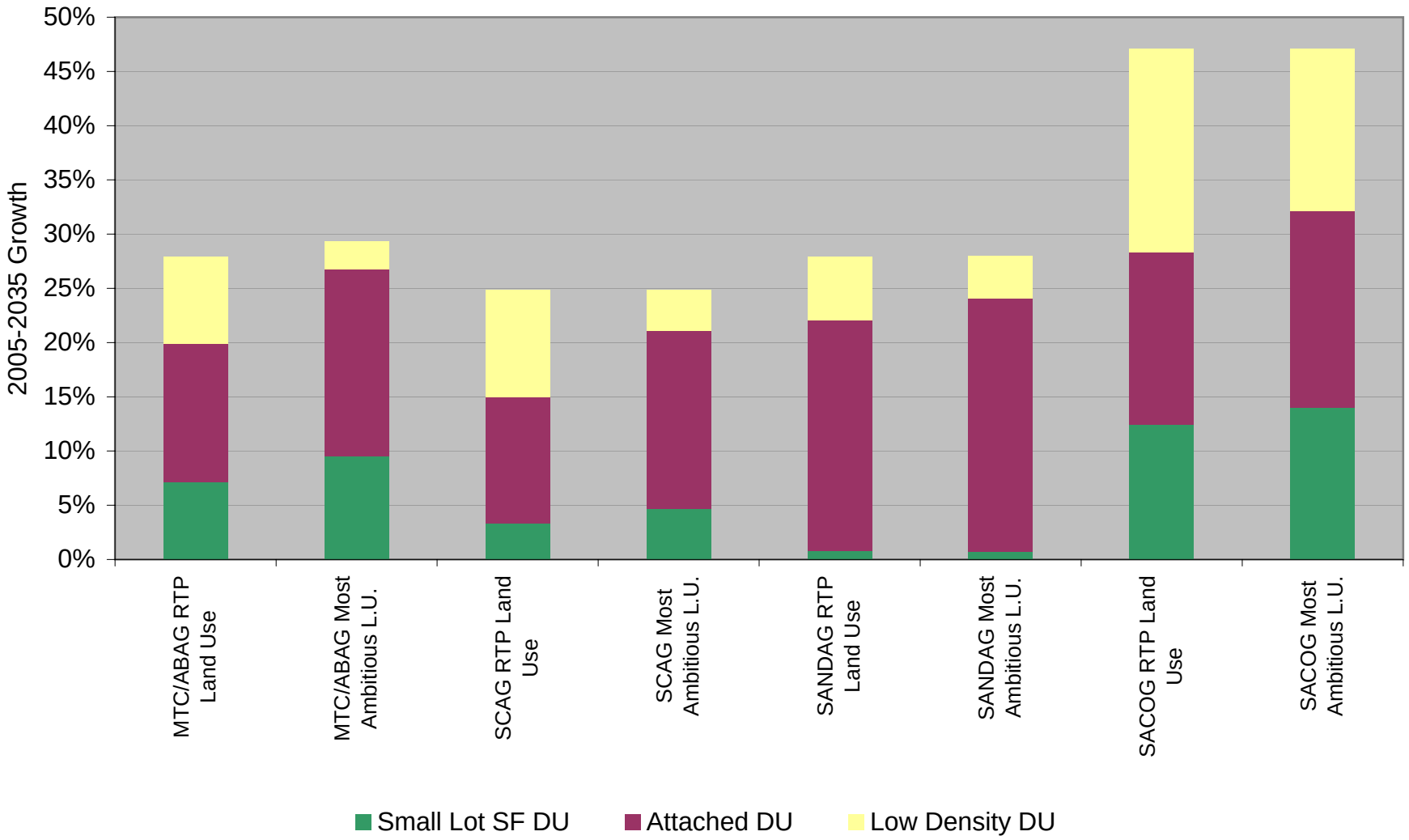


Chart 5A: Transportation Capacity Supply (Roads)

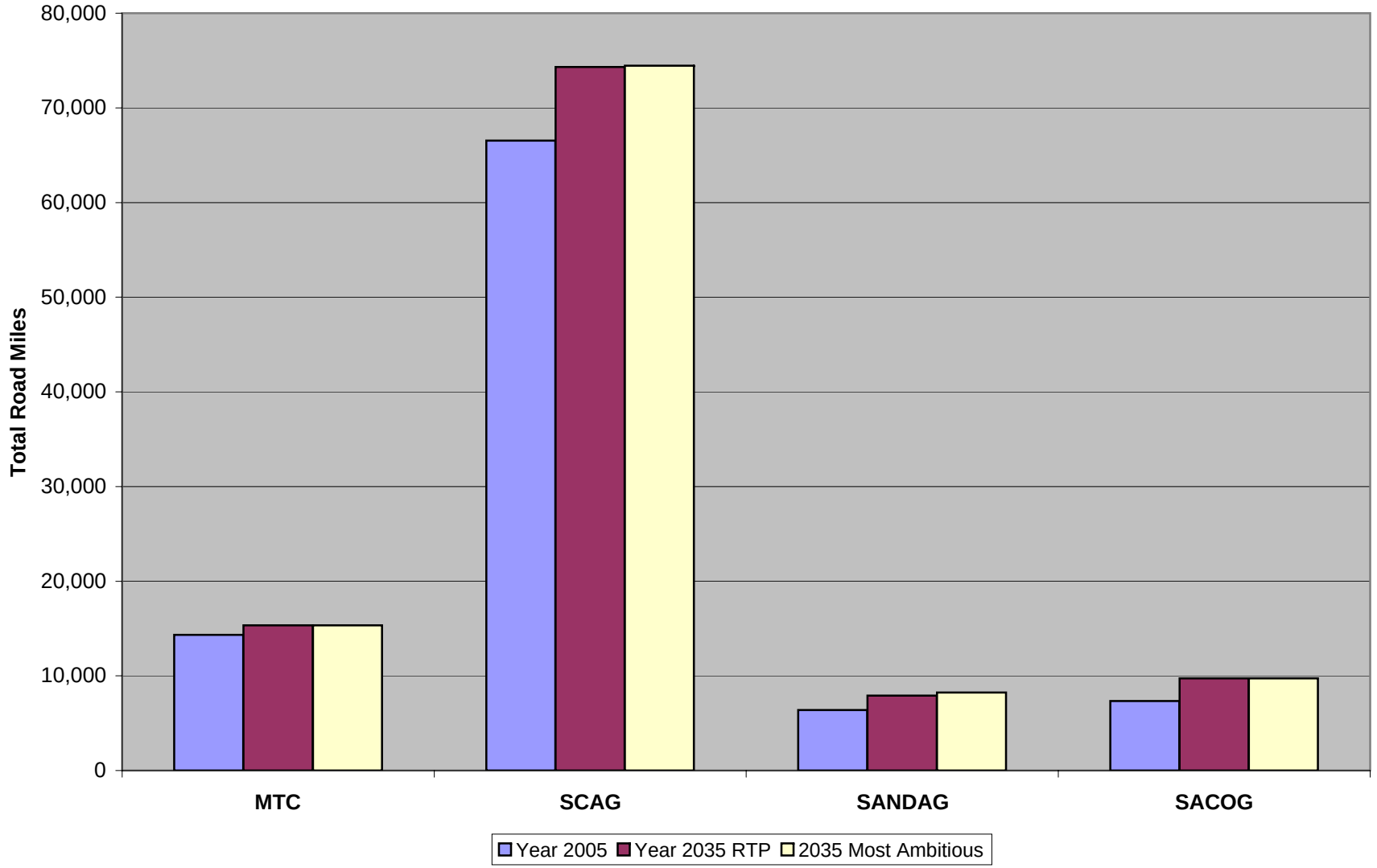


Chart 5B: Transportation Capacity Supply (Transit)

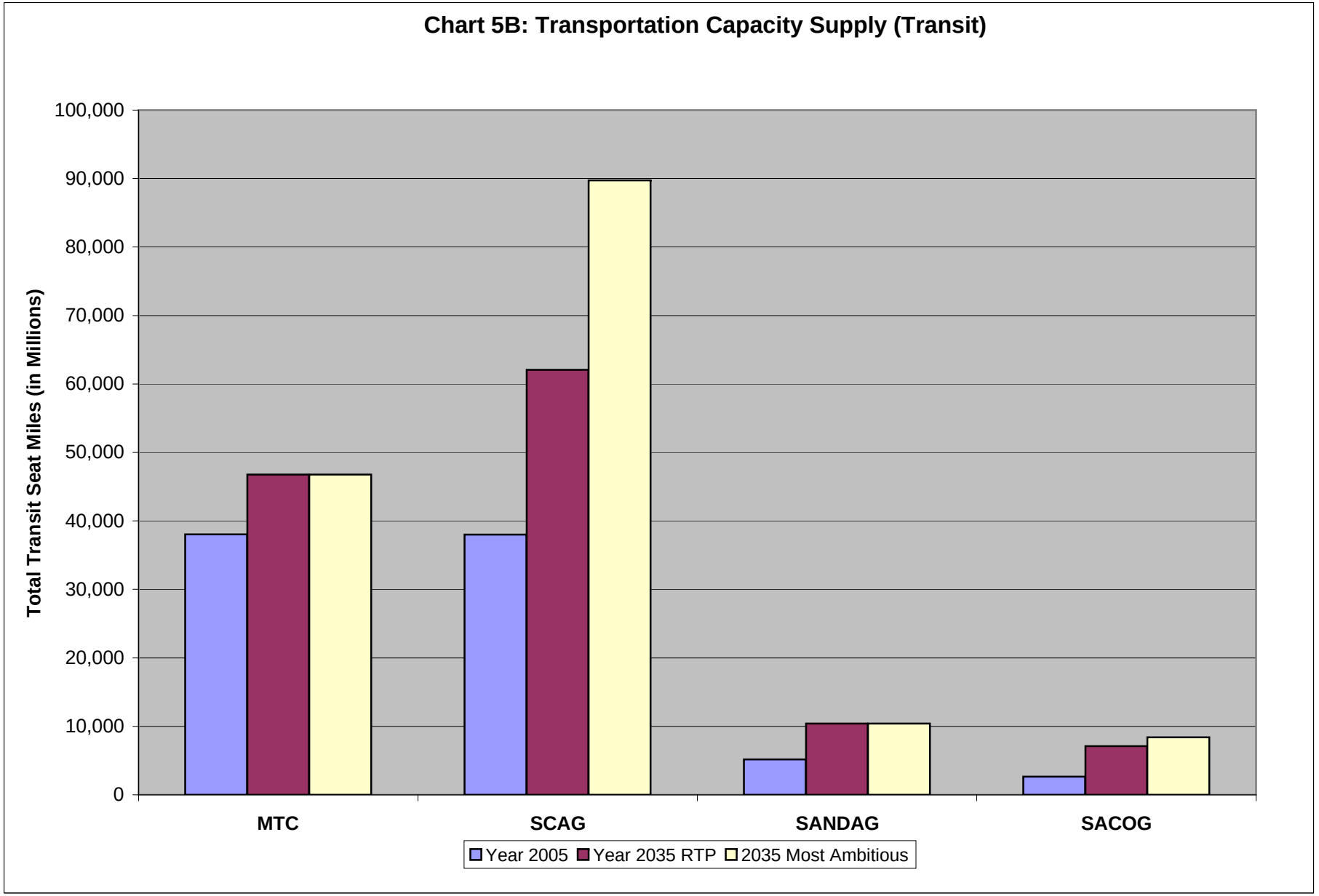


Chart 5C: Daily Transit Trips (in Thousands)

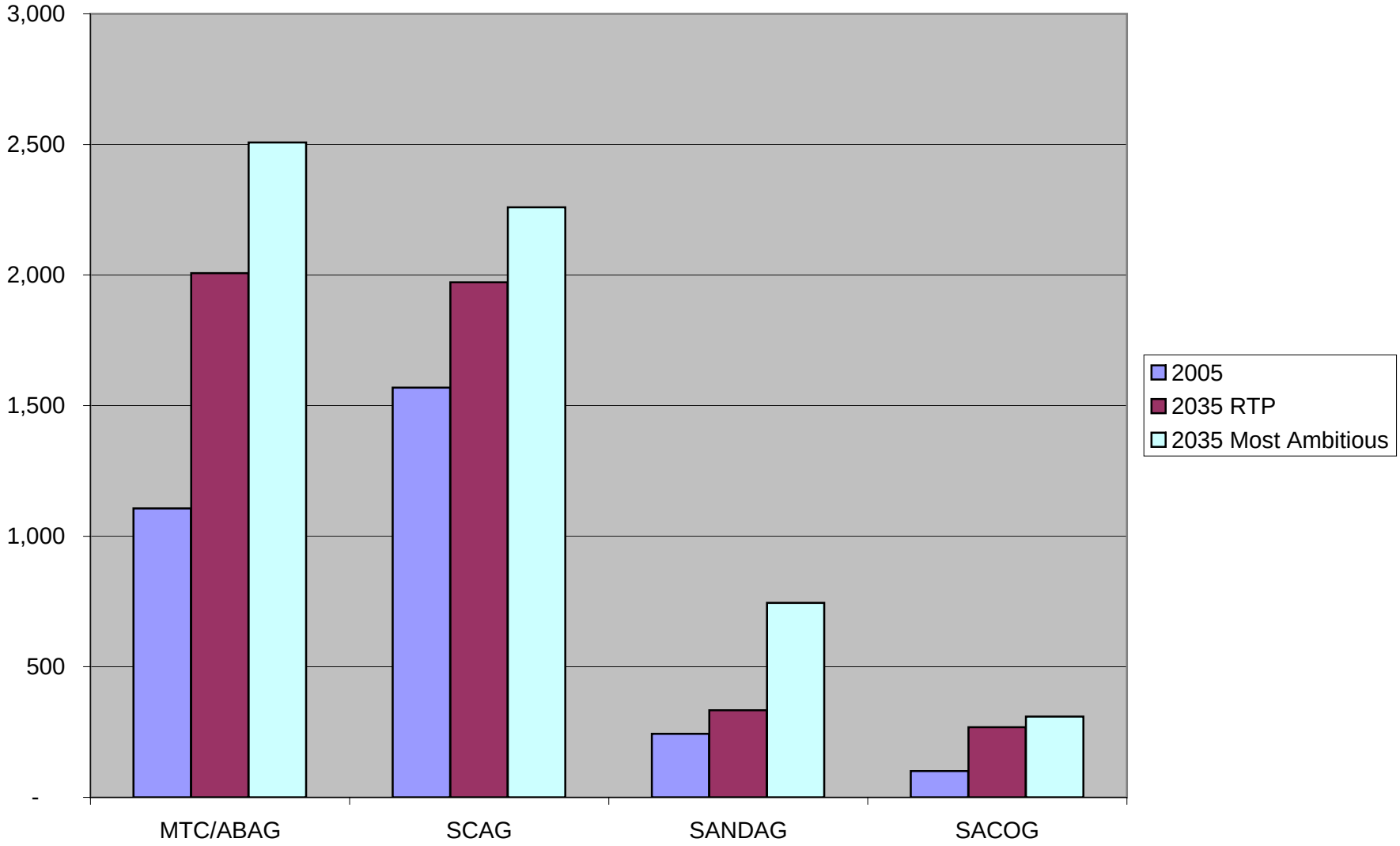


Chart 5D: Daily Transit Trips per Capita

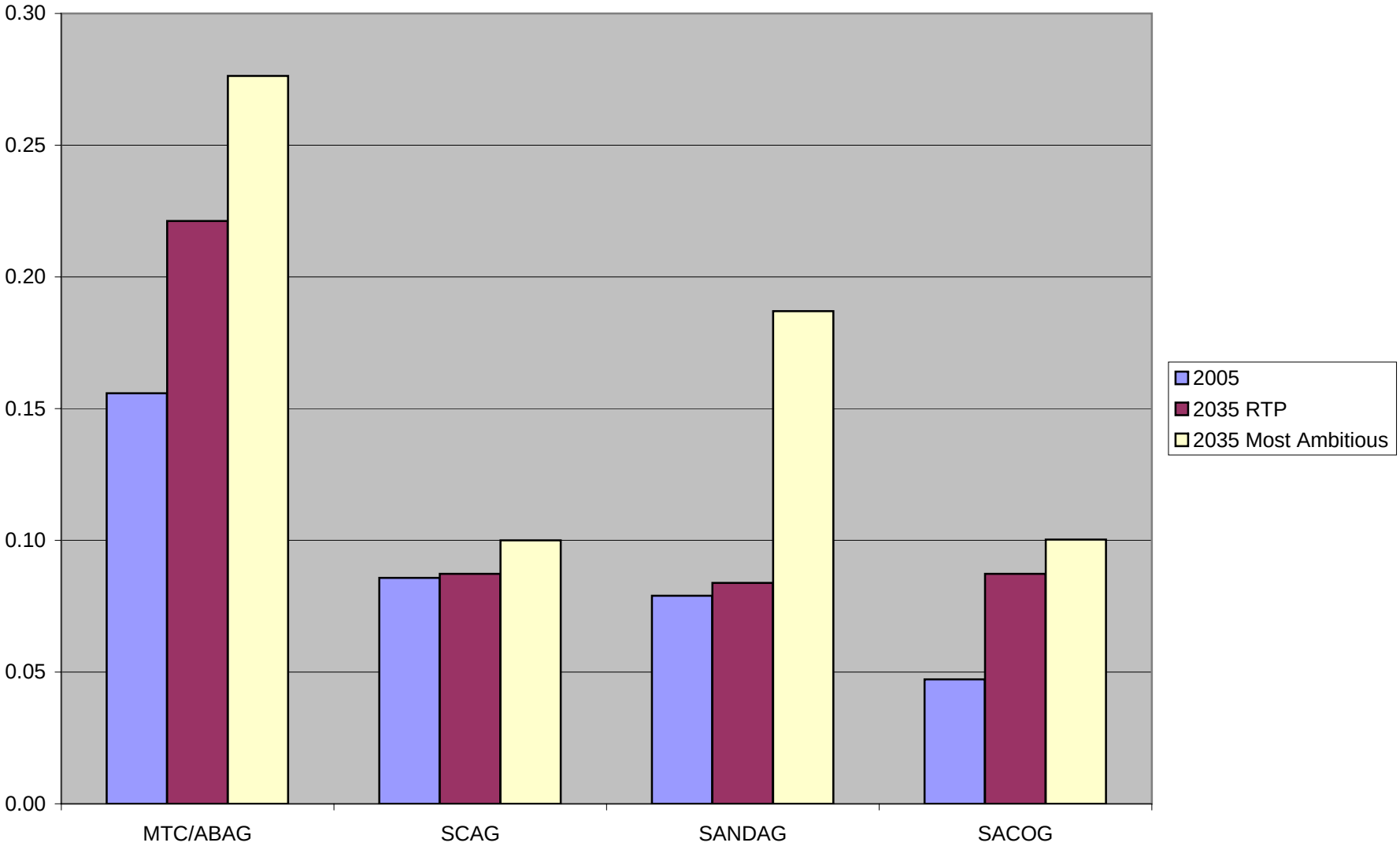


Chart 5E: Daily Auto Trips (in Thousands)

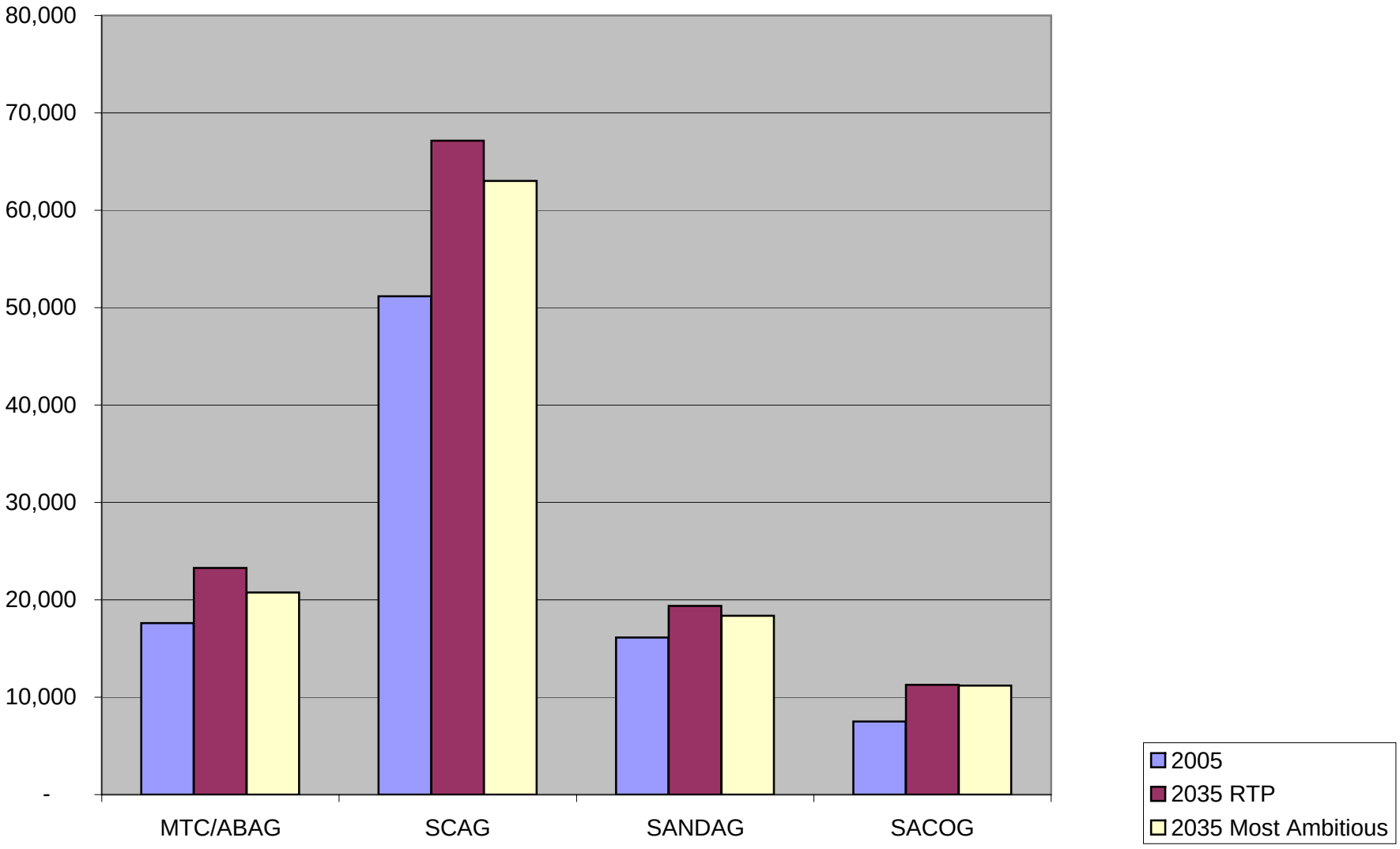
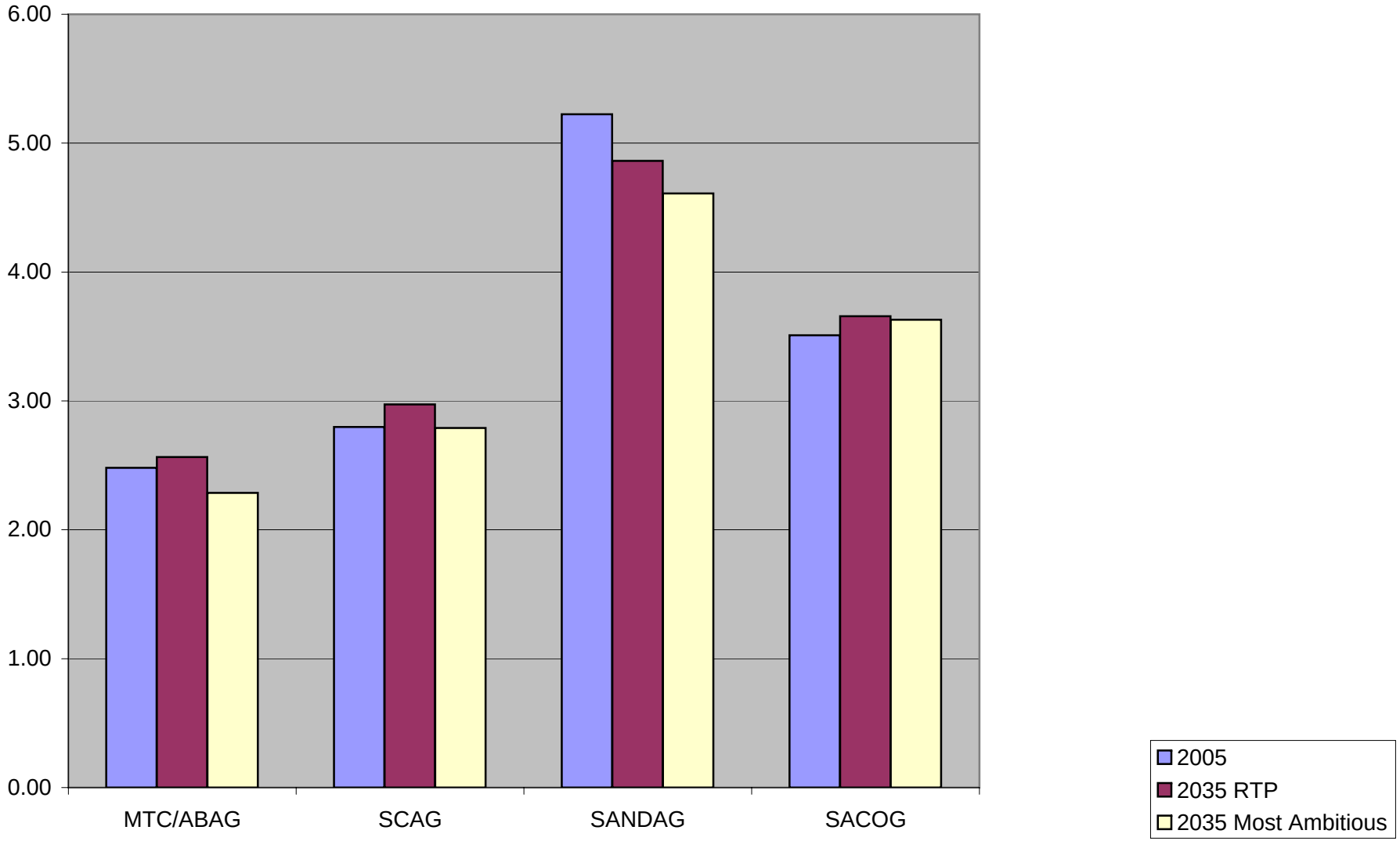


Chart 5F: Daily Auto Trips per Capita



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Memorandum

TO: Regional Targets Advisory Committee DATE: May 17, 2010

FR: Steve Heminger W. I.

RE: Senate Bill 375 Implementation: GHG Target-setting – Scenario Testing

INTRODUCTION

MTC's RTPs have been measuring GHG emissions since the early 1990s. MTC has traditionally evaluated several scenario assessments as part of its RTP process. The evaluations typically range from constrained project, land use and pricing assumptions admittedly to unachievable alternatives based on totally unconstrained assumptions. The purpose of these diverse scenarios has been to test a broad range of options and what their impacts are on various measures, including GHG emissions.

2009 RTP EVALUATION

Background

MTC adopted its 2009 RTP, known as Transportation 2035 (or T2035), in April 2009. T2035 did not deviate from past practice of looking at a very broad range of constrained/unconstrained transportation, land use and pricing scenarios.

The T2035 process took a two-step scenario evaluation approach. First, our "Vision Analyses" evaluated financially unconstrained investment packages – HOV/Express Bus, Freeway Operations, and Rail/Ferry. The second round, conducted as part of our RTP EIR process, looked at several financially constrained options. Our analyses consistently have found that infrastructure, by itself, does not do much for reducing GHG emissions. What makes more of a difference is when these infrastructure improvements are combined with options that increase the operating cost (price) of the private automobile and provide more dense and mixed use land use patterns in urban areas that are well served by transit and are conducive to walking and biking. This was true for both our Vision and RTP EIR analyses for T2035.

Our RTP EIR evaluation provided the basis for the range of scenarios that have been included in the MPO submittal to RTAC and CARB. Because we consistently found that infrastructure investment has little impact on emissions, the analyses focused mainly on pricing and land use options and combinations of the two. In addition, in the financially constrained environment of the RTP, our agency has consistently prioritized a "fix it first" policy, to the extent that nearly 80% of all RTP expenditures are dedicated to maintaining and operating our existing transportation system. Most of the remaining 20% of the expenditures are for transit expansion, with a smaller amount to road expansion. This heavy maintenance investment is attributed to the overall age of the Bay Area's transportation system that was mostly built 50 – 60 years ago. In addition, there is limited right of way available to expand transit or highway systems. As a result, our more recent focus has been to squeeze more

capacity out of the existing system through ramp metering, Bus Rapid Transit (BRT) and other operational improvements.

Alternatives Tested

Given that our T2035 plan invests more than 80% of revenues into maintaining and operating our existing transportation system, there was very little variation in the transportation networks among our scenarios; most of the variation was in land use and pricing assumptions. These scenarios are defined as follows:

Project: The proposed Transportation 2035 Plan is financially constrained, as defined in the past four plans, and consistent with federal planning regulations. A total of $226 billion in projected revenue is estimated to be available under the proposed Transportation 2035 Plan.

Key new projects include: build out of our HOV lane system and conversion to Express (HOT) lanes; completion of several transit expansion projects, including the BART/San Jose/Santa Clara extension, SF MTA's Central Subway to China town, the BART extension to Eastern Contra Costa County; new Marin/Sonoma County rail system; ferry system expansion; region wide ramp metering; and completion of our Regional Bicycle Network.

Heavy Maintenance/Climate Change Emphasis: This alternative maximizes the use of available discretionary funds for investments that (1) reduce shortfalls for transit and local roadway maintenance; (2) improve walkability, bicycling, transit access, and carpooling and ridesharing; (3) help local jurisdictions to plan and build housing near transit; and (4) implement public education and outreach programs to raise awareness and facilitate behavior changes that help the region to meet its climate protection goal. It excludes the Express Lane and transit expansion projects mentioned above in the Project alternative.

Add Land Use and Pricing Assumptions: This alternative applies one or both of the land use and pricing assumptions to the Heavy Maintenance and Project Alternatives. Our pricing and land use scenarios include very aggressive assumptions. We increase auto operating costs nearly five-fold – this is necessary to move the GHG emissions "needle" because the Bay Area is a relatively high-income region (that is less sensitive to price changes). Our land use assumptions include moving 200,000 people in 2035, over and above current projections, in 2035 to San Francisco to better match jobs with workers. Alternatively, we remove a like number of people in several suburban counties that have much higher jobs/housing imbalances.

Needless to say, these pricing and land use assumptions are not considered realistic. Given that MTC has limited control over pricing and even less control over local land use decisions, a more likely scenario would be to provide incentives to local agencies that do implement innovative pricing strategies or take on larger shares of housing and population.

Table 1. Alternative Assessment Results

The RTP EIR alternatives produced a range of GHG emission reductions from 2005 as follows:

	Project	Heavy Maint.	Project + Land use	Heavy Maint. + Land Use	Project + Pricing	Heavy Maint. + Pricing	Project + Land use + Pricing	Heavy Maint. + Land use + Pricing
2020	-5%	-3%	-7%	-5%	-7%	-5%	-10%	-7%
2035	-3%	-1%	-10%	-8%	-10%	-8%	-12	-9%

As shown Table 1, there are several observations regarding GHG emissions compared to the 2005 base year:

1. The Project performs better than the Heavy Maintenance alternative. This makes sense since most of the T2035 system expansion investments are for transit improvements. The highway expansion element, which is only 4% of total RTP funding, is for expanding HOV/Express lanes, which have been shown to encourage more carpooling and improve transit performance.
2. Our pricing and land use options perform about the same. Combined land use and pricing scenarios perform better than one or the other; while the two scenarios are synergistic, they are not additive.
3. Project assessments that we have tested in 2035 range from -3% weekday pounds per capita GHG emission reductions (2035 RTP) to -12% per capita reductions.

SUMMARY

Given that our RTP financially constrained expenditures for maintenance and operations will likely continue in the 80% range, the region will likely not be able to depend on massive infrastructure improvements to support GHG emission reductions. We can expect some modest reductions as a result of strategic expansion through priced Express Lanes and select transit corridors, and operational improvements that squeeze more capacity out of our existing transportation system.

Most of the GHG reductions that can be realized will result from how successful the region can be in moving toward more dense/mixed use and transit oriented development, and implementing more creative ways to price the transportation system to adequately reflect the true costs of a limited resource. To these ends, we have provided incentives to local agencies over the past several years to implement these strategies through our Transportation for Livable Communities (TLC). The TLC program offers planning assistance and capital grants for TOD totaling about $30 million per year program. Our Blueprint program (known as Focus), identified about 120 Priority Development Areas, or PDAs, in cooperation with local agencies, where we will focus all of our TLC funds. We will also implement regional programs, including our Regional Bike Network (about $20 million/yr) and Climate Change Initiative Program (about $40 million/yr).

However, it's difficult to measure the impacts of these programs. Given what we know today and based on our adopted Plan, we can achieve a 5% GHG reduction per capita in 2020 and 5% in 2035. While SB 375 does allow each MPO to submit a target for CARB to consider, for now we will continue to work closely with the other MPOs and provide CARB with as consistent and complete data

as we can to inform the target-setting process and allow CARB to set a target that is both ambitious and achievable.

** REVISED **

SANDAG

BOARD OF DIRECTORS
MAY 14, 2010

AGENDA ITEM NO. 10-05-3
ACTION REQUESTED - DISCUSSION

SENATE BILL 375 IMPLEMENTATION: GREENHOUSE GAS TARGET-SETTING - SCENARIO TESTING

File Number 3000500

Introduction

SANDAG is in the process of developing its first Regional Transportation Plan (RTP) subject to the provisions of Senate Bill 375 (SB 375) (Steinberg, 2008). The 2050 RTP is scheduled for Board adoption in summer 2011. At the March Board of Directors Policy meeting, SANDAG staff provided an overview of the SB 375 implementation efforts currently underway. Staff outlined the status of the greenhouse gas (GHG) target-setting process as outlined by the California Air Resources Board (CARB) through the Regional Targets Advisory Committee (RTAC), and the approach to testing various planning scenarios to determine the effects of GHG reduction strategies on emissions.

Discussion

Baseline RTP Analysis

SANDAG staff, in coordination with the other metropolitan planning organizations (MPOs) in the state and the staff from CARB, has prepared an analysis of adopted RTPs to determine the base year (2005) per capita GHG emissions from the transportation sector (cars and light-duty trucks), as well as projected GHG per capita emissions in the years 2020 and 2035 – the target years outlined in SB 375. For SANDAG, the 2030 RTP, adopted in November 2007, is being used to evaluate this "base case" scenario. In addition, staffs at SANDAG and the other MPOs have developed alternative scenarios for evaluation that would include new and expanded strategies that could lead to reduced per capita GHG emissions as compared to the base case. It is anticipated that the results from any analysis performed will be provided to CARB staff for its consideration in recommending GHG emission targets for the transportation sector later this year. The SANDAG base case scenario (2005 per capita GHG emissions), as expressed from data in the 2030 RTP,[1] and estimates for the target years 2020 and 2035 are outlined in Table 1.

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[1] While the information in Table 1 is based on Revenue Constrained transportation network from the 2030 RTP, it has been processed through the SANDAG four-step transportation model, which includes enhancements that were not available at the time the 2030 RTP was adopted. In addition, assumptions for the price of fuel and the trips that originate outside of the region and pass through the region to a destination outside of the region were not included in the numbers. Finally, the data relies on the recently completed 2050 Regional Growth Forecast.

Table 1 – SANDAG Greenhouse Gas Emissions
(Average Weekday Pounds Per Capita CO_2 Emissions from Passenger Vehicles and Light-Duty Trucks)

	Current Plan		Percentage Change	
2005 Base Year	2020	2035	From 2005 to 2020	From 2005 to 2035
26.0	23.7	24.6	-8.8%	-5.4%

The per capita emissions in 2020 are lower than the 2005 base case due to balanced transportation capital investments and balanced growth in jobs and housing throughout the region. However, per capita emissions increase from 2020 to 2035 due in part to a disparity in employment growth and housing growth that begins to emerge after 2020 as employment clusters in the South Bay and North County Inland areas grow more rapidly than housing. In addition, there is more funding available for capital improvements through 2020 than is available between 2020 and 2035.

SB 375 Scenario Testing Status

In March, SANDAG staff outlined three scenarios that the four largest MPOs (Southern California Association of Governments, Association of Bay Area Governments/Metropolitan Transportation Commission, SANDAG, and the Sacramento Area Council of Governments) agreed to test against their adopted RTPs. SANDAG also evaluated these three scenarios against two land use assumptions to evaluate the effects development patterns could have on GHG reduction. The first land use scenario that was evaluated includes the 2050 Regional Growth Forecast land uses recently accepted by the Board of Directors. The second land use scenario involved the intensified density assumptions for the 'Urban Center' and 'Town Center' place types identified on the SANDAG Smart Growth Concept Map. In addition, SANDAG assumed the areas listed as 'potential' smart growth areas are built out at the minimum density for that place type. The three scenarios are briefly described below. Attachment 1 provides details on the elements that were modeled for each scenario.

System Efficiency and Transportation Demand Management

This scenario would focus on reducing GHG emissions through the implementation of Transportation Demand Management (TDM) and System Efficiency measures. Such measures include congestion relief at identified traffic bottlenecks, telecommuting, expanding ridesharing options, including enhancements to the vanpool program, the bus pool program with the military, and implementing Safe Routes to Schools strategies.

Systems Development

This alternative would focus on expansion of the regional transit system improvements and bicycle/pedestrian systems development to reduce vehicle trips in the San Diego region.

Pricing

This scenario would focus primarily on pricing as a strategy to reduce the demand on the transportation system. This scenario would evaluate the effect of adding additional high-occupancy toll (HOT) lanes to the regional transportation system, and operating this network in a manner that would optimize demand for transit and ridesharing in these corridors. In addition, this scenario

would evaluate the effectiveness of implementing a vehicle miles traveled (VMT) fee, which would increase the cost of driving. Finally, this scenario would include a parking pricing measure that would expand the requirement for private vehicles to pay for parking in certain locations. This scenario is similar in scope to one that was evaluated last year by the Metropolitan Transportation Commission for the San Francisco Bay Area, in conjunction with the update of its most recent RTP.

The three scenarios were developed to assess the effects of various bundles of measures and their ability to reduce GHG emissions. These scenarios were not developed with the same revenue constraints that are used to develop the RTP, only to assess how emissions could be reduced by assembling different GHG reduction measures. The revenue projections that will be used to determine investment levels that can be made in the RTP development are currently being prepared. Once the revenue projections are completed, SANDAG staff will use those projections to further refine these scenarios and to compile a hybrid scenario, based on input provided by the Board of Directors and the measures that perform the best in the scenario testing process. These scenarios, the funding assumptions to develop them, and their results will be submitted to CARB for their use in the target-setting process. After a draft target is issued to SANDAG on June 30, staff will continue to work with CARB and submit feedback on SANDAG's ability to meet the proposed target. Table 2 includes the results of the scenario testing process.

Table 2 – SANDAG Greenhouse Gas Emissions Scenario Testing
(Average Weekday Pounds Per Capita CO_2 Emissions from Passenger Vehicles and Light-Duty Trucks and Percentage Change from 2005 Baseline)

2005 Baseline = 26.0 CO_2 lbs / person		**Series 11 Revenue Constrained**	**Operations: System Efficiency & TDM (Scenario A)**	**Development: System Development (Scenario B)**	**Pricing (Scenario C)**
2050 Regional Growth Forecast	2020	23.7 -8.8%	22.9 -11.9 %	23.4 -10.0%	22.0 -15.4%
	2035	24.6 -5.4%	23.6 -9.2%	24.1 -7.3%	23.1 -11.2%
2050 Regional Growth Forecast + All Urban & Town Center Existing to Max Density Potential to Min Density	2020	23.6 -9.2%	22.7 -12.7%	23.2 -10.8%	21.8 -16.2%
	2035	24.4 -6.2%	23.3 -10.4%	23.8 -8.5%	22.8 -12.3%

Due to existing modeling capabilities, budgetary constraints, and the fact that SANDAG will be migrating to a new transportation model that will be available for development of the next RTP (to be adopted in 2015), some GHG reduction measures cannot be modeled in the same way as the ones that are included in the scenarios outlined above. SANDAG is continuing to support implementation of additional measures despite the fact that they cannot be included in the GHG target-setting process. These additional measures are programs that are currently being implemented in the region for GHG reduction and other desirable outcomes. These measures include:

- Electric vehicle deployment
- Eco-driving[2]

Performance Measures

While the scenario testing process is being refined to determine the effects of the various scenarios on GHG reduction, further analysis would be required if any of these measures were to be adopted as part of the 2050 RTP. In addition, staff will be presenting the Board of Directors with an initial set of performance measures to provide context beyond GHG emission reduction. In addition to GHG emission numbers, staff will provide the Board of Directors with additional performance measures consistent with the adopted RTP policy goals and objectives.

- Mobility
- Reliability
- System Preservation & Safety
- Social Equity
- Healthy Environment
- Prosperous Economy

The Board of Directors will be presented with options for achieving the GHG reduction targets as the development of the RTP proceeds. The development of the 2050 RTP will include considerations for meeting all the goals established by the Board of Directors.

Next Steps

Over the next several weeks, SANDAG staff will continue to participate in the SB 375 GHG target-setting process with CARB, Caltrans, and other MPOs in the state and will regularly report on progress to the Board of Directors and appropriate Policy Advisory Committees. SANDAG recently completed a set of five workshops to solicit input on the development of the RTP and to inform the public about the progress of the GHG target-setting process. In addition, staff solicited comments on the preparation of the environmental impact report for the 2050 RTP.

Staff will continue to seek direction from the SANDAG Board of Directors and Policy Advisory Committees and input from the public on this process throughout the development of the 2050 RTP and its SCS through regular meetings and public outreach activities. While the SB 375 target-setting process does allow MPOs to submit a target for CARB to consider, it is proposed to submit the results of the scenario development process to CARB and work with their staff after the draft target is set to ensure the target is both "ambitious and achievable," in accordance with the RTAC recommendations.

[2] Eco-driving includes driver education and driving techniques that can reduce fuel consumption, accident rates, and GHG emissions.

Schedule for SB 375 Target-Setting Activities

Activity	Agency	Date
Submit final target-setting analysis to CARB staff	SANDAG	Early June
Recommend draft targets to CARB Board	CARB staff	June 30, 2010
Provide comments on draft targets	MPOs	July-September 2010
Approve final targets	CARB	September 30, 2010

Gary L. Gallegos

GARY L. GALLEGOS
Executive Director

~~***Attachments were not ready at the time of mailout and will be sent out under separate cover when completed.***~~

Attachment: 1. SB 375 Target Setting: Description of Alternative Scenarios

Key Staff Contact: Rob Rundle, (619) 699-6949, rru@sandag.org

	Scenario Categories & Measures	Existing RTP Level of Deployment	On Model/ Off Model	2020 Level of Deployment	2035 Level of Deployment
System Efficiency & TDM					
1	Bottleneck relief projects	Revenue Constrained highway network	On	2020 Revenue Constrained highway network updated to include 17 additional projects: I-805 NB Plaza Bl Aux Lane I-8 WB Fletcher Pkwy Aux Lane I-15 SB Centre City Pkwy Aux Lane I-15 SB Valley Pkwy Aux Lane I-8 WB Texas St/Mission Ctr Capacity Improvements I-805 NB University Ave Aux Lane SR-52 (AM/PM) Mast Blvd Interchange Improvements SR-94 WB 49th St. Aux Lane I-5 NB B St. Aux Lane SR-78 EB/WB (AM/PM) Barham Dr. Aux Lane I-805 SB Governor Dr. Aux Lane I-805 NB La Jolla Village Dr Aux Lane I-5 SB 29th St. Aux Lane I-5 NB Manchester Ave Aux Lane I-5 SB 5th Ave Aux Lane	2030 Revenue Constrained highway network (with 17 additional projects noted in the 2020 Level of Deployment)
2	Telecommuting/flexible/alternative work schedules	5% daily white-collar worker trip reduction	On	30% of daily white-collar work trip reduction	Same as 2020 deployment level
3	Vanpool programs	Projected 20% vanpool increase by 2010 already achieved	Off	75% increase in number of vanpools by 2020 (1,124 vans up from 662)	175% increase in number of vanpools by 2035 (1,814 vans up from 662)
4	Safe routes to schools strategies	Not included in RTP assumptions	Off	10% increase in walk/bike school trips (159,775 trips up from 145,250) by 2020	20% increase in walk/bike school trips (179,542 trips up from 149,618) by 2035
5	Carpool programs	Not included in RTP assumptions	Off	70% increase in number of carpoolers (214,724 carpoolers up from 126,587 carpoolers) from 2010 to 2020	144% increase in number of carpoolers (309,342 carpoolers up from 126,587 carpoolers) from 2010 to 2035
6	Buspool programs	Not included in RTP assumptions	Off	Buspool participation of 1% military personnel (1,482 buspoolers) by 2020	Buspool participation of 40% military personnel (41,708 buspoolers) by 2035

SB 375 Target Setting: Description of Alternative Scenarios

	Scenario Categories & Measures	Existing RTP Level of Deployment	On Model/ Off Model	2020 Level of Deployment	2035 Level of Deployment
Systems Development					
1	Transit system improvements	Revenue Constrained transit network	On	2020 Reasonably Expected transit network	2030 Reasonably Expected transit network plus 13 routes added from the Revenue Unconstrained network including: 150: UTC to Downtown 13: Nat'l City to Allied Gardens 929: San Ysidro to 8th St. Trolley 27: Pac Bch to Kearny Mesa 660: El Cajon to Kearny Mesa 31: Mira Mesa to UTC 709: H St. Trolley to Otay Mesa 50: Bay Park to Kearny Mesa 35: Old Town to OB 303: Oceanside to Vista 633: Old Town to SD Airport 662: Centre City Shuttle 520: Orange Line Trolley – Unconstrained Headways
2	Transit station park-and-ride facilities	Revenue Constrained park-and-ride network	On	Model was allowed to unconstrain number of park-and-ride spaces at suburban lots and transit stations (3,500 additional spaces utilized above 16,800 in the 2020 Revenue Constrained network)	Model was allowed to unconstrain number of park-and-ride spaces at suburban lots and transit stations (6,900 additional spaces utilized above 17,500 in the 2030 Revenue Constrained network)
3	Bicycle network facilities	Not included in RTP assumptions	Off	Test full deployment of regional bicycle network (2035 network reduced by 50% to estimate 2020 time period) (280,031 bike trips)	Test full deployment of regional bicycle network (560,062 bike trips)
4	Pedestrian network facilities	Not included in RTP assumptions	Off	10% increase in all walk trips by 2020 (494,203 walk trips up from 449,275)	20% increase in all walk trips by 2035 (559,018 walk trips up from 465,848)
Pricing					
1	HOV & HOT lanes	2030 Revenue Constrained highway network: Managed Lanes (ML) on I-15, I 5, SR 52 and portions of I-805 HOV Lanes on I-5, SR 52, SR 94 and portions of I-805	On	2020 Reasonably Expected highway network including the following enhancements over the Revenue Constrained plan: SR 94 from I-805 to SR 125: +2HOV	2030 Reasonably Expected highway network including the following enhancements over the Revenue Constrained plan: I-5 from SR 905 to SR 54: +2HOV I-5 from SR 54 to I-8: +2HOV SR 78 from I-15 to I-15: +2HOV SR 94/SR 125 from I-805 to I-8: +2HOV I-805 from SR 905 to I-5: +4ML
2	VMT fee*	Not included in RTP assumptions	On	Increase by 8 cents per mile (2005 base year fuel assumption is 17.4 cents per mile).	Same as 2020 deployment level
3	Regional parking pricing program	RTP model 5 zone parking: Zone 5 - Metropolitan Center: $8 per day Zone 4 - Urban Center: $6 per day Zone 3 - Town Center: $4 per day Zone 2 - Community Center: $1 per day Zone 1 - Other: $0 per day	On	Adjust 5 zone system pricing as follows: Zone 5 - Metropolitan Center: $24 per day Zone 4 - Urban Center: $18 per day Zone 3 - Town Center: $12 per day Zone 2 - Community Center: $1 per day Zone 1 - Other: $0 per day	Same as 2020 deployment level

* Since the model does not tie the pricing adjustment to the policy, the VMT fee could also be stated as an increased fuel/carbon tax or for pay-as-you-drive insurance.

SCAG
SCENARIO EXCERCISE

A. SUMMARY OF SCENARIO EXERCISE

SCAG developed five scenarios to test a spectrum of potential GHG reduction strategies for the eventual SCS/RTP. The scenarios create a set of bookends from the most achievable to the most aggressive. Each scenario is comprised of seven distinct components that were varied in order to determine a reasonable range of GHG reduction potential.

Scenarios developed at this time, and for target setting purposes, should be considered sketches, in that they are not based on the full detail, program identification, commitments, or fully defensible assumptions that would normally be associated with a plan. That said the scenarios are useful in demonstrating the likelihood of achieving any given level of results based on the policy options that are available to the SCAG region through the development of an RTP/SCS. The scenario(s) identified as "ambitious/achievable" are based on the most credible and supportable potential strategies for the region.

The components (described in detail in sections B. and C. below) included in each scenario are:

- Six Transportation Components (bundled into four packages, described in detail under section B. below):
  - Highways and Arterials
  - Transit
  - Travel Demand Management (TDM)
  - Non-Motorized Transportation System
  - Transportation System Management (TSM)
  - Pricing
- Land Use and Growth (described in detail under Section C. below)

In addition, each scenario includes a set of assumptions for such factors as fuel price and fuel efficiency. As part of the statewide MPO consultation process, these assumptions were normalized across the exercises prepared by each region.

The component by component description of each scenario can be found on the attached table. A generalized description is as follows:

- Scenario 1 (Achievable) – Based on projected RTP trend land use and growth, no improvements in transportation infrastructure, consideration of State decrease in transit funding, and no additional policies beyond current RTP commitments (Transportation Package A).
- Scenario 2 (Ambitious/Achievable)– Based on "Blueprint 1" land use, reflecting locally supported Blueprint Planning land use policy incorporating concepts developed through the region's Compass Blueprint efforts, and gradual improvements in transportation infrastructure and policy (e.g. Los Angeles County Measure R projects and new TDM, TSM, and non-motorized assumptions) (Transportation Package B).

- Scenario 3 (Ambitious/Achievable)- Based on "Blueprint 1" land use, reflecting locally supported Blueprint Planning land use policy incorporating concepts developed through the region's Compass Blueprint efforts, and incrementally more aggressive improvements in transportation infrastructure and policy relative to Scenario 2 (Transportation Package C).
- Scenario 4 (Ambitious) - Based on "Blueprint 1" land use, reflecting locally supported Blueprint Planning land use policy incorporating concepts developed through the region's Compass Blueprint efforts, and the most aggressive improvements in transportation infrastructure and policy as set forth in Scenario 4, with the addition of a 2 cent VMT fee in 2035 (Transportation Package D).
- Scenario 5 (Ambitious) – Based on "Blueprint 2" land use, reflecting optimization of land uses beyond what has been vetted or supported by local jurisdictions, and the most aggressive improvements in transportation infrastructure and policy as set forth in Scenario 4, with the addition of a 2 cent VMT fee in 2035 (Transportation Package D).

B. TRANSPORTATION COMPONENTS

Transportation strategies can be broadly divided into categories: 1) capital improvements that are designed and targeted to enhance the existing transportation system, and 2) programs and actions that will result in more efficient utilization of the transportation system. Capital improvements are primarily major projects that add capacity, extend or expand existing facilities, and strategically add new links in the network. As such, capital projects directly affect the transportation network in the model.

TRANSPORTATION ELEMENTS IN THE 2008 REGIONAL TRANSPORTATION PLAN (RTP)

Transportation strategies used in the greenhouse gas (GHG) target-setting exercise include the following:

- **Highways and Arterials:** Examples of Highway and Arterial projects include General Purpose Lanes, Interchanges and Ramp Improvements, Carpool Lanes, Toll/High-Occupancy Toll (HOT) Lanes, and Arterial Improvements.
- **Transit:** Transit projects include Commuter Rail, Heavy and Light Rail, Bus Rapid Transit, the expansion of fixed-route bus services, and other demand-responsive and paratransit services. It should be noted that although the 2008 RTP includes significant investments in transit, transit is currently experiencing a major reduction in funding, primarily from the State in the form of operating funds. As a result, most transit operators in our region have either implemented or are planning significant service cuts.
- **Travel Demand Management (TDM):** Travel Demand Management (TDM) measures are actions that improve transportation system efficiency by altering demand using such strategies and facilities as: pricing, ridesharing, park-and-ride facilities, bicycle-pedestrian facilities, transit friendly development/zoning, and employer-based programs—such as staggered work hours, telecommuting, and carpool or vanpool programs. The end results of these strategies are to: a) reduce Single-Occupancy Vehicle (SOV) trips, and b) redistribute trips from peak demand periods to non-peak periods.
- **Non-Motorized Transportation System:** Non-Motorized Transportation measures are a subset of TDM. By investing in safe and secure bicycle and pedestrian facilities, some work trips and utilitarian/recreational trips can be reduced.
- **Transportation System Management (TSM):** Transportation System Management (TSM) techniques improve system capacity and system efficiency without physical expansion or behavioral changes. Typical TSM measures involve continuous management and operation of traffic systems, and utilize integrated traffic control systems, incident management programs, Intelligent Transportation System technologies, traffic signal synchronization, changeable message

signs (CMS), automated vehicle locations systems, real-time traffic information systems, traffic operations and management systems, etc.

- **Pricing Assumptions in 2008 RTP:** The transportation strategies utilized include a number of corridors in which tolls, in the form of HOT Lanes, are assumed. HOT Lanes are assumed for the SR-710 North Tunnel, High Desert Corridor, SR-91/SR-241 connectors, CETAP Corridors between Riverside and Orange Counties, the SR-91 Express Lanes extension to I-15 including connectors to I-15, and I-15 between SR-74 and the San Bernardino County Line.

TRANSPORTATION PACKAGES USED IN TARGET SETTING SCENARIOS

Scenario 1: Transportation Package A
Transportation Package A used in Scenario 1 is the adopted 2008 RTP with a reflection of reduced funding for transit. This scenario consists of the following expenditures:

Highways and Arterials	Transit	TDM	Non-Motorized (NMT)	TSM	Pricing
$80	$30 (HSR) $45 (other transit) + + 20% increase in headways in LA and Orange counties	$1.3	$1.8	$3	$26 (Toll Roads/HOT Lanes)

($ billions)

Scenario 2: Transportation Package B
Scenario 2 consists of Transportation Package A in Scenario 1, plus RTP Amendments 1, 2, and 3. This package consists of the following strategies **above and beyond** Transportation Package A:

Highways and Arterials	Transit	TDM	Non-Motorized (NMT)	TSM	Pricing
$15 additional	Restoration of 2008 RTP transit service levels + $15 additional (capital)	$0.1 additional	$0.6 additional	<$0.1 additional 3% speed capacity increase in urban areas on major & minor arterials	< $0.1 additional

($ billions)

Scenario 3: Transportation Package C
Scenario 3 consists of Transportation Package B in Scenario 2, plus several additional strategies. This package consists of the following strategies **above and beyond** Transportation Package B:

Highways and Arterials	Transit	TDM	Non-Motorized (NMT)	TSM	Pricing
—	State HSR Phases 1 (2020) & 2 (2035)	$0.1 additional (1% additional reduction in home-based work trips*)	$0.25 additional (0.5% reduction in VMT from increase in NMT share)	5% speed capacity increase in urban areas on major & minor arterials	Permanent I-10 and I-110 HOT Lanes**

($ billions)
* In the form of work-at-home and telecommute share
** I-10 and I-110 HOT Lanes were added in Amendment #3 (included in Transportation Package B) as one-year temporary demonstration projects.

Scenario 4: Transportation Package D
Scenario 4 consists of Transportation Package B in Scenario 2, plus several additional strategies. This package consists of the following strategies **above and beyond** Transportation Package B:

Highways and Arterials	Transit	TDM	Non-Motorized (NMT)	TSM	Pricing
—	20% decrease in headway State HSR Phases 1 (2020) & 2 (2035)	$0.2 additional (2% additional reduction in home-based work trips*)	$0.5 additional (1% reduction in VMT from increase in NMT share)	7% speed capacity increase in urban areas on major & minor arterials	Permanent I-10 and I-110 HOT Lanes** $0.02 VMT Fee (2035 only)

($ billions)
* In the form of work-at-home and telecommute share
** I-10 and I-110 HOT Lanes were added in Amendment #3 (included in Transportation Package B) as one-year temporary demonstration projects.

Scenario 5: Transportation Package D (SAME AS ABOVE)
Scenario 5 consists of Transportation Package B in Scenario 2, plus several additional strategies. This package consists of the following strategies **above and beyond** Transportation Package B:

Highways and Arterials	Transit	TDM	Non-Motorized (NMT)	TSM	Pricing
—	20% decrease in headway State HSR Phases 1 (2020) & 2 (2035)	$0.2 additional (2% additional reduction in home-based work trips*)	$0.5 additional (1% reduction in VMT from increase in NMT share)	7% speed capacity increase in urban areas on major & minor arterials	Permanent I-10 and I-110 HOT Lanes** $0.02 VMT Fee (2035 only)

($ billions)
* In the form of work-at-home and telecommute share
** I-10 and I-110 HOT Lanes were added in Amendment #3 (included in Transportation Package B) as one-year temporary demonstration projects.

C. LAND USE AND GROWTH COMPONENTS

Overview
Through the scenario exercise for target setting purposes, SCAG developed and examined the ramifications of different growth and land use patterns for the region for 2020 and 2035. The application of growth patterns for specific scenarios can be seen in the summary tables. The development of different scenarios was based on SCAG's extensive experience through prior growth forecasting and Compass Blueprint efforts. Through those efforts, the region has observed a gradual inclusion more efficient development policies reflected in local plans. The Blueprint Planning scenarios, as such, reflect to a large degree, local planning that is currently committed or under consideration. For the more aggressive scenario, SCAG incorporated explicit regional intervention that shifted growth among between jurisdictions to optimize growth and development in strategic locations (e.g. transit) and to improve jobs/housing balance. A description of each land use variation is as follows:

RTP Trend
The land use assumptions in RTP Trend are based on historical trends and illustrate the most likely growth distribution and land use pattern in the absence of policy intervention at either the local or the regional level. This scenario does not include recent General Plan policies enacted by local jurisdictions since the last RTP planning cycle.

SCAG
SCENARIO EXCERCISE

Blueprint Planning 1
The land use assumptions in Blueprint Planning 1 represent the expected growth distribution by applying current general plans and recent local land use policies to the regional and county control totals. It was developed through a bottom-up approach, based on input collected from our cities and counties through February 2, 2010. An extensive outreach and local-regional collaborative process resulted in deriving feedback from 93% of SCAG jurisdictions. Comparing this feedback to earlier growth forecasts confirms a sea change of commitment by many to localized strategies that better link land use and transportation investments resulting in improved accessibility and fewer GHG emissions. Many jurisdictions are embracing growth near current and planned transit investments, allowing for mixed use development by right and creating complete street that accommodate multiple modes of transportation.

Blueprint Planning 2
The land use assumptions in Blueprint Planning 2 are based on many of the strategies found in Blueprint Planning 1 and bolstered by policies designed specifically to improve future travel behavior and reduce vehicle emissions. These policies reflect current development patterns in some portions of the region and emerging planning strategies in others. In the broad context, the SCAG region can be viewed through two lenses: the highly urbanized basin area of Los Angeles, Orange and Ventura Counties and the growing periphery of north Los Angeles, north and east San Bernardino, Riverside and Imperial Counties. The recommended policies apply to each of these contexts differently, requiring a deeper understanding of the growth dynamics at play.

These policies were founded upon the Compass Blueprint Principles developed through the regional growth visioning efforts in preparation for the 2004 RTP and adopted as advisory in the 2008 RTP. Still, many assumptions in this scenario are not feasible within the current political and financial climate. A major theme guiding this scenario was to focus growth to existing and planned high quality transit stations resulting in densities that, while plausible, have not occurred in most parts of the SCAG region to date. While this scenario achieves considerable VMT and GHG emission reductions, it required shifting population and employment across both city and county lines, resulting in increased housing growth in the urban core and new and enhanced employment centers in the inland empire and the Antelope and Victor Valleys. Specifically, relative to Blueprint Planning 1, the assumptions of Blueprint 2 call for an inter-county shift of 30,000 households in 2020 and 93,000 households in 2035 from inland counties to costal counties.

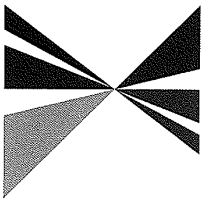
Blueprint Planning 1

County	Households 2020	Employment 2020	Households 2035	Employment 2035	J/H Ratio 2008	J/H Ratio 2020	J/H Ratio 2035
Imperial	75,699	93,550	94,701	117,756	1.24	1.24	1.24
Los Angeles	3,513,838	4,647,080	3,848,649	5,007,014	1.33	1.32	1.30
Orange	1,056,947	1,763,135	1,091,642	1,838,018	1.63	1.67	1.68
Riverside	882,821	909,622	1,132,512	1,231,588	0.99	1.03	1.09
San Bernardino	712,862	834,194	857,783	1,111,692	1.15	1.17	1.30
Ventura	294,354	390,054	320,449	429,584	1.30	1.33	1.34
SCAG Region	6,536,521	8,637,635	7,345,736	9,735,652	1.32	1.32	1.33

Blueprint Planning 2

County	Households 2020	Employment 2020	Households 2035	Employment 2035	J/H Ratio 2008	J/H Ratio 2020	J/H Ratio 2035
Imperial	70,051	87,153	88,780	115,898	1.24	1.24	1.31
Los Angeles	3,533,744	4,568,073	3,903,595	4,879,422	1.33	1.29	1.25
Orange	1,068,072	1,792,798	1,124,933	1,920,665	1.63	1.68	1.71
Riverside	852,386	910,380	1,046,127	1,249,129	0.99	1.07	1.19
San Bernardino	718,371	887,860	856,984	1,125,550	1.15	1.24	1.31
Ventura	293,958	391,358	325,374	444,969	1.30	1.33	1.37
SCAG Region	6,536,582	8,637,622	7,345,793	9,735,633	1.32	1.32	1.33

SOUTHERN CALIFORNIA



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May 17, 2010

Lynn Terry
Deputy Executive Officer, California Air Resources Board
1001 "I" Street
P.O. Box 2815
Sacramento, CA 95812

Dear Ms. Terry:

First, we would like to thank ARB for participating with us last December in a first-of-its-kind dialogue with State and regional leaders on how to collaborate on SB 375 and related initiatives. Your contributions set the right tone for our agencies' working together. Similarly, we would like to thank your Executive Officer and other staff for participation in our successful regional conference and General Assembly last week in La Quinta.

At this time, as authorized by the SCAG Regional Council on April 1, 2010, I am pleased to submit for your consideration information to support a greenhouse gas (GHG) emission reduction target pursuant to SB 375 and the process established in the report of the Regional Targets Advisory Committee (RTAC). Also included in this submittal are several pieces of accompanying material, including the SCAG region's proposed technical methodology for your review and approval.

We have been pleased to work in partnership with you and your staff on the implementation of this important law leading up to the development and adoption of our first Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan in 2012. At this critical juncture, we respectfully urge that you continue to pursue implementation of SB 375 with flexibility, openness, and in a way that encourages broad thinking and innovation.

In particular, we respectfully request that you establish a target range, as opposed to a distinct number, for the SCAG region. Similarly, you may consider creating a range for other regions, if they request it. The concept of a range will, we believe, further the goals of SB 375 in the SCAG region in several ways, notably by instilling a strategy development rather than just a compliance mind-set as we develop the actual SCS. We are happy to discuss this element of our recommended target further with you.

SCAG developed five scenarios to test a spectrum of potential GHG reduction strategies for the eventual SCS/RTP. The scenarios create a set of bookends from the most achievable to the most aggressive. Each scenario is comprised of seven distinct land use and transportation components (including pricing) that are varied in order to determine what is ambitious and achievable. The scenarios "ramp up" from a business as usual case, with no distinct policy interventions, to a very aggressive case, with policy interventions across the board.

We have attached additional material, including detailed tables that describe the contents and results of the scenarios. The conclusions gleaned from this exercise support our target range as noted above. In brief, scenarios 2 and 3 represent ambitious and achievable GHG reductions for the SCAG region, while scenarios 4 and 5 are ambitious but not achievable for this cycle given funding constraints and other feasibility considerations. Scenario 1, likewise, while achievable is not ambitious.

Also included in this submittal is our SB 375/SCS Technical Methodology as approved by the Regional Council on April 1, 2010. The methodology is intended for estimating greenhouse gas emissions associated with the SCS/RTP, and is developed in consultation with your staff and with other MPOs. In brief, this methodology seeks to establish a broad array of tools to capture the benefits of policy in the SCAG region. It seeks to take advantage of the development of new tools during the time that the plan is being developed, but also builds off of SCAG's current capacity and extensive experience in transportation and air quality modeling and analysis. We respectfully request that you approve this methodology, pursuant to the law, such that we can begin implementation of the Public Participation Plan.

We have endeavored to develop these key pieces of the SB375 implementation process with the involvement of the public and our partners and stakeholders. Of note, we held a regional conference and General Assembly on May 6-7 in La Quinta that featured a substantive discussion on these issues. This session was attended by over 500 individuals. We also fulfilled our statutory obligation to hold a workshop on the RTAC report. We did so at a regional conference in Ontario on November 18, 2009. That event was also attended by nearly 500 people. We convened a series of subregional roundtable discussions to further inform of target scenario development and recommendation. Finally, SCAG has held over 100 meetings to inform our region on SB 375 and to seek their input.

We have previously provided your staff an overview of sustainability policy and planning in the SCAG region. We believe that SB 375 provides us an opportunity to continue along the path of developing more sustainable, prosperous, and complete communities. This is a path that we have helped to lay through our Compass Blueprint program. Further, we have committed to expand our efforts by bringing new resources to Compass Blueprint, and by establishing a new Green Cities program that will reward local efforts to reduce GHG emissions. Our cities and counties have taken up this challenge. We have more than 80 jurisdictions that have pursued Compass Demonstration Projects, and many of our jurisdictions are also preparing Climate Action Plans or Sustainability Plans. We look forward to continuing to work with you to advance this crucial work.

Please do not hesitate to contact me to discuss any part of this submittal.

Sincerely,

HASAN IKHRATA
Executive Director

Attachments :
Attachment 1 - Scenario Summary Tables
Attachment 2 - Technical Methodology
Attachment 3 - Subregional Roundtable Summary Results

HI:jl

Attachment 1 – Scenario Summary Tables

Scenario Planning

Seven Components

Scenario	Land Use	Network	TDM	TSM	Non-Motorized	Transit	Pricing
1	RTP Trend	2008 RTP	2008 RTP	2008 RTP	2008 RTP	20% increased headway LAC & OC	2008 RTP
2	Blueprint Planning 1	08 RTP Amnd 3	08 RTP Amnd 3	08 RTP Amnd 3 + 3% speed & capacity increase	08 RTP Amnd 3	08 RTP Amnd 3	08 RTP Amnd 3
3	Blueprint Planning 1	08 RTP Amnd 3 + CHSR Phase 1 + CHSR Phase 2 in 2035	08 RTP Amnd 3 + 1% reduction of HBW trips	08 RTP Amnd 3 + 5% speed & capacity increase	08 RTP Amnd 3 + 0.5% VMT reduction	08 RTP Amnd 3	08 RTP Amnd 3
4	Blueprint Planning 1	08 RTP Amnd 3 + CHSR Phase 1 + CHSR Phase 2 in 2035	08 RTP Amnd 3 + 2% reduction of HBW trips	08 RTP Amnd 3 + 7% speed & capacity increase	08 RTP Amnd 3 + 1% VMT reduction	08 RTP Amnd 3 + 20% decrease in headways	08 RTP Amnd 3 + I-10 & I-110 Hot Lanes + 2¢ VMT fee in 2035
5	Blueprint Planning 2	08 RTP Amnd 3 + CHSR Phase 1 + CHSR Phase 2 in 2035	08 RTP Amnd 3 + 2% reduction of HBW trips	08 RTP Amnd 3 + 7% speed & capacity increase	08 RTP Amnd 3 + 1% VMT reduction	08 RTP Amnd 3 + 20% decrease in headways	08 RTP Amnd 3 + I-10 & I-110 Hot Lanes + 2¢ VMT fee in 2035

Attachment 1 – Scenario Summary Tables

Scenario Planning Results

Five Scenarios

Scenario	2020	2035	
	% Change of Daily CO2 (per capita from 2005)	% Change of Daily CO2 (per capita from 2005)	
1	-6%	-3%	Achievable
2	-7%	-5%	Ambitious & Achievable
3	-8%	-6%	Ambitious & Achievable
4	-9%	-10%	Ambitious
5	-10%	-12%	Ambitious

SCAG Attachment 2 – Technical Methodology

SCAG SB 375/SCS Technical Methodology and Related Processes for Estimating GHG Emissions

Prior to a Metropolitan Planning Organization (MPO) formally taking credit for implementing the public participation plan required by SB 375, the MPO must submit to the California Air Resources Board (ARB) a description of the technical methodology it intends to use to estimate the greenhouse gas (GHG) emissions from its Sustainable Communities Strategy (SCS) and, if necessary, its Alternative Planning Strategy (APS). SB 375 encourages the MPO to work with the ARB until the ARB Board concludes that the technical methodology operates accurately. [Government Code Section 65080(b)(2)(I)(i)]

The following outlines SCAG's technical methodology for implementation of SB 375 for the SCAG region. As described below, SCAG's comprehensive technical methodology exists in tandem with the outreach, planning, forecasting, and the iterative scenario development process described below.

SCAG's comprehensive technical methodology for SB 375 implementation consists of the following elements:

A) Analysis Years
B) Bottom-Up Process and Outreach/Stakeholders Input
C) Data Development for SCS
D) Sustainable Community Strategies
E) Models and Tools
F) Technical Methodology

A detailed description of each of these elements is provided in the following sections.

A) Analysis Years

For the purposes of SB 375 analyses, the Regional Targets Advisory Committee (RTAC) recommends a base year of 2005. As a result, MPOs would be required to achieve per capita emissions reductions equivalent to some percentage below their 2005 per capita levels by 2020 and 2035.

SCAG will interpolate 2005 data for SB 375 target setting and recommendation purposes. This methodology was discussed and agreed upon by RTAC at their September 16, 2009 meeting. Table 1 on the next page summaries all the analysis years and their purposes for SB 375.

Table 1
Analysis Years for SB 375

YEAR	PURPOSE
2003	Used with 2008 to interpolate 2005
2005	Base year for SB 375 target setting
2008	Used with 2003 to interpolate 2005
2020	SB 375 GHG target year
2035	SB 375 GHG target year and 2012 RTP horizon year

B) Bottom-Up Process and Outreach/Stakeholder Input

A collaborative and inclusive bottom-up process is the key to ensure a successful development of SCAG region 2012 Regional Transportation Plan (RTP) and SCS. With this principle, following are the major tasks and associated objectives that SCAG has undertaken since 2008 to move the process forward to address the requirements of SB 375.

1. Program Setup

- Conduct SB 375 Workshops throughout the region and provide information on requirements and concepts of SB 375, plus the Conceptual Land Use Scenario exercise
- Conduct initial outreach strategy kick-off
- Develop and adopt Guidelines and Public Participation Plan
- Gather response from subregions on development of optional subregional SCS
- Finalize roles and responsibilities among regional partners, particularly subregions and County Transportation Commissions (CTCs)

2. GHG Target Development

- Determine and review RTP base year (2008) condition
- Develop 2005 base year via interpolation
- Develop Trend Baseline growth projections for 2020 and 2035 and account for impact of the economic downturn and associated revenue shortages on the adopted 2008 RTP
- Review and gather local input on general plans including growth forecast/distribution and land use for 2020 and 2035
- Develop a range of scenarios
- Conduct Target-setting Subregional Roundtables with stakeholders
- Develop GHG target (range) recommendation to ARB

3. Draft RTP/SCS Development

- Continue to collect input on additional local planning efforts
- Outreach to develop policy assumptions for Draft RTP/SCS
- Incorporate subregional SCSs, as appropriate
- Perform technical analyses, including quantification of GHG reductions projected to be achieved by the SCS
- Develop Draft RTP/SCS

4. Final RTP/SCS Development and Approvals

- Develop Final RTP/SCS
- SCAG Regional Council Approval
- Regulatory approvals

C) Data Development for SCS

1. Socio-Economic Growth Forecast

The process for developing growth and economic forecasts includes:

- Initiate the SB 375 and 2012 RTP/SCS growth forecasting process (commenced October 2008)
- Convene a panel of experts for technical assistance and advisory role (May 2009 and will continue through the 2012 RTP/SCS process)
- Produce range of growth forecasts
- Build teams to conduct one-to-one meetings with local jurisdictions/subregions and all major stakeholders (August 2009 – present).
- Continue local and subregion review, comment, and input
- Release draft growth forecasts
- Adopt final forecasts as part of SCS

2. 2012 SCS/RTP Datasets and Trend Baseline

To meet the requirements of SB 375 in developing a SCS by 2012, the following datasets will be developed in collaboration with subregions, local jurisdictions, and CTCs (Figure 1):

1. 2005 base year developed through interpolation for SCS target setting and recommendation
2. 2008 base year for 2012 RTP
3. Trend baseline growth distribution and underlying land uses
4. General plan based growth forecast and distribution
5. Policy Forecast/SCS

The "trend baseline" illustrates the most likely outcomes of growth distribution and land use in the absence of recent policy intervention, allowing the region and its jurisdictions to take credit for actions and policies adopted recently or in the near future. While the "trend baseline" is a

technical projection that provides a best estimate of future growth based on past trends and assumes no recent general plan land use policies, the Policy Forecast/ SCS is derived using local input regarding their general plan land use strategies through a bottom up process, and also reflecting additional local planning and regional policies.

3. Data and GIS Maps

Data/GIS maps have been provided to subregions and local jurisdictions for their review. These data include the 2008 base year population, employment, households, and housing units estimates and their projections for 2020 and 2035. GIS maps include existing land use for 2008, the general plan land use and zoning, the resource areas, and other important areas identified in SB 375.

The list of data/GIS maps include:

1. Existing land use (2008)
2. General plan land use and zoning
3. Resource areas include:

(a) All publicly owned parks and open space;

(b) Open space or habitat areas protected by natural community conservation plans, habitat conservation plans, and other adopted natural resource protection plans;

(c) Habitat for species identified as candidate, fully protected, sensitive, or species of special status by local, state, or federal agencies or protected by the federal Endangered Species Act of 1973, the California Endangered Species Act, or the Native Plan Protection Act;

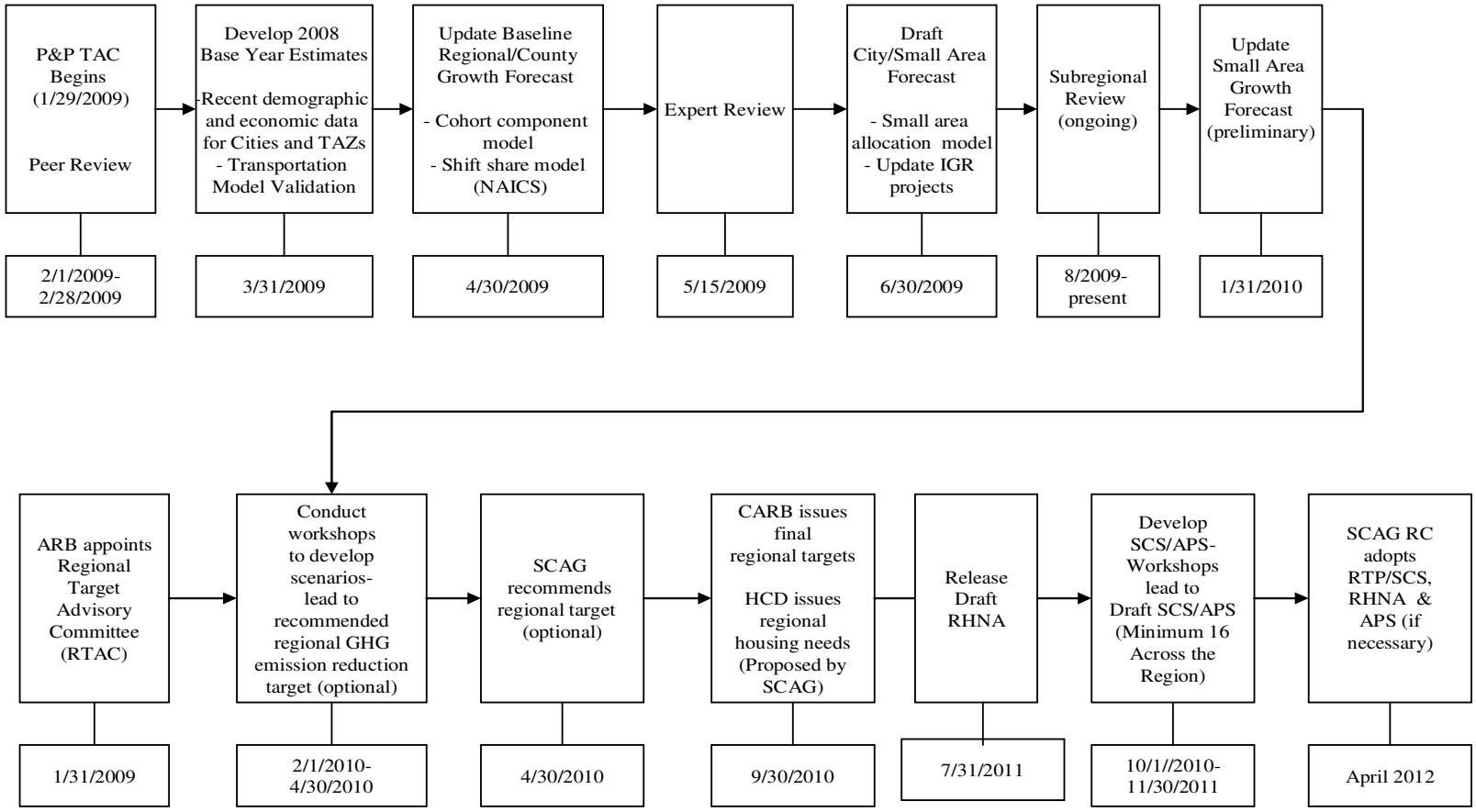
(d) Lands subject to conservation or agricultural easements for conservation or agricultural purposes by local governments, special districts, or nonprofit 501(c)(3) organizations, areas of the state designated by the State Mining and Geology Board as areas of statewide or regional significance pursuant to Section 2790 of the Public Resources Code, and lands under Williamson Act contracts;

(e) Areas designated for open-space or agricultural uses in adopted open-space elements or agricultural elements of the local general plan or by local ordinance;

(f) Areas containing biological resources as described in Appendix G of the CEQA Guidelines that may be significantly affected by the sustainable communities strategy or the alternative planning strategy; and

(g) an area subject to flooding where a development project would not, at the time of development in the judgment of the agency, meet the requirements of the National Flood Insurance Program or where the area is subject to more protective provisions of state law or local ordinance.

Figure 1. Draft 2012 RTP Growth Forecasts: Milestones and Timeline



4. Farmland
5. Spheres of influence
6. Transit priority areas
7. City/Census tract boundary with ID
8. City/TAZ boundary with ID

4. Relationship to Regional Housing Needs Assessment

SB 375 requires that the RHNA allocated housing units be consistent with the development pattern included in the SCS. *See*, Government Code §65584.04(i). Population and housing demand must also be proportional to employment growth. At the same time, in addition to the requirement that the RHNA be consistent with the development pattern in the SCS, the SCS must also identify areas that are sufficient to house the regional population by income group through the RTP planning period, and must identify areas to accommodate the region's housing need for the next local Housing Element eight year planning period update.

By State law, SCAG will be adopting the RHNA by 2012 and applying it to local jurisdictions at the jurisdiction boundary level. SCAG staff believes that consistency between the RHNA and the SCS may be accomplished by aggregating the housing units contained in the smaller geographic levels noted in the SCS and including such as part of the total jurisdictional number for RHNA purpose. SCAG staff has concluded that there is no consistency requirement for RHNA purposes at sub-jurisdictional level.

D) Sustainable Communities Strategies (SCS)

1. Land Use Component

The growth distribution, for SCS purposes, is the adopted growth forecast used for the RTP. SB 375 requires that this forecast be developed in such a way that it demonstrates reduced GHG emissions due to land use strategies as compared to the baseline scenario or the "trend baseline" as previously described. The trend baseline is intended to represent the most likely growth distribution in absence of the land use strategies.

In previous RTPs, land use scenario exercises to test the effectiveness of various land use strategies on VMT (and resulting GHG) reduction showed considerable promise in achieving that goal. SCAG will work with its member cities and other stakeholders to develop a range of potential land use strategies for consideration in SCS development. Each of these strategies will be included in one or more draft scenarios and GHG emissions will be quantified. Prior to incorporating any strategies into a final SCS, SCAG, in consultation with the applicable local government, will determine the political and market feasibility of said strategy.

2. Transportation Investment

The transportation network consists of the existing and planned transportation projects. SB 375 requires that certain transportation planning and programming activities be "consistent" with the SCS (with some exceptions based on grandfathering provisions in the law). In other words, the

development of the future transportation network should proceed in such a way that it complements the anticipated growth strategy and distribution reflected in the SCS.

Development of a SCS presents an opportunity to develop approaches to system management and operational improvements, implementing pricing policies, and improving the coordination between transit services and non-motorized transportation, with the goal of creating more livable communities. These efforts assume collaboration and voluntary participation among subregional stakeholders and CTCs in order to derive higher performance from the transportation system.

3. Transportation Demand Management / Transportation Systems Management

In addition to transportation projects, the RTP contains policies such as Transportation Demand Management (TDM) or Transportation System Management (TSM) policies. These include pricing, ride sharing, smart shuttles, preferential parking, freeway metering, etc. These policies can be layered with the other major elements of the SCS. It is anticipated that TDM/TSM policies will be of particular use in locales that do not have substantial existing or planned transit infrastructure.

4. Other Economic Factors & Principles

- Align economic development with the land use and transportation investment strategies
- Promote job-housing supply balance
- Develop a "Land-use Strategy" that market wants and can deliver

5. Subregional SCSs

SB 375 allows for subregional councils of governments in the SCAG region to have the option to develop the SCS, and the APS if necessary, for their area. Subregional agencies were requested to indicate to SCAG, by December 2009, if they intended to exercise this option to develop their own SCS. Subregions that choose to develop a SCS for their area must do so in a manner consistent with Framework and Guidelines prepared by SCAG pursuant to SB 375. To date the Orange County Council of Governments (OCCOG)/Orange County Transportation Commission (OCTA) and the Gateway Council of Governments have indicated their intent to exercise this option.

SCAG will accept and incorporate a subregional SCS, unless (a) it does not comply with SB 375, (b) it does not comply with federal law, or (c) it does not comply with the adopted Subregional Framework and Guidelines. In the event that a compiled regional SCS, including subregional submissions, does not achieve the regional target, SCAG will initiate a process with partners to develop and consider additional GHG emission reduction measures region-wide.

SCAG assumes ARB will recognize and grant "credit" for business and city requested voluntary efforts to reduce GHG as part of the SCS. One example may be clean fuel fleets above and beyond AB 32 requirements.

6. Local Voluntary Efforts

In estimating emissions benefits from an SCS, the region may account for local voluntary efforts that result in reduced vehicle GHG emissions not limited to strategies aimed at reduced VMT.

Examples of such efforts may include local neighborhood electric vehicle programs or local incentives for the purchase or use of electric or other alternative fuel vehicles (e.g. preferential parking). Any local voluntary effort to reduce emissions that is accounted for in the SCS should demonstrate additional benefits beyond what is already required in State law.

In accounting for the benefits of such efforts, SCAG may rely on any local analysis to determine emissions savings. In lieu of locally derived data, SCAG may estimate emissions benefits by determining incremental improvements relative to what is derived from ARB's GHG emission methodology.

E) Models and Tools

1. Trip-Based Regional Transportation Demand Model

Until fully functional activity-based travel demand models are developed and validated to be used for RTP purposes, SCAG's existing trip-based regional transportation demand model represents the current state-of-the-practice modeling tool. Although SCAG's trip-based model is the most comprehensive model in use, SCAG is undertaking model improvements and enhancements over the next two years. The major enhancements include updates to the vehicle ownership model, trip distribution and mode choice model, heavy-duty truck model, highway and transit networks, freeway and arterial speed studies, and enhancement of sensitivity to potential SCS strategies such as pricing and transit-oriented development strategies.

The trip-based regional transportation demand model consists of four major model components:

- Trip Generation - how often do people travel, for what purpose and at what time; how many workers are drawn to a given employment center
- Trip Distribution - where do people travel to work, school, and for other activities
- Mode Choice - how many people drive alone, share a ride, walk and bike, or take transit
- Network Assignment - what routes do people use and how much congestion do they experience

The model calculates vehicle miles and vehicle hour travelled (VMT and VHT), speeds and delay, and other performance measures for both passenger car and heavy duty vehicles. The enhanced regional model will utilize Census Block Group (10,569 in SCAG modeling area) as the analysis unit for most model components. The inter-regional and ports related travel are also included in the model. Attachment A describes the SCAG regional travel demand modeling process in detail.

2. PECAS Land Use / Economic Model

SCAG is in the process of developing a land use model, known as the PECAS (Production, Exchange, Consumption, Allocation System) Land Use Model, as are other MPOs and entities within the State. Land use models are intended to predict economic activity over a geographic space, such that land uses associated with economic activity can be assessed from changes in transportation investment and policies. The effects of transportation and land use policy changes will be assessed through interactions and feedbacks in an integrated transportation model and land use model system.

3. Activity-based Travel Demand Model

Activity-based travel demand model is based on the concept that travel is a derived demand for activity participation. This approach predicts passenger trip travel demand based on assumptions of travel behavior and, unlike the trip-based model, takes trip chaining (e.g. home to work to day care to home) into consideration.

The model will create activity-based origin and destination (O&D) tables for passenger trips that replace the trip generation, trip distribution and mode choice tables for these trips in the trip-based model. O&D tables for other trips such as heavy-duty trucks, airport ground access trips, and trips into and out-of the region, would be combined with the passenger O&D from the activity-based model and then run through the trip assignment step from SCAG's existing trip-based travel demand model.

4. Local Sustainability Tool

SCAG is developing a GIS-based tool which will be made available to subregions and local governments for their use in subregional strategy development. This tool is intended to accomplish the following:

- Help local planners visualize their process as related to various land use strategies, and see the effects of certain policy choices "on the ground";
- Display instant results estimating directional and order-of-magnitude VMT and emission reductions as result of community design, and other land use decisions made by stakeholders; and
- Be scalable to various geographic levels.

Figure 2 on the next page depicts the input, process, and output of the Local Sustainability Tool.

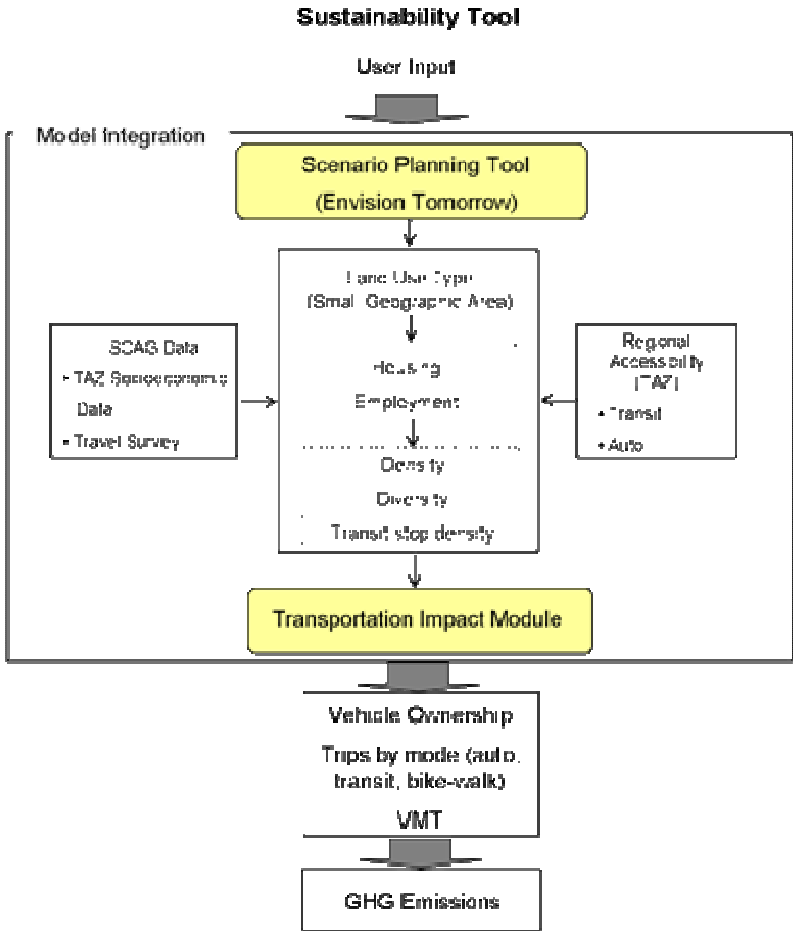
5. EMFAC

The ARB's EMFAC (short for "EMission FACtor") model is a computer model capable of estimating both current year, as well as back-cast and forecasted emission inventories for calendar years of 1970 to 2040. EMFAC estimates the emission rates of 1965 and newer vehicles, powered by gasoline, diesel or electricity. Emissions inventory estimates are made for over one hundred different technology groups and are reported for ten broad vehicle classes segregated by usage and weight.

EMFAC calculates the emission rates of HC, CO, NOx, PM, lead, SO2 and CO2 for 45 model years for each vehicle class within each calendar year, for twenty four hourly periods, for each month of the year, for each district, air basin, county and subcounty in California. EMFAC can report the gram per mile emission rates of a single technology group or the ton per day inventory for the entire 28,000,000 vehicle California fleet.

To determine regional and air basin emissions, SCAG runs the ARB's EMFAC model using the outputs from the trip-based regional transportation demand model.

Figure 2



6. Policies and Practices

The concept of "Policies and Practices" has been put forward by ARB to provide MPOs flexibility in taking GHG emission reduction credit for efforts not readily quantified with conventional tools and models. As set forth in the RTAC report, the "Policies and Practices" are:

- One of several resources to be used in target setting;
- A component of GHG reduction strategy development;
- A means to facilitate public review of the GHG reduction strategy for all MPOs;
- A means of target compliance demonstration by small MPOs in the first round and as an action plan to supplement model compliance by all MPOs; and
- An accuracy check tool for use by ARB as part of its strategy approval process.

In addition to providing subregional "Policies and Practices" scenario testing capabilities through the Local Sustainability Tool, SCAG will develop a list of regional "Policies and Practices." The SCS and/or APS will incorporate applicable "Policies and Practices" either through modeling or off-model analyses. Examples of Policies and Practices include: transit-oriented development, pedestrian networks, bike programs, flexible work hours/telecommuting, etc.

7. REMI Model

As in the previous RTP development process, SCAG will conduct an economic impact analysis for the 2012 RTP and its major policy components. For the 2012 RTP and SCS, SCAG will use the REMI regional economic model for the socioeconomic impact analysis. The economic impact analysis/report will focus on Region-wide employment, income, economic output, productivity impacts, and local government finance from impacts of major policy components, including land use, transportation investment, TDMs/TSMs, pricing, and others.

In addition, the economic impact analysis will attempt to measure those not-normally-estimated benefits associated with change in development patterns. Among them, energy savings resulting from less water usage and its transport; impacts on urban/suburban run-offs and water quality due to impacts on pervious and impervious lands; and various health impacts from different built environment and community design.

8. Peer Review Process

SCAG has embarked on a program to update the existing transportation model and to develop next generation activity-based and land use models. SCAG's goal is to have state-of the-art modeling capabilities. A model peer review program has been integrated into SCAG's model development process to ensure the new tools meet performance expectations and to increase overall model credibility. Expert panel reviews have been included in each of SCAG's major model improvement programs. To date, separate expert panel reviews have been conducted on the Regional Growth Forecast, the Heavy-Duty Truck Model and the pricing component of the model. Recommendations from these panels have been integrated into the consultant scopes of works to refine the model development efforts. A full peer review will be conducted on the final modeling system that will be used in the Year 2012 RTP/SCS analysis.

F) Technical Methodology

The methodology for estimating transportation-related GHG emissions associated with regional growth scenarios is primarily based on SCAG's trip-based regional transportation demand model and the ARB's EMFAC model. Once completed (that is, calibrated and validated), SCAG's land use model will be used to develop scenario land use data, and the activity-based model will be used in the SCS scenario analysis. The methodology steps are described below.

1. Develop land use portion of SCS

Growth forecasts, particularly the local input based growth forecasts, will be developed based on SCAG's bottoms-up integrated growth forecasting process and will be used as the basis and starting point to develop the SCS. This dataset may or may not achieve the GHG reduction target set by ARB. If additional strategies are necessary to achieve the target, SCAG will work with its member cities and other stakeholders to develop a range of potential land use strategies for consideration in SCS development. Each of these strategies will be included in one or more draft scenarios and GHG emissions will be quantified to test their effectiveness. Prior to incorporating any strategies into a final SCS, SCAG, in consultation with the applicable local government, will determine the political and market feasibility of said strategy.

2. Identify related transportation investments/improvements and other SCS policies

The regional SCS will identify and examine new investments in transportation facilities and improvements in TDM and TSM strategies as well as other relevant policies and strategies. These investments/improvements will be incorporated into the regional transportation demand model where feasible.

3. Analyze RTP/SCS through modeling

SCAG will use the draft versions of the Activity-based and PECAS land use models to test GHG emission reduction scenarios as appropriate. The SCS and alternatives scenarios will be used as input to the regional transportation demand model for RTP/SCS/conformity/CEQA analyses.

4. Use off-model analyses to estimate VMT changes or GHG reductions from land use, Policies and Practices, or other strategies if necessary

Per the RTAC and ARB recommendations, SCAG will use off-model analyses as necessary and appropriate to account for any voluntary efforts or other strategies that are not captured by the regional transportation demand model. The off-model analysis methodology will be informed by the on-going collaboration among MPOs and between MPOs and the ARB on this subject, as well as discussion with applicable technical working groups. SCAG anticipates that the off-model analysis technique will be primarily used for quantifying voluntary efforts from cities/counties and the business sector, and those policies and practices that are not readily applicable for modeling analyses.

5. Run ARB's EMFAC Model

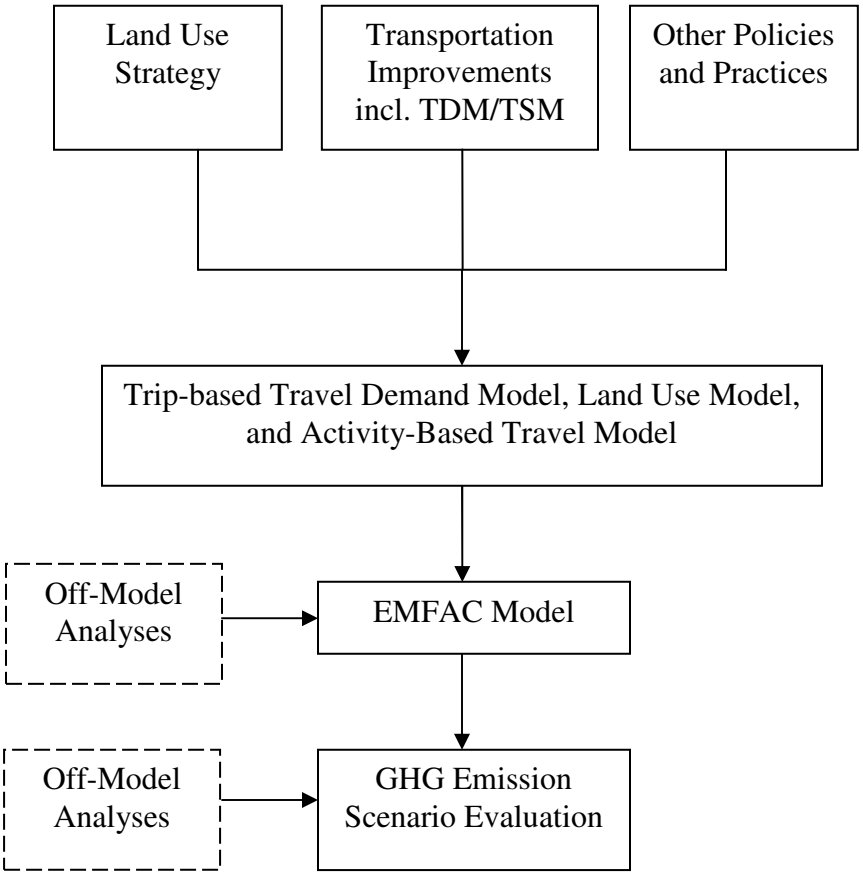
SCAG will run EMFAC for baseline and SCS scenarios in the appropriate milestone years. GHG emissions will be calculated based on ARB methodology for converting EMFAC emission outputs to CO2 equivalent emissions. Adjustments to EMFAC that account for recent state laws which reduce GHG emissions from passenger vehicles will be made per ARB direction.

6. Scenario Evaluation

Summarize and compare trend baseline and various SCS scenarios to demonstrate SCS benefits and its comparison with the GHG reduction targets against base year 2005.

The flow chart on the next page illustrates the proposed technical methodology for estimating GHG emissions.

Figure 3
Proposed Technical Methodology for Estimating GHG Emissions

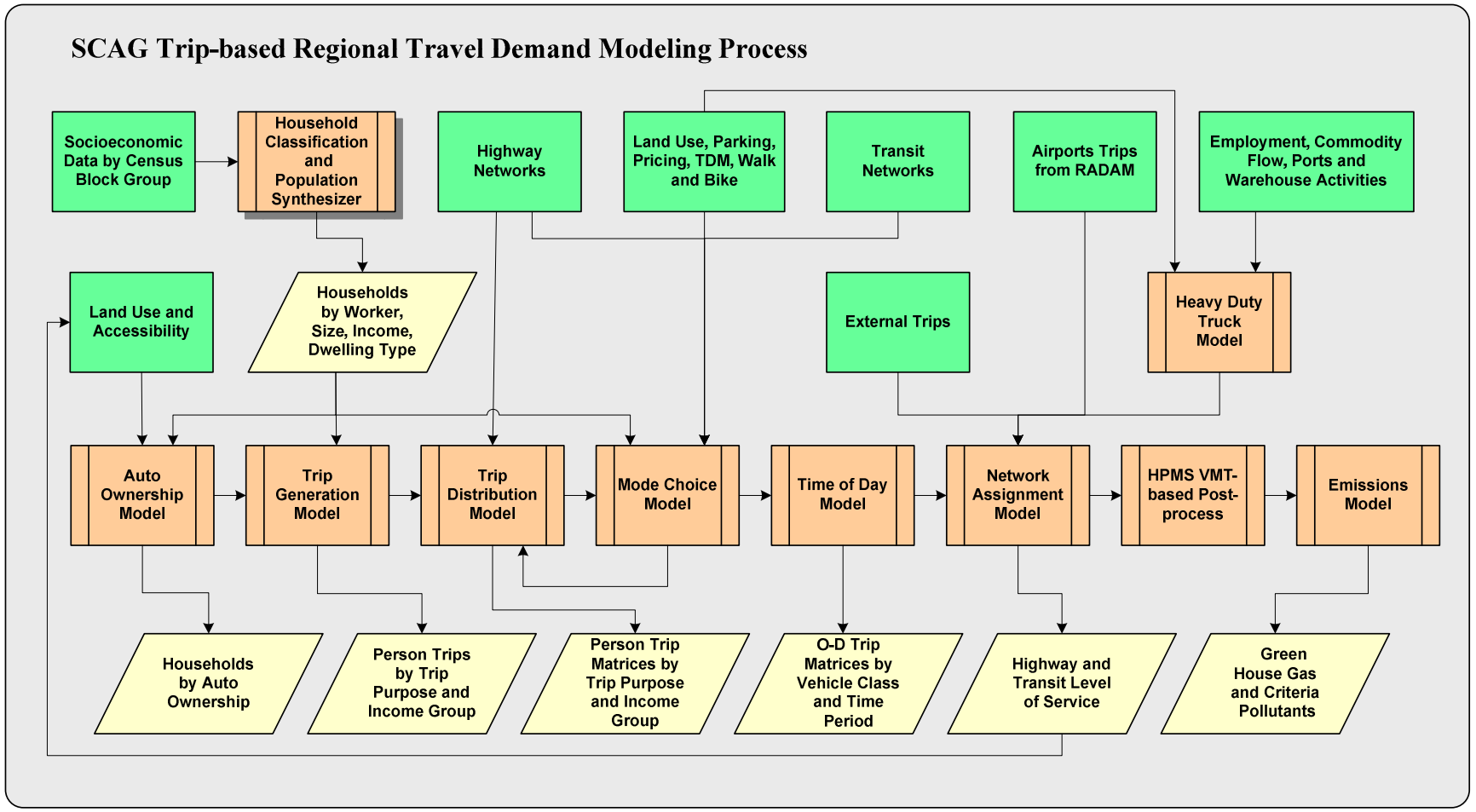


Following is a list of applicable milestones.

- CARB issues Final Regional Targets – September 2010
- SCS development (preliminary scenario, draft, etc) – through early 2011
- Release Draft RTP/regional SCS for public review – November 2011
- Regional Council adopts RTP/SCS – April 2012

Attachment A

Summary Description of SCAG Regional Travel Demand Modeling Process


SCAG Trip-based Regional Travel Demand Modeling Process
Socioeconomic Data by Census Block Group
Household Classification and Population Synthesizer
Highway Networks
Land Use, Parking, Pricing, TDM, Walk and Bike
Transit Networks
Airports Trips from RADAM
Employment, Commodity Flow, Ports and Warehouse Activities
Land Use and Accessibility
Households by Worker, Size, Income, Dwelling Type
External Trips
Heavy Duty Truck Model
Auto Ownership Model
Trip Generation Model
Trip Distribution Model
Mode Choice Model
Time of Day Model
Network Assignment Model
HPMS VMT-based Post-process
Emissions Model
Households by Auto Ownership
Person Trips by Trip Purpose and Income Group
Person Trip Matrices by Trip Purpose and Income Group
O-D Trip Matrices by Vehicle Class and Time Period
Highway and Transit Level of Service
Green House Gas and Criteria Pollutants
Legend
Input
Module
Output
Note:
Population Synthesizer (shadowed) is a new component.
All the model modules and input data are updated for 2008 model validation and 2012 RTP analysis.

MODEL INPUTS AND ASSUMPTIONS

Socioeconomic Data by Census Block Group

Socioeconomic data, which describes population, households, and employment at Block Group level, are used as major input to SCAG's Regional Model. The concept is that travel is a derived demand of activity participation, which is directly related to the demographics and economic characteristics of households. The model uses both aggregate and disaggregate socioeconomic data (SED). The aggregate data are counts of population, households and employment for each Transportation Analysis Zone (TAZ). The disaggregate data are Public Use Microdata Sample (PUMS) records from Census, which contain detailed information about persons and households characteristics in the region.

Highway Networks

The highway networks were originally developed from the Thomas Brothers GIS database and then updated with street inventory survey data (the latest SCAG region street inventory survey was conducted in year 2008) in the TransCAD environment. The networks include detailed coding of the region's freeway system (mixed-flow lane, auxiliary lane, HOV lane, toll lane, truck lane, etc.) as well as arterials, major collectors, and some minor collectors. Separate highway networks for each time period were developed to simulate time of day differences in roadway capacity and vehicle travel restrictions, such as arterial parking restrictions during peak hours, HOV lane minimum vehicle occupancy requirement, and heavy-duty vehicle restrictions on certain roadways.

Land Use and Accessibility for Auto Ownership Model

Accessibility refers to the ease of reaching goods, services, activities, and destinations. Many factors affect accessibility, including the quality and affordability of transport options, transport system connectivity, and land use patterns. The auto and non-auto accessibilities of a zone directly influence household auto ownership. Land use patterns, in particular high density, mixed-use developments also directly influence household auto ownership.

Land Use, Parking, Pricing, TDM, Walk and Bike for Mode Choice Model

Land use, zonal parking, roadway pricing, and Travel Demand Management (TDM) are inputs to mode choice, in addition to the modal level of service obtained from the highway, transit, and non-motorized networks. Parking fees/restrictions, road pricing cost/policies, and land use densities have direct influence on travelers' mode choice. For example, increasing parking fees encourages travelers to shift from auto to transit. Also, high employment and residential densities encourage the use of transit and non-motorized modes.

Transit Networks

The transit networks include more than 1,800 transit routes, representing approximately 130 transit carriers over the entire SCAG region. The transit routes are completely compatible with the highway geography. Separate transit networks are developed for five time periods based on the transit service information contained in the up-to-date Los Angeles County Metropolitan Transportation Authority (Metro) Transit TripMaster database and data collected from transit agencies not included in the TripMaster database. Transit services are grouped into 8 transit modes (Local Bus, Rapid Bus, Express Bus, BRT, Transit Way, Urban Rail, Commuter Rail, and High Speed Rail (HSR), according to their service characteristics and fare structures. The transit networks include detailed representation of all rail stations, transfer opportunities among the different modes and between transit routes and park-and-ride locations. A TeleAtlas street network along with Census Block level data is used to calculate walk accessibilities and to develop walk access to transit.

External Trips

External trips (i.e., inter-regional trips) are trips with one or both ends located outside the SCAG modeling area. SCAG model includes 40 cordon locations consisting of freeways and arterials leading into and out of SCAG modeling area. A cordon traffic origin-destination survey was conducted in year 2003 and the results were used to develop inter-regional Light and Medium (LM) duty vehicle trip matrices, including External-to-External (E-E), External-to-Internal (E-I), and Internal-to-External (I-E) trips. The origin-destination survey will be updated for the 2012 RTP.

Airports Trips from RADAM

Airports trips include passenger trips and cargo trips. Both airport passenger and cargo trip tables (about 100 zones for the SCAG modeling area) are obtained from the Regional Airport Demand Allocation Model (RADAM). The daily airport passenger trips from the RADAM model are then disaggregated into regional model TAZ (using employment data for business trips and household data for non-business trips) and further split into five time periods by four modes of travel: drive alone, 2-person carpool, 3-person carpool, and 4-or-more person carpool. The airport vehicle trips are merged with the other auto vehicle trips prior to the network assignment step. Similarly, the RADAM model generated air cargo truck trips at the RADAM zones. These trips are then disaggregated into the regional model TAZs based on the North American Industry Classification System (NAICS) employment data. The daily air cargo trips are split into five time periods by three truck types (light HDT, medium HDT, and heavy HDT) and merged with the HDT truck trips prior to network assignment.

Employment, Commodity Flow, Ports, and Warehouse Activities

These inputs to the transportation model are data related to the freight activities, including employment by industrial classification, commodity flows, seaports, warehousing, trucking and wholesale trade, etc. SCAG is in the process of updating the heavy duty truck model.

MODEL MODULES AND PROCEDURES

Household Classification and Population Synthesizer

This module classifies zonal households into several household segments. Prior to the application of Auto Ownership module, households are classified across the following four attributes:

1) Household Size (4 categories): the number of one-person households, two-person households, three-person households, and four or more person households.
2) Number of Workers (4 categories): the number of households with no worker, with one worker, with two workers, and with three workers or more.
3) Household Income (4 categories): the number of households with annual household income (in 1999 dollars) less than $20K (Low), $20K-$50K (Medium), $50K-$100K (High), and $100K or more (Very High).
4) Type of Dwelling Unit (2 categories): single-family detached, and multi-family/attached and group quarters.

For Home-Based-Work (HBW) trip generation, households are aggregated across the dwelling unit type and size attributes, and then further disaggregated into four Age of Head of Household groups (18 to 24 years old, 25 to 44 years old, 45 to 64 years old, and 65 years old or older).

The Population Synthesizer is a module that generates a synthetic population by expanding the existing disaggregate sample data (from Census PUMS data) to mirror known aggregate distributions of household and person attributes (from SCAG zonal data). The control variables used in the population synthesizer are the above-mentioned four household variables. A synthetic population is generated for the entire SCAG region using this procedure.

Auto Ownership Model

The auto ownership model provides an estimate of households by auto ownership level (0, 1, 2, 3, 4 or more) for each zone. This information is used in trip generation models to estimate zonal person trips. The basic structure of the auto ownership model is a multinomial logit formulation, using input socioeconomic variables (household size, household income, number of workers, and type of dwelling unit) and land use and accessibility variables (mixed residential and employment, intersection density, transit accessibility, and non-motorized accessibility).

Trip Generation Model

Trip generation is the process of estimating daily person trips generated by (i.e., trip production) and attracted to (i.e., trip attraction) each TAZ on an average weekday. The trip generation model contains 9 trip purposes: home-based work (HBW), home-based school (HBSC), home-based college/university (HBCU), home-based shopping (HBS), home-based social-recreational (HBSR), home-based serving-passenger (HBSP), home-based other (HBO), work-based other (WBO), and other-based other (OBO) trips. HBW trips are further split into 8 types based on two trip categories ("Direct" versus "Strategic") and four income categories (less than $20,000, $20,000 to $49,999, $50,000 to $99,999, and $100,000 or more). "Direct" home-work trips go directly between home and work. "Strategic" home-work trips include one or more intermediate

stops between home and work. In total, there are 16 trip types: 8 types for home-based work, and one type for each of the other 8 trip purposes.

Trip Distribution Model

The trip distribution model estimates the number of trips from each TAZ to each other TAZ. Destination choice models are developed for HBW, HBS, HBSR, HBSP, HBO, WBO, and OBO trip purposes while a gravity model approach is used to distribute trips for HBSC and HBCU trip purposes. The trip distribution is estimated as a function of the attractiveness of the destination zone and the travel impedance from origin to destination. The destination choice models include other variables, such as intrazonal indicators, employment or residential density variables, and flags for special generators. For each of the 9 trip purposes, the productions and attractions are split into both peak and off-peak periods.

Mode Choice Model

Mode choice is the process of taking the zone-to-zone person trips by trip purpose from the trip distribution model, and determining how many of these trips are made by various travel modes. The SCAG mode choice model is a nested logit model. The top branch of the nesting structure includes Auto, Transit, and Non-Motorized. The branch under Auto includes Drive Alone and Shared Ride which is further split into 2-person carpool, 3-person carpool, and 4-or-more person carpool. The branch under Transit includes Local Bus, Rapid Bus, Express Bus, BRT, Transit Way, Urban Rail, Commuter Rail, and HSR. The branch under Non-Motorized includes Walk and Bicycle. Separate mode choice models are estimated for each trip purpose and time period. Mode choice is a function of level of service attributes (in-vehicle travel time, out-of-vehicle travel time, fares, parking fees, roadway tolls, auto operating costs), household attributes such as income, and zonal attributes such as residential and employment densities.

Heavy Duty Truck (HDT) Model

According to the California Air Resources Board (ARB), a HDT is defined as a truck with a gross vehicle weight of 8,500 pounds or more. The SCAG HDT Model includes internal truck trip models and external truck trip models. The internal truck trips are generated using a cross-classification method by applying truck trip rates for a two-digit NAICS code by the number of employees in that category and also the number of households within each zone. The daily truck trip ends are distributed using a gravity model to create daily truck trips for each of the three truck types: 1) light HDT, 2) medium HDT, and 3) heavy HDT. The external truck trips are developed using an econometric model to estimate inbound and outbound commodity flows by counties. The county to county commodity data are allocated to the zonal level based on NAICS employee distribution and then converted to trucks trips using observed data collected during model development. Seaport and airport related truck trips were included as special generator truck trips. The daily truck trips by truck types are allocated to five time periods and merged with the auto trips in trip assignment.

Time of Day Model

The time of day model is used to allocate daily auto trips to five time periods of a day (AM peak: 6am-9am; Mid-day: 9am-3pm; PM peak: 3pm-7pm; Evening: 7pm-9pm; Night: 9pm-6am). It consists of discrete choice model with functions that consider the trip purpose, desired time of

travel, current time of travel, trip duration, flexibility in arrival and/or departure time, trip distance, and travel cost. The time of day model also converts person trip matrices in Production-Attraction (PA) format into vehicle matrices in Origin-Destination (OD) format.

Network Assignment Model

Network assignment is the process of loading vehicle trips on the appropriate networks. For highway assignment, the Regional Model consists of series of multi-class simultaneous equilibrium assignments for seven classes of vehicles (drive alone, 2-person carpool, 3-person carpool, 4 or more-person carpool, light HDT, medium HDT, and heavy HDT) and for each of the five time periods. During this assignment process, trucks are converted to Passenger Car Equivalent (PCE) for each link and each truck type based on 1) percentage of trucks, 2) percentage of grade, 3) length of the link, and 4) level of congestion (v/c ratios). Transit vehicles are also included in the highway assignment. For transit trip assignment, the final transit trips from the last loop mode choice models are aggregated by access mode and time period, and then assigned to transit networks for each time period. The vehicle trip tables obtained from mode choice, airport, and heavy duty models are aggregated to the 4,109 zone system (Tier-1 zones) prior to network assignment.

Model Convergence

In order to maintain consistency between the speeds predicted by the highway assignment and the travel times input to the entire travel demand model chain, the predicted speeds are used to re-compute highway and transit travel times, and the entire model sequence are repeated until input and output speeds are consistent with each other.

HPMS VMT-based Post-process

In this step, the outputs from the Network Assignment Model, which including traffic volumes, speeds, Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), and Vehicle Hours of Delay (VHD) are adjusted so that the base-year model VMT by air-basin by county is consistent with Highway Performance Monitoring System (HPMS) VMT as appropriate. Additional adjustments might be needed based on off-model analysis of Sustainable Communities Strategy (SCS) related Policies and Practices prior to the application of the Emissions Model.

Emissions Model

SCAG uses the EMFAC model developed by ARB to calculate on-road motor vehicle emissions. In the EMFAC model, the emission rates from each of the motor vehicle types are multiplied with vehicle activity data to calculate on-road motor vehicle emissions. The activity data taken from the regional model outputs include 1) highway link information such as volumes, distance, and congested speed and 2) intra-zonal trips, average travel time and distance. The output pollutants are ROG, CO, NOx, CO2, PM10, PM2.5, and SOx. Fuel consumption is also calculated.

MODEL OUTPUTS

Population Synthesizer Outputs

The synthetic households by Number of Workers, Household Size, Household Income, and Type of Dwelling Unit, and a separate classification of households by Number of Workers, Age of Household Head, and Household Income are the outputs from the Population Synthesizer module and the inputs to the Trip Generation Model.

Auto Ownership Model Outputs

The auto ownership model generates households by auto ownership, in other words, the number of households with 0 car, 1 car, 2 cars, 3 cars, and 4 or more cars for each zone, which are the inputs to the Trip Generation Model.

Trip Generation Model Outputs

The output from trip generation model includes person trip tables by 9 trip purposes, of which HBW trips are further split into 8 types by 4 income groups and Direct/Strategic categories for both peak and off-peak periods. These 32 person trip tables are used individually in the Trip Distribution step.

Trip Distribution Model Outputs

The Trip Distribution Model distributes person trips from each trip production zone to each and every attraction zones, resulting in 32 person trip Production/Attraction (P/A) matrices, which are the inputs to the Mode Choice Model.

Mode Choice Model Outputs

The outputs from the Mode Choice Model are person trip P/A matrices by 9 purposes, 14 travel modes (Drive Alone, 2-Person Carpool, 3-Person Carpool, 4 or more Persons Carpool; Local Bus, Rapid Bus, Express Bus, Transit Way Bus, BRT, Urban Rail, Commuter Rail, High Speed Rail; Walk and Bike), and 2 time periods (peak and off-peak). They are the inputs to the Time of Day Model. The Mode Choice Model also splits toll and non-toll trips.

Time of Day Model Outputs

The outputs from the Time of Day Model include passenger vehicle trip matrices in OD format by time period and occupancy level. These matrices are then combined with external trips, airport trips, and HDT trips to produce final vehicle OD matrices (3 passenger vehicle classes and 3 HDT classes in 5 time periods) for Network Assignment step. The 3 passenger vehicle classes are drive alone, 2-person carpool, and 3-person carpool. The 3 HDT classes are light HDT, medium HDT, and heavy HDT. Transit person trips matrices for each of five time periods are also produced in this step for transit assignment.

Network Assignment Model Outputs

Major outputs of the Network Assignment model are highway and transit level of service attributes, including traffic flows and the associated speeds, VMT, VHT, and VHD on the

highway networks as well as transit boarding and passenger loads on each transit line for each time period.

Emissions Model Outputs

The outputs of the emissions model are the quantities of various pollutants including ROG, CO, NOx, CO2, PM10, PM2.5, and SOx.

SCAG Attachment 3 - Subregional Roundtable Summary Results

SB 375 Leadership Roundtable Survey Results

The following table summarizes survey feedback received at the subregional Leadership Roundtables organized by SCAG in Imperial, Westside Cities, Ventura, San Gabriel Valley, North Los Angeles, Orange County, and San Bernardino. Each Roundtable was customized and only those questions that were asked at most of the Roundtables are listed on the table.

For questions 1 through 4, which focus on land use, subregions are at least open to exploring the strategy or in many cases have already or intend to integrate the strategy into future plans. Questions 5 through 7 focus on transportation strategies. For question 5, which deals with transportation investments, transit system expansion and complete streets stand out as being most important. Question 6, which deals with TSM strategies, traffic signal coordination, operational improvements to relieve bottlenecks, and transit system improvements (e.g. fewer stops) have the most support. Question

	Imperial	WCCOG	VCOG	SGVCOG	NLA	OCCOG	SANBAG	Average
1. Mixing Land Uses								
Fully adopted in our plans and policies	35%	58%	33%	40%	51%	31%	60%	44%
Intend to integrate into our current and future plans	38%	39%	42%	35%	36%	53%	30%	39%
Open to exploring this strategy	18%	0%	21%	8%	9%	14%	10%	11%
Need to study/assess this further before pursuing	9%	3%	5%	10%	2%	1%	0%	4%
Implausible for our city	0%	0%	0%	6%	2%	1%	0%	1%
2. Focusing New Growth Near Transit								
Fully adopted in our plans and policies	12%	31%	11%	26%	38%	15%	15%	21%
Intend to integrate into our current and future plans	38%	54%	30%	32%	42%	37%	40%	39%
Open to exploring this strategy	35%	9%	30%	6%	6%	19%	15%	17%
Need to study/assess this further before pursuing	9%	6%	9%	21%	10%	19%	5%	11%
Implausible for our city	6%	0%	20%	15%	4%	10%	25%	11%
3. Increasing Housing Densities within Employment Areas								
Fully adopted in our plans and policies	21%	38%	10%	18%	16%	31%	10%	21%
Intend to integrate into our current and future plans	24%	41%	35%	16%	53%	49%	55%	39%
Open to exploring this strategy	33%	7%	35%	29%	22%	13%	30%	24%
Need to study/assess this further before pursuing	21%	10%	15%	18%	4%	7%	5%	11%
Implausible for our city	0%	3%	5%	20%	6%	1%	0%	5%
4. Prioritizing Infill Development								
Fully adopted in our plans and policies	21%	70%	38%	44%	33%		40%	41%
Intend to integrate into our current and future plans	24%	21%	33%	27%	35%		30%	28%
Open to exploring this strategy	35%	6%	20%	15%	19%		20%	19%
Need to study/assess this further before pursuing	21%	3%	8%	10%	6%		10%	10%
Implausible for our city	0%	0%	3%	5%	7%		0%	2%
5. Transportation Investments (respondents asked to prioritize and reflects most important response)								
Transit System Expansion	50%	58%	54%	64%	47%	55%		55%
Complete Streets	39%	27%	37%	18%	47%	32%		33%
Traffic Calming	0%	10%	4%	12%	0%	10%		6%
Safe Routes to School	11%	5%	4%	6%	6%	3%		6%
6. TSM								
Parking management (e.g. maximum parking, sharec	8%		9%	25%	12%	10%		13%
Operational improvements to relieve bottlenecks	28%		28%	20%	20%	35%		26%
Ramp metering	0%		2%	0%	0%	0%		0%
Speed limit reductions	0%		2%	0%	4%	0%		1%
Traffic signal coordination (ITS)	47%		26%	22%	24%	27%		29%
Signal prioritization for transit	8%		2%	4%	6%	6%		5%
Transit service improvements (e.g. fewer stops, expr	8%		30%	29%	35%	22%		25%
7. TDM								
Parking pricing management	0%		2%	21%	19%	0%		8%
Telecommuting and alternative work schedules	26%		35%	26%	29%	17%		27%
Vanpooling	4%		5%	9%	8%	0%		5%
Vehicle Sharing (e.g. car sharing, bike sharing, park	9%		19%	28%	25%	11%		18%
Road pricing measures (HOT lanes, congestion prici	9%		40%	17%	19%	13%		19%
None of the above	52%					59%		22%

Note: Highest percentage responses are highlighted. Blank cells indicate that the exact question was not posed at the Leadership Roundtable.