

ARB Staff Release

**Draft Regional Greenhouse Gas Emission Reduction Targets
For Automobiles and Light Trucks
Pursuant to Senate Bill 375**

June 30, 2010

Electronic copies of this document can be found on ARB's website at <http://www.arb.ca.gov/cc/sb375/sb375.htm>. Alternatively, paper copies may be obtained from the Public Information Office, Air Resources Board, 1001 I Street, Visitors and Environmental Services Center, 1st Floor, Sacramento, California 95814, (916) 322-2990. If you are a person with limited English and would like to request interpreter services, please contact ARB's Bilingual Manager at (916) 323-7053.

For individuals with sensory disabilities, this document is available in Braille, large print, audiocassette, or computer disk. Please contact ARB's Disability Coordinator at (916) 323-4916 by voice or through the California Relay Services at 711, to place your request for disability services.

This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Written comments

ARB maintains a web-based comment system to provide an ongoing opportunity for public comment during the target-setting process. Interested stakeholders may submit comments on this document to ARB through the following website: <http://www.arb.ca.gov/cc/sb375/comments.htm>.

Written comments may also be sent directly to:

Attn: Ms. Lezlie Kimura Szeto
SIP and Local Government Strategy Section
California Air Resources Board
P.O. Box 2815
Sacramento, California 95812
Fax: (916) 322-3646

For general questions, contact:

Mr. Douglas Ito, Manager
SIP and Local Government Strategy Section
phone: (916) 322-0285
email: dito@arb.ca.gov

INTRODUCTION

For the first time statewide, Senate Bill 375 (SB 375), also known as the Sustainable Communities and Climate Protection Act of 2008, requires regional transportation plans to include a Sustainable Communities Strategy (SCS) that links transportation and land use planning together into a more comprehensive, integrated process. This more integrated approach to planning is not new. There are communities in California that are already taking actions that will support a more sustainable future. Over the past decade, many California regions have pursued regional blueprint planning efforts to explore growth scenarios to help guide local land use and transportation decisions. These efforts are broad-based, collaborative local planning exercises. Many of the regional transportation plans (RTPs) that the Metropolitan Planning Organizations (MPOs) have in place today are beginning to reflect these initial efforts.

SB 375 is a mechanism to help further these sustainable planning efforts. The SCS adds more detail to the traditional land use allocations used by MPOs to "...set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce greenhouse gas emissions from passenger vehicles to achieve, if there is a feasible way to do so, the greenhouse gas targets set by the state board...¹." Put most simply, the SCS is a mechanism for more effectively linking a land use pattern and a transportation system together to make travel more efficient and communities more livable. The result is reduced greenhouse gas emissions from passenger vehicles along with other benefits.

Under SB 375, the California Air Resources Board (ARB) is required to set passenger vehicle greenhouse gas emission reduction targets for 2020 and 2035 for each of the 18 MPO regions in California. ARB must set targets by September 30, 2010. The law also recognizes ARB's target-setting responsibility as a recurring process, allowing ARB to update the targets every four years.

To assist ARB in setting targets, SB 375 calls for ARB to appoint a Regional Targets Advisory Committee (RTAC) composed of representatives of MPOs; affected air districts; the League of California Cities; the California State Association of Counties; local transportation agencies; and members of the public, including homebuilders, environmental organizations, environmental justice organizations, affordable housing organizations, and others. ARB established the 21 member committee in January 2009 to recommend factors to be considered and methodologies to be used in setting targets. The RTAC delivered its recommendations to ARB in September 2009.

The RTAC's final report contains a number of recommendations on SB 375 implementation issues. One key technical recommendation is for the targets to be expressed in terms of a percent reduction in per capita greenhouse gas emissions from a 2005 base year. The metric is simple, easily understood, can be developed

¹ Government Code Section 65080(b)(2)(A)(i)

with currently available data, and is used by MPOs today. This metric also has the advantage of directly addressing growth rate differences among the regions. Beyond its technical recommendation on the target metric, the RTAC also made recommendations on the target-setting process. The Committee emphasized the need for a high degree of collaboration among ARB and the MPOs, since MPOs are directly responsible for carrying out the planning requirements in SB 375. To help guide the collaboration through the target-setting process, the RTAC outlined a multistep “bottom-up” approach. ARB and the MPOs have been following this approach over the past nine months, to the extent that time and resources have allowed.

In addition to its recommendations on target-setting, the RTAC also made recommendations on longer-term implementation issues. In particular, the RTAC recognized the importance of highlighting the additional benefits, beyond greenhouse gas reductions, that communities and local governments can realize from sustainable planning efforts under SB 375. Some of these potential benefits include increased mobility, cleaner air, improved health, better protection of our State’s natural resources, and cost savings. The RTAC recommended that MPOs identify, quantify, and highlight these and other co-benefits in their planning processes. MPOs can quantify some of the benefits, such as reduced congestion, through their own local planning processes using their existing travel models. The RTAC did recognize the limitation in the available methods, and acknowledged that additional tools are needed to help quantify community co-benefits.

Following the completion of the RTAC report, MPO staff formed a technical working group, which included ARB staff, to coordinate the development of various land use and transportation policy scenarios for ARB’s target-setting process. These scenarios were developed to test the effectiveness of implementing various transportation and land use policies. The MPOs discussed technical issues including: land use and transportation strategies that could be tested in the MPO scenarios, different approaches to interregional travel, travel cost assumptions, and future revenue assumptions. A number of MPOs provided the initial results of their scenario analyses and target-setting approaches to ARB and the public in time for the final RTAC meeting on May 25, 2010.

Over the last six months, a number of MPOs developed planning scenarios that use travel models and other technical tools to show how a region’s land use and travel patterns can change over time using different assumptions about land use and transportation policies. Many MPOs started developing these scenarios by building on existing blueprint efforts and other sustainable planning actions in their regions. While these scenarios are not the official long-range plans adopted by the regions, they do provide insight into the potential benefits that may result from different sets of local and regional land use and transportation policy decisions. The MPO scenarios are intended to inform the target-setting process and show ARB and the public the possible benefits of more integrated planning under SB 375.

Over the long-term, these potential benefits are expected to grow as land use and transportation plans shift to reflect changing demographics, market trends, and sustainability goals. When looking at the data provided by the MPOs, it is clear that it will take several four-year RTP planning cycles for the land use forecasts and transportation investments to fully reflect the changes envisioned by SB 375.

DRAFT TARGETS

For the 2020 targets, two points have consistently been made over the past few months by MPO staff and other stakeholders. First, significant change in land development patterns and transportation infrastructure will take time. As a result, a significant portion of the built environment in 2020 will be defined by decisions that have already been made, and a large portion of the near-term benefits will come from improving the efficiency of each region's existing transportation network. Second, the timing of economic recovery, including the recovery of the housing market and resources for local planning and implementation, will matter. Many MPOs have reported that their forecasts are adjusted to account for some of the near-term effects of the recession in their regions. Given the relatively short forecast period between now and 2020, those adjustments are important.

For the 2035 targets, ARB staff recognizes that the forecasting uncertainties are much greater than for the 2020 scenarios. While significant changes in land use patterns and transportation infrastructure can be expected over the next 25 years, predicting the pace and nature of change is challenging. A number of MPOs are continuing to develop additional land use and transportation scenarios which will be considered in the final staff target proposal.

In recognition of the additional MPO work underway, ARB staff is releasing a draft 2020 target range for the four largest MPOs, placeholder 2035 target ranges for the four largest MPOs, and placeholder target ranges for the San Joaquin Valley MPOs for both 2020 and 2035. While the draft targets for these MPOs are now ranges, ARB staff will propose specific targets for each region for ARB Board consideration in September. For the remaining six MPOs, ARB staff proposes an alternative approach for setting targets. These approaches are described in greater detail below.

Four Largest MPOs

The four largest MPOs in the State² clearly demonstrated the capability to bring significant staff and technical resources to the target-setting process. These MPOs have provided the most complete technical information and scenario results. Based on the information provided, ARB staff is proposing a 2020 draft target range of five to ten percent per capita reduction in greenhouse gas emissions from 2005 levels. This range is based on the potential reductions from land use and transportation planning scenarios provided by the MPOs.

² Metropolitan Transportation Commission, Sacramento Area Council of Governments, San Diego Association of Governments, and Southern California Association of Governments

**Table 1. Four Largest MPOs
Draft Greenhouse Gas Reduction Targets for 2020
(Percent Reduction in Per Capita Emissions Relative to 2005)***

MPO Regions	2020 Draft Targets
Metropolitan Transportation Commission (MTC) Sacramento Area Council of Governments (SACOG) San Diego Association of Governments (SANDAG) Southern California Association of Governments (SCAG)	5 - 10%

* Percent reduction numbers do not include emission reductions expected from Pavley Greenhouse Gas Vehicle Standards and Low Carbon Fuel Standard measures.

There is less complete information available for setting the long-term 2035 targets than for 2020. This is evident in the variability of the scenario results for the four large MPOs, which the MPOs point out, include policy scenarios that would be easily achievable by the region, as well as extremely aggressive policy scenarios that could not realistically be implemented³.

At this time, only the Southern California Association of Governments has identified a target range for 2035: a five to six percent reduction in per capita greenhouse gas emissions from 2005 levels. However, the Executive Directors for each of the four largest MPOs have acknowledged the need for additional work to be done prior to setting final targets, and have committed to continuing the technical work in the coming weeks.

Given the status of work on 2035 scenarios, ARB staff is proposing to use each MPO's individual 2035 scenario range as the 2035 placeholder targets.

**Table 2. Four Largest MPOs
Placeholder Greenhouse Gas Reduction Targets for 2035
(Percent Reduction in Per Capita Emissions Relative to 2005)***

MPO Regions	2035 Placeholder Targets
Metropolitan Transportation Commission (MTC)	3-12%
Sacramento Area Council of Governments (SACOG)	13-17%
San Diego Association of Governments (SANDAG)	5-19%
Southern California Association of Governments (SCAG)	3-12%

* Percent reduction numbers do not include emission reductions expected from Pavley Greenhouse Gas Vehicle Standards and Low Carbon Fuel Standard measures.

³ See Appendix for MPO descriptions of scenarios. Full MPO data submittals can be viewed on ARB's website: <http://www.arb.ca.gov/cc/sb375/data/data.htm>

San Joaquin Valley MPOs

The San Joaquin Valley (Valley) MPOs⁴ have a long history of multi-county coordination that is recognized in SB 375 through a special provision granting the Valley MPOs the option of developing a joint SCS. To address SB 375, the Valley MPOs are using the existing valleywide planning structure to coordinate on SB 375 implementation.

The San Joaquin Valley is a rapidly growing region, with population growth rates double those in most other areas of the State. Whether it is done collectively as a Valley or as individual counties, the local and regional planning efforts to accommodate this expected population growth are extremely relevant to the long-term success of SB 375.

Consistent with their history of coordination on air quality, transportation, and other regional issues, the Valley MPOs have been working together to provide baseline data to ARB. This effort culminated in data submissions from Fresno and Kern, and a joint effort from the remaining six Valley MPOs.

Four of the eight Valley MPOs provided target-setting scenarios and three provided recommended targets⁵. The San Joaquin Council of Governments provided a target-setting scenario based on data from the local blueprint effort and supplemented by updated information about local jurisdictions' planned growth and General Plan updates. The Council of Fresno County Governments submitted scenarios and suggested greenhouse gas emission reduction targets that reflect ongoing discussions with their local jurisdictions about the region's approach to target-setting. The Kern Council of Governments provided scenarios and suggested targets that are based on existing plans; removed the travel impacts from strategic employment resources, defined as military bases, wind farms, and prisons; and reflected an increase in per capita greenhouse gas emissions. The Kings County Association of Governments recommended a target that relies on current baseline projections and reflects progress that has been made to implement the local blueprint. To date, the San Joaquin Valley MPO submittals span a range in per capita greenhouse gas emissions from a seven percent reduction to a twelve percent increase.

Overall, the data from the Valley MPOs provides a limited technical foundation for target-setting. ARB staff intends to work closely with the San Joaquin Valley MPOs before recommending final targets. In the interim, staff is guided by the principle that the targets in the San Joaquin Valley should reflect a reduction, not an increase, in per capita greenhouse gas emissions. As a result, staff is releasing a placeholder target range of one to seven percent reduction for both the 2020 and 2035 targets in

⁴ Council of Fresno County Governments, Madera County Transportation Commission, Merced County Association of Governments, Kern Council of Governments, Kings County Association of Governments, San Joaquin Council of Governments, Stanislaus County Council of Governments, and Tulare County Association of Governments

⁵ See Appendix for MPO descriptions of scenarios. Full MPO data submittals can be viewed on ARB's website: <http://www.arb.ca.gov/cc/sb375/data/data.htm>

the San Joaquin Valley, reflecting the portion of the Valley MPOs' submitted ranges that result in per capita greenhouse gas emission reductions.

**Table 3. San Joaquin Valley MPOs
Placeholder Greenhouse Gas Reduction Targets for 2020 and 2035
(Percent Reduction in Per Capita Emissions Relative to 2005)***

MPO Regions	2020 Placeholder Targets	2035 Placeholder Targets
Council of Fresno County Governments Madera County Transportation Commission Merced County Association of Governments Kern Council of Governments Kings County Association of Governments San Joaquin Council of Governments Stanislaus County Council of Governments Tulare County Association of Governments	1-7%	1-7%

* Percent reduction numbers do not include emission reductions expected from Pavley Greenhouse Gas Vehicle Standards and Low Carbon Fuel Standard measures.

Remaining Six MPOs

Collectively, the remaining six MPOs⁶ represent about five percent of both the State's greenhouse gas emissions and vehicle miles traveled from passenger vehicles. They have the most limited resources, staffing, and technical expertise to bring to the target-setting process.

For these MPOs, ARB staff is proposing to use the most current greenhouse gas per capita projections from each MPO, adjusted for the impacts of the recession, as the basis for individual MPO targets for this first target-setting cycle. This approach allows the focus of this first target-setting cycle to appropriately remain on the largest and fastest growing regions of the state.

ARB staff will continue to work closely with these six MPOs to ensure the most current projections from each region are used. Based on the MPO submittals to date from this group, ARB staff anticipates some will identify greenhouse gas emission reductions beyond what is currently reflected in their adopted RTPs.

NEXT STEPS

These proposed draft targets will be revised after a public workshop process. A final staff proposal will be released in August and the Board will consider adoption of targets in September.

⁶ Association of Monterey Bay Area Governments, Butte County Association of Governments, San Luis Obispo County Council of Governments, Santa Barbara County Association of Governments, Shasta County Regional Transportation Planning Agency, and Tahoe Metropolitan Planning Organization

Appendix

Excerpts of MPO Target Setting Scenarios and Results

This Appendix contains excerpts from the full MPO submittals. They are intended to provide an overview of the MPO descriptions of their target setting scenarios and resulting greenhouse gas emission reductions. For the full MPO submittals, please see the ARB website: <http://www.arb.ca.gov/cc/sb375/mpo/info.htm>

Excerpts are included for the following MPOs:

Bay Area Metropolitan Transportation Commission (MTC)
Sacramento Area Council of Governments (SACOG)
San Diego Association of Governments (SANDAG)
Southern California Association of Governments (SCAG)

Council of Fresno County Governments (COFCG)
Kern Council of Governments (KCOG)
Kings County Association of Governments (KCAG)
San Joaquin Council of Governments (SJCOG)

Butte County Association of Governments (BCAG)
San Luis Obispo Council of Governments (SLOCOG)
Santa Barbara County Association of Governments (SBCAG)

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

**Bay Area Metropolitan Transportation
Commission (MTC)**



**METROPOLITAN
TRANSPORTATION
COMMISSION**

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
TEL 510.817.5700
TDD/TTY 510.817.5769
FAX 510.817.5848
E-MAIL info@mtc.ca.gov
WEB www.mtc.ca.gov

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.

J:\SECTION\PLANNING\MTC Scenario Development 1 pager rev.doc

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

Sacramento Area Council of Governments
(SACOG)



Description of SACOG Scenario Testing For SB375 Greenhouse Gas Reduction Target Setting

Introduction

SACOG tested seven policy scenario options, in concert with other large MPO's around the state involved in GHG target setting for SB375. This work was done to inform SACOG, other MPO's, the Regional Targets Advisory Committee, and CARB regarding the GHG reduction potential of various scenario options. This information was presented to SACOG's Transportation Committee, along with a proposed range for GHG reduction targets, and released for public comment on May 6, 2010. This document provides more details on the content of scenarios, analysis approach, and results.

Description of Scenario Options

The most basic scenario is the adopted Metropolitan Transportation Plan or MTP ("A Creative New Vision for Transportation in the Sacramento Region", adopted in 2008). The adopted MTP was the first long range transportation plan which the region developed after the Blueprint process was complete. Six other test scenarios were tested, each of which expands or enhances implementation of various policies over-and-above the adopted MTP. The policies are organized into one of four "bundles", as follows:

- Land use measures
- Transportation system development
- Transportation system and demand management
- Transportation pricing

Scenario 1 is the currently adopted MTP. The adopted MTP is largely, but not completely, consistent with the Blueprint land use vision adopted in 2004. The amount of transit service is increased by almost 80% from 2005, on a service-hours-per-capita basis. System and demand management is expanded marginally from current deployment levels, after accounting for population growth. No transportation pricing policies are included in the MTP.

Each of the policy bundles, with the exception of pricing, is represented to some degree in the MTP. The scenario options for this analysis are conceptually defined as enhanced implementation of these policy bundles, compared to the levels included in

the current MTP. Scenarios 2 through 5 each focus on expanding/enhancing one policy bundle, in addition to currently planned investments.

- **Scenario Option 2 (Land Use Enhancement)** is more consistent with the Blueprint's distribution of new residential housing stock. The growth share for single family large lot units is about 30% (compared to 36% for the MTP), and the combined small-lot-single-family and attached unit share is 68% (compared to 61% for the MTP). Residential units in Transit Priority Areas accounted for 46% of the growth (compared to 36% for the MTP)¹.
- **Scenario Option 3 (Transit Enhancement)** expands investment in transit compared to the MTP. As mentioned above, the adopted MTP would significantly expand transit by 2035, compared to 2005 levels; this scenario increases transit service by 18 percent compared to the MTP, with service expansion focused on the most productive transit corridors.
- **Scenario Option 4 (System and Demand Management Enhancements)** expands the planned investments in transportation systems and demand management in the adopted plan. The adopted MTP includes some expansion of the current employer-based programs (primarily marketing, education, and coordination), and growth of the region's ITS and incident management to account for population growth. Scenario 4 would expand the investment in employer-based programs to include more direct incentives for non-single-occupant vehicle commuting (e.g. transit passes, non-motorized subsidies, etc.), and provide more resources for ITS and incident management. Additionally, this scenario would provide some level of public subsidy to establish car-sharing programs in at least 2 communities or employment centers where market demand alone is unlikely to support a private car-sharing venture.
- **Scenario Option 5 (Pricing)** would add significant new transportation pricing policies to the adopted MTP. Four policies are included: congestion pricing for the regions major freeways, with tolls ranging from \$0.10 to \$0.25 per mile; a general VMT-based charge of \$0.01 to \$0.03 per mile; policy-based increases to off-street parking charges at employment centers; and additional subsidies to transit fares, to reduce out-of-pocket costs for using transit.

Scenario options 6 and 7 look at combining the policy bundles:

- **Scenario Option 6** would combine Options 2, 3, and 4; no pricing policies are included.
- **Scenario Option 7** would combine Options 2, 3, 4 and 5.

Table 1 provides a summary comparison of the seven scenario options.

¹ For purposes of SB375, transit priority areas (TPAs) are defined by service expected to be in the horizon year of the adopted MTP. These growth percentages are computed based on applying this definition to the base year dwellings. If TPAs are defined by 2005 transit service in the base year, a much smaller number of dwelling units fall in TPAs in 2005 (approximately 103,000), and the growth share in TPAs would be much higher.

Table 1. Land Use & Transportation Characteristics of Scenario Options

Scenario Option	Year	Land Use Characteristics	Transportation Characteristics
Base year	2005	33% of residential use is compact (attached or small lot single family). 47% of dwellings are in Transit Priority Areas.	4% of freeways are HOV lanes, 19% of transit service is high frequency. TSM/TDM deployment is moderate. No car sharing or pricing programs.
1: Adopted MTP2035	2020	Compact residential is 54% of growth. 34% of residential growth is in Transit Priority Areas.	The HOV lane miles per capita more than doubles compared to 2005, and transit service is +22%. TSM/TDM increases with population. Minimal car sharing. No policy-based pricing.
	2035	Compact residential is 61% of growth. 36% of residential growth is in Transit Priority Areas.	Continued modest increase in HOV lanes, and transit service is +79% compared to 2005 per capita service. TSM/TDM increases with population. Minimal car sharing. No policy-based pricing.
2: MTP + Land use enhancements	2020	Compact residential is 61% of growth. 44% of residential growth is in Transit Priority Areas.	No change from Adopted MTP.
	2035	Compact residential is 68% of growth. 46% of residential growth is in Transit Priority Areas.	No change from Adopted MTP.
3: MTP + Transit enhancements	2020	No change from Adopted MTP.	Transit service 16% above Adopted MTP.
	2035	No change from Adopted MTP.	Transit service 18% above Adotped MTP.
4: MTP + Transportation System and Demand Management enhancements	2020	No change from Adopted MTP.	TSM/TDM grows faster than population growth. Car sharing more widespread than in MTP.
	2035	No change from Adopted MTP.	TSM/TDM grows faster than population growth. Car sharing more widespread than in MTP.
5: MTP + Transportation Pricing	2020	No change from Adopted MTP.	\$0.01/VMT, \$0.10/congested VMT, +25% in employment center parking, 10% transit fare reduction.
	2035	No change from Adopted MTP.	\$0.03/VMT, \$0.25/congested VMT, +50% in employment center parking, 25% transit fare reduction.
6: MTP+Land Use, Transit, and TSM/TDM	2020	See option 2.	See options 3 and 4.
	2035	See option 2.	See options 3 and 4.
7: MTP + All enhancements	2020	See option 2.	See options 3, 4, and 5.
	2035	See option 2.	See options 3, 4, and 5.

Source: SACOG, May 2010.

Each scenario option is based on enhanced, coordinated implementation of the policy bundles, without explicit reference to cost or actual implementation feasibility, so this testing focused on the benefits which could be reasonably expected from implementation of the policies.

SACOG will transition from this scenario testing for GHG target setting to a more rigorous scenario analysis for its MTP update through Summer and Fall 2010. Through this MTP scenario analysis, SACOG will consult with local agencies in the SACOG region and the costs, cost-effectiveness and implementation potential of the various programs and projects will be considered.

Coordination with Other MPO's on Scenario Definition and Assumptions

As mentioned above, SACOG staff coordinated with other MPO's around the state in the definition of the scenarios, as follows:

- Definition of Scenarios
 - The MPO's agreed to create logical scenarios combining land use measures, transportation system development (i.e. capital and system expansion projects), demand and system management strategies, and pricing.
 - Each MPO combined these measures in different ways, but to the degree possible, standardized their descriptions of the deployment level of each measure.
- Fuel prices and average mileage for passenger vehicle fleets standardized:
 - Per gallon fuel prices, in Year 2009 dollars: \$4.74 in 2020; \$5.24 in 2035 (compared to \$2.67 in 2005).
 - Average fleet mileage based on CARB EMFAC + Pavley/Low Carbon Fuel post-processor estimates by MPO. For SACOG:
 - 20.6 mpg in 2005
 - 25.5 mpg in 2020
 - 29.3 mpg in 2035
- Growth projections
 - The most recent growth projections should be used including the effects of the current housing and economic downturn.
 - SACOG's revised projections are shown in Table 2.

Table 2. Revised SACOG Growth Projections

Year	Revised Growth Projections for Test Scenarios Analysis		Growth Projections for 2008 MTP		Differences (Revised minus MTP)	
	Household Population	Jobs	Household Population	Jobs	Household Population	Jobs
2005	2,245,700	1,024,500	2,245,700	1,024,500		
2008	2,309,968	1,021,472	2,324,800	1,069,467	-14,832	-47,995
2020	2,660,127	1,172,053	2,769,200	1,282,426	-109,073	-110,373
2035	3,218,700	1,364,000	3,413,136	1,529,100	-194,436	-165,100

Source: Center for Continuing Study of the California Economy and SACOG, March 2010.

Scenario Analysis Approach

The test scenario options were evaluated using five basic travel indicators: passenger vehicle GHG; passenger vehicle miles traveled (VMT); transit trips; non-motorized (i.e. bike and walk) trips; and congested VMT.

The primary source of estimates for future year changes to travel indicators is the Sacramento Activity-Based Travel Simulation Model (SACSIM). SACSIM is unique among regional travel demand models in that it uses parcel-level land use data. SACSIM was one of the first regional travel demand models to implement a person-based simulation of travel demand for all household-generated travel, using a day-pattern, tour approach for representing travel. SACOG also elected to develop SACSIM using parcel level data mainly because the capacity to analyze the effects of land use on travel behavior requires data far more detailed than conventional traffic analysis zones. These features and SACSIM's documented sensitivity to key factors like land use, demographics, transportation costs and proximity to transit make SACSIM a powerful tool for measuring the potential for influencing travel through both land use and transportation policies.

SACOG recognizes that SACSIM does not explicitly model the effects of many "supply side" management policies (e.g. incident management, ITS, etc.)², transportation demand management policies (e.g. employer-based TDM strategies), and pricing (especially congestion pricing)³. For these policies, post-processing adjustments to

² SACOG is engaged in the Strategic Highway Research Program, Phase 2 "C10" project, which will link SACSIM to a micro-simulation assignment software package; this work is expected to be complete in 2012, and will significantly enhance SACSIM as an evaluation tool for supply-side, operations-oriented strategies.

³ SACOG has been awarded funding from the California Strategic Growth Council for enhancement of SACSIM's representation of travel costs, and development of the capability to represent pricing policies such as congestion pricing and transit fares. This work will be completed by 2012.

SACSIM model results were made. Table 3 provides an accounting of the modeling and post-processing used for the analysis of scenario options.

Table 3. Analysis Approaches for Scenario Options

Analysis Approach	Policy Bundles			
	Land Use	Transp. System Devel.	System + Demand Mgmt.	Pricing
SACSIM	X	X	X	X
Post-Processing			X	X

Source: SACOG, May 2010.

Post-Processing of SACSIM Forecasts

The “Moving Cooler” report provides information on the GHG reduction potential for several system and demand management strategies, at different deployment levels and for different horizon years. These reduction estimates for the “Aggressive Deployment” level for 2020 and 2030 are used as a basis for computing GHG reduction percentages which are applied to the basic SACSIM forecasts prepared for this analysis. The calculated post-processing reductions for system and demand management policies, cumulatively, are:

- For Scenario 1 (Adopted MTP), and for scenarios based on MTP (2, 3 and 5):
 - -0.6% in GHG per capita;
 - -0.5% in VMT per capita;
 - +0.2% in transit trips per capita (equivalent to about 600 trips per day in 2020, and 1,300 in 2035)
 - -0.4% reduction in congested VMT per capita.
- For Scenario 4 (MTP + System/Demand Management Enhancements), and for scenarios based on Scenario 4 (6 and 7):
 - -1.1% in GHG per capita;
 - -1.0% in VMT per capita;
 - +0.5% in transit trips per capita (equivalent to about 1,000 trips per day in 2020, and 1,900 in 2035)
 - -0.8% reduction in congested VMT per capita.

The pricing policy bundle was assumed to include four elements: congestion pricing; VMT charges; parking pricing; and additional transit fare subsidy. For each policy, the “market” for potentially affected travelers was based on the basic SACSIM model runs performed for this analysis. Each policy was enumerated in terms of the most likely increase to average travel cost to the affected travelers. Published elasticities are then applied to compute changes in VMT and number of trips to compute the most

likely changes to travel indicators. The resulting changes in VMT are compared to those published for the above-referenced analysis performed by MTC, to judge reasonable-ness of the results.

- For Scenario 5 (MTP + Pricing) and for Scenario 7 (MTP + All Policies):
 - For 2020 deployment level (see Table 2):
 - -2.6% reduction in GHG per capita;
 - -2.2% reduction in VMT per capita;
 - +3.5% increase in transit trips per capita; and
 - -1.9% reduction in congested VMT per capita.
 - For 2035 deployment level (see Table 2):
 - -4.6% reduction in GHG per capita;
 - -4.1% reduction in VMT per capita;
 - +8.1% increase in transit trips per capita; and
 - -3.3% reduction in congested VMT per capita.

SACOG Scenario Analysis Results

Table 4 provides a detailed accounting of the results of the analysis for the seven scenarios options.

GHG Reduction Results

For GHG reductions, the key metric was the percentage reduction in per capita passenger vehicle GHG, compared to Year 2005⁴. Year 2005 estimated GHG per capita is 22.4 pounds per day.

- The Adopted MTP (#1) resulted in the following GHG reductions:
 - 4 percent by 2020
 - 13 percent by 2035
- The smallest added reductions, compared to the Adopted MTP, were generated by the Transit Enhancements (#3), and by Expanded System Management (#4). The reductions were less than 1 percent over-and-above the Adopted MTP for both 2020 and 2035.
- Land Use Enhancement (#2) and Pricing (#5) both generated additional reductions of 1 percent or greater, compared to the Adopted MTP, for most horizon years.
- Combining Land Use, Transit, and Expanded System Management (#6) resulted the following GHG reductions:
 - 7 percent by 2020 (3 percent more than the Adopted MTP)
 - 14 percent by 2035 (nearly 2 percent more than the Adopted MTP)
- Adding Pricing to the Scenario Option 6 resulted in the following GHG reductions:
 - 8 percent by 2020 (4 percent more than the Adopted MTP)

⁴ Note that the estimates of GHG reduction presented in this report are “pre-Pavely/LCF”—i.e. they do not account for the effect of implementation of these other elements of AB32, and only include the effects of land use and transportation changes.

- 17 percent by 2035 (5 percent more than the Adopted MTP)

Other Benefits

Although the focus of this scenario analysis was GHG reduction potential, other metrics are of interest as well, and are included in Table 4.

- For transit ridership:
 - Land Use Enhancement (#2) generated the largest individual increases (22 percent more transit trips than the Adopted MTP in 2020, and 14 percent more in 2035)
 - Transit Enhancement (#3) and Pricing Only (#5) had the next largest individual increases relative to the Adopted MTP (4 to 6 percent in 2020, 13 percent in 2035)
 - The combined scenarios (#6 and #7) both had 27 percent or greater increases in transit ridership, compared to the adopted MTP.
- Congestion reductions were forecasted for all options, relative to the Adopted MTP⁵:
 - Land Use Enhancement (#2) generated the largest individual decreases in congestion (8 percent reduction compared to the Adopted MTP in 2020, and 2 percent in 2035).
 - Pricing (#5) generated the next largest decrease in congestion (about one-half percent in 2020, and 2 percent in 2035).
 - The combined scenarios generated 11 percent decreases in 2010, and 4 percent in 2035.

⁵ Some of the congestion reduction shown for all alternatives is related to the reduction in population and jobs in the revised growth projections. The final changes to congestion will take account of the reduced revenues, and reduced transportation projects funded through those revenues, in the update of the MTP.

Table 4. SACOG Scenario Testing Results

Scenario	Horizon Year:		Travel Indicators				
			Pass.Veh. GHG Per Capita (lbs per weekday)	Pass.Veh. VMT Per Capita (mile per weekday)	Transit Trips per Capita (trips per weekday)	Walk or Bike Trips per Capita (trips per weekday)	Congested Miles Traveled Per Capita (miles per weekday on congested)
2005	Base Year for 2008 MTP		22.4	23.5	0.05	0.30	1.6
1: Adopted MTP (2008)	2020	#	21.5	23.0	0.06	0.32	1.4
		% Change From 2005	-4.0%	-2%	+31%	+6%	-11%
	2035	#	19.6	21.2	0.09	0.34	1.3
		% Change From 2005	-12.6%	-10%	+77%	+14%	-19%
2: Land Use Enhancements	By 2020:	#	21.1	22.6	0.08	0.33	1.3
		% Change From 2005	-5.9%	-4%	+53%	+10%	-18%
	By 2035:	#	19.3	20.9	0.09	0.36	1.3
		% Change From 2005	-13.8%	-11%	+91%	+20%	-21%
3: Transit Enhancements	By 2020:	#	21.5	23.0	0.07	0.32	1.4
		% Change From 2005	-4.1%	-2%	+37%	+6%	-11%
	By 2035:	#	19.6	21.2	0.09	0.34	1.3
		% Change From 2005	-12.7%	-10%	+89%	+14%	-19%
4: TSM/TDM Enhancements	By 2020:	#	21.4	22.9	0.06	0.32	1.4
		% Change From 2005	-4.5%	-3%	+31%	+7%	-11%
	By 2035:	#	19.5	21.1	0.09	0.34	1.3
		% Change From 2005	-13.1%	-10%	+77%	+14%	-19%
5: Pricing	By 2020:	#	21.3	22.8	0.07	0.32	1.4
		% Change From 2005	-4.7%	-3%	+35%	+7%	-11%
	By 2035:	#	19.0	20.6	0.09	0.35	1.3
		% Change From 2005	-15.1%	-12%	+90%	+15%	-20%
6: Combine Land Use, Transit, TSM/TDM	By 2020:	#	20.9	22.4	0.08	0.33	1.3
		% Change From 2005	-6.5%	-5%	+60%	+10%	-21%
	By 2035:	#	19.2	20.7	0.10	0.36	1.2
		% Change From 2005	-14.4%	-12%	+103%	+20%	-21%
7: Combine Land Use, Transit, TSM/TDM and Pricing	By 2020:	#	20.6	22.2	0.08	0.33	1.2
		% Change From 2005	-7.9%	-6%	+64%	+11%	-22%
	By 2035:	#	18.5	20.1	0.11	0.37	1.2
		% Change From 2005	-17.4%	-14%	+119%	+22%	-23%

Source: SACOG, May 2010.

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

San Diego Association of Governments
(SANDAG)



401 B Street, Suite 800
 San Diego, CA 92101-4231
 (619) 699-1900
 Fax (619) 699-1905
 www.sandag.org

June 4, 2010

3100000

MEMBER AGENCIES

- Cities of
- Carlsbad
- Chula Vista
- Coronado
- Del Mar
- El Cajon
- Encinitas
- Escondido
- Imperial Beach
- La Mesa
- Lemon Grove
- National City
- Oceanside
- Poway
- San Diego
- San Marcos
- Santee
- Solana Beach
- Vista
- and
- County of San Diego

ADVISORY MEMBERS

- Imperial County
- California Department of Transportation
- Metropolitan Transit System
- North County Transit District
- United States Department of Defense
- San Diego Unified Port District
- San Diego County Water Authority
- Southern California Tribal Chairmen's Association
- Mexico

Mr. Doug Ito
 Manager
 Air Quality and Transportation Planning Branch
 California Air Resources Board
 1001 I Street, 7th Floor, Box 2815
 Sacramento, CA 95814

Dear Mr. Ito:

SUBJECT: Scenario Testing for Greenhouse Gas Target Setting Pursuant to RTAC Recommendations Under SB 375 and Response to Information Request

SANDAG staff has initiated discussions with the SANDAG Board of Directors regarding the initial scenario testing for the greenhouse gas (GHG) target setting process. Pursuant to recommendations in the Regional Targets Advisory Committee (RTAC) report, SANDAG has coordinated extensively with the other Metropolitan Planning Organizations (MPOs) in the State to develop a comparable analysis of the currently adopted Regional Transportation Plans (RTPs) and how various transportation and policy scenarios perform in regard to GHG emissions in the years 2020 and 2035. The purpose of this letter is to formally transmit this information to staff at the California Air Resources Board (CARB) and provide responses to the questions CARB presented to the MPO planning directors at their June 1, 2010, meeting.

Target Setting Analysis

The SANDAG Board of Directors was presented with the initial results of the scenario testing process on May 14, 2010 (Attachment 1). After discussion by the Board regarding modifications to some of the assumptions that staff made in the scenarios, a hybrid scenario was prepared and presented to the Board on May 28, 2010 (Attachment 2).

While the hybrid scenario did perform well compared to the other scenarios, there are several important points that the SANDAG Board of Directors wishes to express to the CARB for their consideration.

1. These scenarios have not been constrained by the actual revenues that will be available when the Board begins to prioritize investments as part of the RTP development process, so CARB should not expect that all the assumptions made in the scenario development process, or the resulting greenhouse gas reductions, are financially feasible. It should be noted that, in developing its adopted 2030 RTP, SANDAG developed two

funding scenarios: the *Revenue Constrained scenario*, limited to \$41 billion in traditional funding sources; and the *Reasonably Expected Revenue scenario*, a more aggressive \$57 billion scenario that includes additional funding. The Revenue Constrained scenario is a federally required scenario that must be analyzed for air quality conformity purposes and is used to program projects in the Regional Transportation Improvement Program (RTIP). In contrast, the Reasonably Expected Revenue scenario assumes both current sources of transportation revenue as well as potential future revenue sources – such as attracting additional state and federal funds for major capital projects and increases in state and federal gas taxes based on historical trends.

In developing the alternative scenarios that we tested in the SB-375 target setting analysis, particularly in the area of transportation system improvements, we included projects that were contained in the Reasonably Expected Revenue scenario but not in the Revenue Constrained scenario in the adopted 2030 RTP. It should be emphasized that, unless additional revenue sources are identified, some or all of those projects will not be able to be included in the next RTP.

2. While two land use scenarios were tested against the GHG reduction scenarios (the adopted 2050 growth forecast and an intensified version of the 2050 growth forecast), the Board of Directors was clear that any additional land use intensification should not be considered by CARB as the recently adopted 2050 growth forecast already includes significant increases in compact development compared to the previous growth forecast.
3. None of the measures included in any of the scenarios have been adopted by the SANDAG Board of Directors and inclusion of any of these measures and the level of deployment will not be determined until the SANDAG Board establishes the transportation project evaluation criteria and has a better understanding of the revenues that will be available for the RTP.

Understanding these significant caveats to the assumptions that were made in developing the scenarios that were tested, SANDAG respectfully submits the attached reports to CARB staff for their consideration in the draft GHG target setting process.

MPO Follow Up Questions from CARB

SANDAG staff has prepared the following responses to questions transmitted to the MPOs by CARB staff on June 1, 2010.

1. If you were to fully account for the impact of the recession in your region, how would the % reductions in GHG/capita numbers change for each scenario in 2020?

Response: It is likely that the recession would have an impact on forecasted revenues through 2020, compared to the revenue forecast that was used in SANDAG's adopted RTP through 2020. It is likely that the impact would be a reduction in available revenues, as a result of both reduced population and reduced economic activity through the period from 2005 to 2020. This would result in a fiscally constrained revenue forecast for that period that would require a lower level of investment in transportation projects and programs than otherwise would be the case for the alternative scenarios we have tested. However, we have not completed a revised revenue forecast for this period that reflects these potential impacts.

- a. In what ways has the recession affected your region (e.g., population, jobs, unemployment, new development, foreclosures, vacancy rates, etc.)?

Response: In comparing our recently completed regional growth forecast (Series 12) with our previous long-range growth forecast (Series 11), population projections were offset by approximately five years. Housing projections in the short term were offset by about five years due to an oversupply of existing housing stock brought on by the recession and foreclosures, but housing growth by 2035 is in alignment with previous projections. Job growth is offset by 10-15 years as a result of the forecast.

Residential vacancy rates are currently around 6 percent regionwide. In the Series 11 growth forecast, SANDAG projected vacancy rates around 4.5 percent, declining to less than 4 percent by 2030.

San Diego County has lost more than 116,400 jobs since the second quarter of 2008, with the unemployment rate peaking to 11.1 percent in January 2010 (compared to 5.4% in the second quarter of 2008). Currently, there are 162,000 unemployed people in the region and the unemployment rate has improved slightly to 10.4 percent (as of April). The region also has experienced a slump in real per capita personal income since 2007.

New development, as measured by the number of building permits for new private housing, also has declined: from 7,400 in 2007 to 4,900 in 2008 and 2,900 in 2009. During the same time period, the number of mortgage defaults has increased over 70 percent from 22,200 in 2007 to 38,300 in 2009.

- b. If you have already included the impact of the recession, where is it reflected in your scenario data?

Response: As discussed above, the recession has been largely responsible for a reduction in the forecasted population, housing, and jobs for the San Diego region in 2020, compared to our previous growth forecast.

2. What factors cause the reductions in 2020 to be different from 2035, and where do they show up in your data?

Response: All the MPOs show a reduction in per capita GHG from the 2005 base case to the year 2020. For SANDAG, this is 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 for three of the four large MPOs. For SANDAG, this is 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. As a result, the average trip length in our model does increase by about 5 percent from 2020 to 2035. We believe that this is largely being driven by home based work trips getting longer.

In addition, there is more funding available for capital improvements through 2020 than is available between 2020 and 2035. As mentioned, the 2030 RTP was used as the basis for this initial analysis. Since the 2030 RTP only identifies improvements and funding through 2030,

this analysis did not assume additional funds or improvements from 2030 through 2035. The only factor that changed during this timeframe was population growth.

3. What model improvements, changes in planning assumptions, or additional policies are you considering that were not used in developing your scenarios? How will they impact the direction and/or magnitude of change?

Response: We are not planning to make any significant modeling improvements prior to completion of our next RTP, which is currently underway, and is scheduled to be adopted in 2011. We also are not planning to make any significant changes to our planning assumptions for development of our next RTP, with the exception of producing a new fiscally constrained revenue forecast that will take into account the impacts of the recession, as well as a different time period than that which was used in developing the revenue forecast for our adopted 2030 RTP. At this time, it is not clear how the revenue forecast for the next RTP will compare to that which was used in the existing plan.

Also, we have no plans at this time to evaluate any other policies that would lead to reduced greenhouse gas emissions, with the possible exception of a policy that would lead to deployment of electric vehicles at a faster rate than is assumed by ARB for the San Diego region in its planning analysis. We had evaluated "eco-driving education" as a possible measure early in our target-setting analysis, but we now believe that such a program would be more cost-effective if implemented on a statewide basis rather than on a regional basis.

4. Have the sensitivities of your model changed since the 2009 Model Evaluation Survey conducted for RTAC? If yes, please explain why (i.e., are you using any new models or postprocessors to develop your scenarios that were not evaluated during the RTAC Survey?).

Response: SANDAG has completed the following modeling improvements:

- Completion of 4D and truck model integration
- Improved sensitivity to tolling as a result of additional work on SR-125, I-15, and Coronado Bay Bridge (SR 75)
- Density: Sensitivity Unknown -> Reasonably Sensitive
- Mix: Sensitivity Unknown -> Reasonably Sensitive
- Pedestrian Environment: Sensitivity Unknown -> Reasonably Sensitive

It also should be noted that SANDAG will be developing a Benefit Cost Analysis and Economic Impact Assessment for the upcoming RTP.

5. Did you add, remove, or change the level of deployment of any transportation projects or programs in your scenarios? If so, what type of projects or programs?

Response: SANDAG initially developed three separate scenarios (A, B, and C) in support of the SB 375 target setting process. Scenario A looked at system efficiency and transportation demand management measures; Scenario B included the analysis of transit and multi-modal transportation system improvements; and Scenario C evaluated the implications of pricing measures. These scenarios were developed to test the effects that various bundles of measures could have on GHG emissions. These three scenarios were also evaluated against two alternative land use scenarios to evaluate the effects development patterns could have

on GHG reduction. The first land use scenario that was evaluated was based on the SANDAG Series 12 2050 Regional Growth Forecast land uses recently accepted by the SANDAG 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.

After reviewing the three scenarios and corresponding results with the SANDAG Board of Directors, staff developed a hybrid scenario which included the input from the Board. Changes between the individual scenario analysis and the hybrid scenario included eliminating the VMT fee, deployment of a more aggressive buspool assumption regarding deployment of buspools in 2020, and a reduction in the deployment level for the Telecommute/Flexible Schedule measure (from 30% to 15%), bringing the estimated participation rate for that program more in line with the other three large MPOs. Additionally, high occupancy vehicle (HOV) facilities previously included in the adopted RTP were programmed as high occupancy toll (HOT) facilities in the 2030 time frame. The levels of deployment from the other measures (bottleneck relief, vanpool program, carpool program, safe routes to schools, transit system improvements, park and ride facilities, bicycle and pedestrian network improvements, and regional parking pricing) remained unchanged between the individual scenario analysis and the development of the hybrid scenario.

SANDAG staff presented the results of this hybrid scenario to the SANDAG Board of Directors on May 28, 2010. The Board accepted the report, with direction to SANDAG staff that the results for the second land use scenario (which involved more intensive land use densities than the Series 12 Regional Forecast) not be included in the report submitted to ARB.

6. Please provide calculations of Vehicle Miles Traveled per capita as well as Greenhouse Gas Emissions per capita in reporting results of the evaluation of your adopted RTP and alternative scenarios.

Response: See Attachment 3.

Sincerely,


GARY L. GALLEGOS
Executive Director

RR/cda

Attachment 1 – SANDAG Board Report Item 3 - May 14, 2010

Attachment 2 – SANDAG Board Report Item 17 - May 28, 2010

Attachment 3 – SANDAG Comparison of Results of Alternative Scenarios VMT Per Capita and Total VMT Estimates



**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.

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 CO₂ Emissions from Passenger Vehicles and Light-Duty Trucks)

2005 Base Year	Current Plan		Percentage Change	
	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 CO₂ 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-driving²

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 | • Social Equity |
| • Reliability | • Healthy Environment |
| • System Preservation & Safety | • 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
Executive Director

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

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

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
System Efficiency & IDW		Revenue Constrained highway network	On	2020 Revenue Constrained highway network updated to include 17 additional projects:	2030 Revenue Constrained highway network (with 17 additional projects noted in the 2020 Level of Deployment)
1	Bottleneck relief projects	Revenue Constrained highway network	On	I-805 NB I-8 WB I-15 SB I-15 SB I-8 WB I-805 NB SR-52 (AM/PM) SR-94 WB I-5 NB SR-78 EB/WB (AM/PM) I-805 SB I-805 NB I-5 SB I-5 NB I-5 SB Plaza BI Fletcher Pkwy Centre City Pkwy Valley Pkwy Texas S/Mission Ctr University Ave Mast Blvd 49th St B St Baham Dr. Governor Dr. La Jolla Village Dr 29th St Manchester Ave 5th Ave Aux Lane Aux Lane Aux Lane Aux Lane Capacity Improvements Aux Lane Interchange Improvements Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane	2020 Revenue Constrained highway network updated to include 17 additional projects: 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 carpools (214,724 carpools up from 126,587 carpools) from 2010 to 2020	144% increase in number of carpools (309,342 carpools up from 126,587 carpools) 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 8 th 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 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)
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)	
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.



**BOARD OF DIRECTORS
MAY 28, 2010**

**AGENDA ITEM NO. 10-05-17
ACTION REQUESTED - APPROVE**

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

File Number 3100000

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 May 14, 2010, Board of Directors Policy meeting, SANDAG staff provided an overview of the SB 375 implementation efforts, which included the testing of initial scenarios that were developed to demonstrate the effects various bundles of transportation and land use measures could have on greenhouse gas (GHG) emissions. At that meeting, staff indicated that a hybrid scenario would be developed and presented at the May 28, 2010, Board meeting.

Recommendation

SANDAG staff recommends that the Board of Directors authorize the Executive Director to submit to the California Air Resources Board (CARB) a report describing the scenarios, the funding assumptions used to develop them, and their results for CARB's use in the greenhouse gas target-setting process. It is further recommended that after a draft target is issued to SANDAG on June 30, staff continue to work with CARB and submit feedback on SANDAG's ability to meet the proposed target.

Discussion

Baseline RTP Analysis for Large Metropolitan Planning Organizations (MPOs)

SANDAG staff, in coordination with the other MPOs in the state and the staff from the California Air Resources Board (CARB), have prepared an analysis of adopted RTPs to determine the base year (2005) per capita GHG emissions from the transportation sector (passenger vehicles¹), as well as projected GHG per capita emissions in the years 2020 and 2035 – the target years outlined in SB 375. At the May 14 meeting, staff outlined the baseline information for SANDAG. As a basis of comparison, the results of the other large MPOs – Southern California Association of Governments (SCAG), Metropolitan Transportation Commission/Association of Bay Area Governments (MTC/ABAG), and Sacramento Area Council of Governments (SACOG) – are included in Table 1 below. The SANDAG data in Table 1 has been modified since this information was presented on May 14. The numbers have been revised to include a cost for vehicle maintenance, a factor the other large MPOs had included in their baseline assumptions.

¹ Passenger vehicles are defined as cars and light-duty trucks.

For SANDAG, the revenue constrained scenario for the 2030 RTP, adopted in November 2007, was used to develop this base case. In addition, staff at SANDAG and the other MPOs developed and evaluated 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 this analysis will be provided to CARB staff for its consideration in recommending GHG emission targets for the transportation sector later this year.

Table 1 – MPO Greenhouse Gas Emissions
(Average Weekday Pounds Per Capita CO₂ Emissions from Passenger Vehicles)

MPO	2005 Base Year	Current Plan		Percentage Change	
		2020	2035	From 2005 to 2020	From 2005 to 2035
SCAG	21.2	20.1	20.4	-5%	-4%
MTC/ABAG	20.8	19.7	20.1	-5%	-3%
SANDAG ²	26.0	23.2	23.4	-11%	-10%
SACOG	22.4	21.5	19.6	-4%	-13%

From this information, SANDAG has higher 2005 base year per capita GHG than any of the other large MPOs in the state, which is attributed to several factors. First, SANDAG and SACOG have more total vehicle miles traveled (VMT) per capita than SCAG and MTC. Because SANDAG and SACOG are grouped together for total VMT per capita, the fact that SANDAG comes out substantially higher in the baseline estimates of GHG for SB 375 needs to be explained.

SB 375 is focused on passenger vehicles (i.e., cars and light-duty trucks) rather than total GHG emissions, which would include emissions from other vehicle classes. In the SCAG, MTC, and SANDAG regions, SB 375 related travel accounts for more than 90 percent of VMT. In the SACOG region and other Central Valley MPOs, SB 375 related travel only accounts for 70-80 percent of total VMT. This difference is likely due to interstate trucking. SANDAG also has as low, or lower household size and lower zero-car households than other regions in the state, which contribute to higher GHG per capita. In addition, the SANDAG region has a higher percentage of interregional trips than the other major MPO regions. This results in adding GHG emission without adding population, therefore contributing to the increase in per capita GHG emission rates.

All the MPOs show a reduction in per capita GHG from the 2005 base case to the year 2020. For SANDAG, this is 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 for three of the four large MPOs. For SANDAG, this is 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. As

² 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, vehicle maintenance, and the trips that originate outside the region and end outside of the region were not included in the numbers. Finally, the data relies on the recently completed 2050 Regional Growth Forecast.

mentioned, the 2030 RTP was used as the basis for this initial analysis. Since the 2030 RTP only identifies improvements and funding through 2030, this analysis did not assume additional funds or improvements from 2030 through 2035. The only factor that changed during this timeframe was population growth.

SB 375 Scenario Testing Status

At the May 14 Board Policy meeting, SANDAG staff outlined three scenarios that the four largest MPOs agreed to test against their adopted RTPs. SANDAG also evaluated these three scenarios against two alternative land use scenarios to evaluate the effects development patterns could have on GHG reduction. The first land use scenario that was evaluated is based on the 2050 Regional Growth Forecast land uses recently accepted by the Board. 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 will be built out at the minimum density for that place type.

On May 14, staff indicated that a hybrid scenario would be developed and that the results would be presented to the Board on May 28. The Board provided feedback on which measures should be eliminated from further analysis. Based on the Board's input, the regional VMT fee was removed, and changes to several of the ridesharing assumptions also were made. The resulting hybrid scenario, which was evaluated against the same two land use scenarios identified above, is presented in Table 2. Detailed assumptions about the measures that are included in the hybrid scenario are included in Attachment 1.

Due to time constraints, the hybrid scenario tested was evaluated only for the 2035 target year. The results show that the hybrid scenario, which bundles together various measures, could have additional GHG reductions compared to the three initial scenarios originally tested.

**Table 2 – SANDAG Greenhouse Gas Emissions Scenario Testing
(Average Weekday Pounds Per Capita CO₂ 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)	Hybrid Scenario**
2050 Regional Growth Forecast	2020	23.7 -8.8%	22.9 -11.9 %	23.4 -10.0%	22.0 -15.4%	n/a n/a
	2035	24.6 -5.4%	23.6 -9.2%	24.1 -7.3%	23.1 -11.2%	21.1 -18.8%
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%	n/a n/a
	2035	24.4 -6.2%	23.3 -10.4%	23.8 -8.5%	22.8 -12.3%	20.8 -20.0%

* The numbers in this column do not correspond to the numbers in the SANDAG row of Table 1. Table 1 was updated to include a vehicle maintenance cost that the other MPOs in the state assume in their model. Since SANDAG was unable to update all the numbers in the table, only the hybrid scenario includes a vehicle maintenance cost in the results.

**It is assumed that all the other scenarios would be reduced by approximately 5 percent if the vehicle maintenance cost was applied to those initial model results.

It is important to note that 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. Similarly, the hybrid scenario does not reflect the financial limits of what will be available as the Board prioritizes projects and programs in the 2050 RTP. The revenue projections that will be used to determine investment levels are currently being prepared. Once the revenue projections are completed, SANDAG staff will use those projections to further refine the measures and level of deployment of the measures that the Board will consider as part of the 2050 RTP.

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.

Staff will be presenting these results at a scheduled meeting of the Regional Targets Advisory Committee (RTAC) on May 25, 2010, (after the posting of this agenda) and will report to the Board on any important issues or outcomes from that meeting.

Staff will continue to seek direction from the Board and solicit input from the public on this process throughout the development of the 2050 RTP and its Sustainable Communities Strategy 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 that SANDAG submit the results of the scenario development process to CARB and work with its staff after the draft target is set to ensure the target is both "ambitious and achievable," in accordance with the RTAC recommendations.

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
Executive Director

Attachment: 1. SB 375 Target Setting: Hybrid Scenario Description

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

SB 375 Target Setting: Hybrid Scenario Description (all the following measures were included in the hybrid scenario)

System Efficiency & TDM		Existing RTP Level of Deployment		On Model/ Off Model		2020 Level of Deployment		2035 Level of Deployment	
1	Bottleneck relief projects	Revenue Constrained highway network	On	2020 Revenue Constrained highway network updated to include 17 additional projects:	2030 Revenue Constrained highway network (with 17 additional projects noted in the 2020 Level of Deployment)				
				I-805 NB I-8 WB I-15 SB I-15 SB I-8 WB I-805 NB SR-52 (AM/PM) SR-94 WB I-5 NB SR-78 EB/WB (AM/PM) I-805 SB I-805 NB I-5 SB I-5 NB I-5 SB	Plaza Blvd. Fletcher Pkwy Centre City Pkwy Valley Pkwy Texas St./Mission Ctr. University Ave. Mast Blvd. 49th St. B St. Barham Dr. Governor Dr. La Jolla Village Dr. 29th St. Manchester Ave. 5th Ave.	Aux Lane Aux Lane Aux Lane Aux Lane Capacity Improvements Aux Lane Interchange Improvements Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane Aux Lane			
2	Telecommuting/flexible/alternative work schedules	5% daily white-collar worker trip reduction	On	15% 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 carpools (214,724 carpools up from 126,587 carpools) from 2010 to 2020	144% increase in number of carpools (309,342 carpools up from 126,587 carpools) from 2010 to 2035				
6	Buspool programs	Not included in RTP assumptions	Off	Buspool participation of 15% military personnel (15,766 buspoolers) by 2020	Buspool participation of 40% military personnel (41,708 buspoolers) by 2035				

SB 375 Target Setting: Hybrid Scenario Description (all the following measures were included in the hybrid scenario)

		Existing RTP Level of Deployment		On Model/ Off Model		2020 Level of Deployment		2035 Level of Deployment	
Systems Development		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:	
1	Transit system improvements	Revenue Constrained transit network	On	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 Olaj 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	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)	
2	Transit station park-and-ride facilities	Revenue Constrained park-and-ride network	On	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	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	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	High-occupancy vehicle (HOV) and high-occupancy toll (HOT) lanes	2030 Revenue Constrained highway network:	On	On	2020 Reasonably Expected highway network including the following enhancements over the Revenue Constrained plan: SR 94 from I-805 to SR 125: +2 HOV	2030 Reasonably Expected highway network, including the following enhancements over the Revenue Constrained plan (where only 2 HOT lanes available, assumes 3 occupant HOV): I-5 from SR 905 to SR 54: +2 HOT I-5 from SR 54 to I-8: +2 HOT SR 78 from I-15 to I-15: +2 HOT SR 94/SR 125 from I-805 to I-8: +2 HOT I-805 from SR 905 to I-5: +4 HOT			
2	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	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			

Attachment 3

SANDAG Comparison of Results of Alternative Scenarios
VMT Per Capita and Total VMT Estimates

VMT Per Capita Estimates

		Series 11 Revenue Constrained		Operations: System Efficiency & TDM (Scenario A)		Development: Land Use & System Development (Scenario B)		Pricing (Scenario C)		Combined (Scenario A+B+C)		Hybrid Scenario (A+B+C-VMT Fee +Maint. Fee)	
		2020	2035	23.3	-8.5%	23.8	-6.8%	22.2	-12.9%				
Series 12 Forecast		23.9	-6.1%	24.3	-4.8%	24.7	-3.2%	23.5	-7.9%			22.4	-12.3%
Series 12 + All Urban & Town Center Existing to Max Density Planned to Min Density		23.8	-6.7%	23.2	-9.2%	23.6	-7.4%	22.1	-13.5%			22.1	-13.2%
		24.6		24.0		24.4		23.2		21.6			
			-3.5%		-5.7%		-4.2%		-8.9%		-15.4%		

Total VMT Estimates

		Series 11 Revenue Constrained		Operations: System Efficiency & TDM (Scenario A)		Development: Land Use & System Development (Scenario B)		Pricing (Scenario C)		Combined (Scenario A+B+C)		Hybrid Scenario (A+B+C-VMT Fee +Maint. Fee)	
		2020	2035	82,492	6.6%	84,059	8.6%	78,559	1.5%				
Series 12 Forecast		84,651	9.4%	97,785	26.4%	99,380	28.4%	94,542	22.2%			90,046	16.4%
Series 12 + All Urban & Town Center Existing to Max Density Planned to Min Density		84,071	8.6%	81,885	5.8%	83,489	7.9%	77,987	0.8%			89,085	
		99,091		96,766		98,407		93,577		86,833			
			28.1%		25.1%		27.2%		20.9%		12.2%		15.1%

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

**Southern California Association of Governments
(SCAG)**

SCAG SCENARIO EXERCISE

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).

SCAG SCENARIO EXERCISE

- 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

SCAG SCENARIO EXERCISE

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.

SCAG SCENARIO EXERCISE

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 EXERCISE

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	Employment	Households	Employment	J/H Ratio		
	2020	2020	2035	2035	2008	2020	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

**SCAG
SCENARIO EXERCISE**

Blueprint Planning 2

County	Households 2020	Employment 2020	Households 2035	Employment 2035	2008	J/H Ratio 2020	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

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

Scenario Planning Results

Five Scenarios

Scenario	2020	2035	
	% Change of Daily <u>C02</u> (per capita from 2005)	% Change of Daily <u>C02</u> (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

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

Council of Fresno County Governments (COFCG)



Council of Fresno County Governments

SB375 GREENHOUSE GAS EMISSION REDUCTION TARGET RECOMMENDATION



Based on the “Moving Cooler” definition of deployment level, ITS, Ramp Metering, and Vanpool/car share strategies in the planning scenarios are considered equivalent to the “expanded Current Practice Deployment”, and the Air District Rule 9410 is considered to be “aggressive deployment”, but only applied to 40% of the employment.

**Table 8
TDM/TSM GHG Reduction in 2020 & 2035 by Strategy (at Expanded Current Practice and Aggressive Deployment Level in Metric Tons) based on “Moving Cooler” Report**

Strategies	Deployment Level			
	2020		2030	
	Expanded Current Practice	Aggressive Deployment	Expanded Current Practice	Aggressive Deployment
Ramp Metering	<0.5		<0.5	
Signal Control Management	<0.5		<0.5	
Car-sharing	1		1	
Employer-based Commute Strategies		15		14
Computation of GHG Reductions				
Combined Reduction	7.8		7.4	
Baseline GHG	1700		1675	
Percent GHG reduction against baseline	-0.46%		-0.44%	

Source: “Moving Cooler,” pages 44 and 45.

- Note:
1. All the numbers in the above table is in million metric tons per year.
 2. 0.4 million metric tons were assumed for Ramp Metering, Signal Control Management at expanded current practice deployment level.
 3. SJVAPCD Rule 9410 is considered deployed at the aggressive level, but only applies to 40% of workers. Thus the tonnage for the employer-based commute strategies was multiplied by 40% to reflect the benefits of Rule 9410.

Scenarios

The Fresno COG staff worked with the Task Force and the planning staffs within the jurisdictions of Fresno County , and developed three scenarios:

1. Baseline Scenario
2. Alternative 1 Scenario
3. Alternative 2 Scenario

**Table 9
Scenario Summary**

	Scenarios		
	Baseline scenario (Adopted 2007 RTP)	Alternative 1 (Based on planning activities that have taken place since 2007 RTP plus intensifications in various locations throughout the County)	Alternative 2 (More aggressive corridor and activity center planning in the Metro areas.)
Blackstone/Ventura BRT	x	x	x
Shaw Ave. BRT			x
Improvement to existing transit		x	x
Air District Rule 9410 (employer-based trip reduction program)		x	x
Car Sharing	x	x	x
Operational Improvements (ITS & ramp metering)	x	x	x

Baseline Scenario

The baseline scenario reflects the Fresno COG 2007 Regional Transportation Plan. The *Recommendations of the Regional Targets Advisory Committee (RTAC) Pursuant to Senate Bill 375*, suggest that as part of 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...”

In 2004, the Fresno COG staff began working with the county jurisdictions to develop future socio-economic data for use in COG’s transportation model. These socio-economic data were used for the Fresno COG 2007 RTP and became the basis for the target-setting baseline scenario.

The general plans adopted at the time were used to determine the available developable (vacant land) for each jurisdiction to determine the location of future potential growth.

The City of Fresno planning staff provided Fresno COG with data on their 2025 Fresno General Plan adopted two year before in 2002. This plan called for future expansions into their North Reserve Area (now called their Copper River area) and Southeast Reserve Area (now called SEGA or Southeast Growth Area). The Fresno planning staff also provided COG with assumptions on the number of housing units per acre for each land use designation, average household size, and the timing of development by geographic area.

The City of Clovis planning staff provided data on land use based on their Clovis General Plan adopted in 1993. The forecast to 2025 assumed the complete development of the Shepherd-168 Triangle, and the Northwest and Southeast Urban Centers (now known as the Loma Vista Specific Plan area), and the partial development of the Northeast Urban Center. The Clovis planning staff also provided density factors for their land use designations, as well as projected development timing by geographic area.

The thirteen smaller cities were asked to complete forms estimating population and household data by TAZ for the year 2020. Some cities had their staff or consultants complete the forms. Other cities requested that COG staff forecast the data for them, using material such as general plans and maps, lists of planned projects, population projections, etc.

The County of Fresno planning staff assisted COG in forecasting the population and household data for areas outside the cities' spheres of influence by providing a list of potential projects and the estimated population and/or number of housing units, employment, and timing of each project.

Alternative 1 Scenario

A second scenario, known as Alternative 1 was developed with density intensification and more mixed uses, incorporating the land use principles of the Fresno Blueprint. This alternative included general plan updates and new and updated specific plans that have taken place since the 2007 RTP, as well as corridor and activity center development and additional public transportation measures. Specifically included in Alternative 1 are the Southeast Growth Area (SEGA) and the Loma Vista Specific Plan both of which consist of mixed-used centers of housing and employment.

Alternative 1 also uses density increases and infill along major corridors, urban form areas and activity centers scattered throughout the metropolitan area. In all, 154 areas within the county are identified as having greater densities and/or more mixed use than the Baseline Scenario. Some of the elements of Alternative 1 such as the Southeast Growth Area (SEGA) plan and some corridor intensification plans have not been fully

studied or adopted by their respective city councils. Other major sustainable projects included in this scenario are listed in Table 10.

After the modeling, Alternative 1 presented a marked improvement in GHG reduction over the Baseline Scenario.

Alternative 2 Scenario

Alternative 2 was structured with even more aggressive corridor and activity center planning in the metropolitan area, along with additional transportation measures. This scenario provided even more reductions in GHG emissions, but also requires land use changes which may not be supportable until more sophisticated development assessment and market demand analyses are employed. Under this scenario, 204 areas have greater densities and/or more mixed use than the Baseline Scenario.

A summary description of the land use in the three alternative scenarios is listed in Table 10.

Table 10
Summary of Land Use Changes by Scenario

DESCRIPTORS	SCENARIOS		
	BASELINE	ALTERNATIVE 1	ALTERNATIVE 2
SEGA (Southeast Growth Area) Generally bounded by Dakota, Jensen, Temperance and Highland; Jensen, North, Minnewawa and Temperance	Medium low and medium density residential	Eight mixed-use centers of commercial, office and mixed residential	Eight mixed-use centers of commercial, office and mixed residential
Loma Vista Specific Plan Area Generally bounded by Bullard, Dakota, Locan and McCall	Ag and rural to high density residential	Four master planned communities which includes high and very high density residential and mixed use/business campus use	Four master planned communities which includes high and very high density residential and mixed use/business campus use
Harlan Ranch Area east of DeWolf Bounded by Shepherd, SR 168 and DeWolf	Generally low density residential	A mix of low, medium, medium high, and high density residential	A mix of low, medium, medium high, and high density residential
Blackstone Corridor	Little new growth	Growth from Shaw to Downtown	Growth from Audubon to Downtown
Fresno Urban Form Areas Scattered throughout Fresno particularly along major corridors	No increased densities	10 square miles of infill and density intensification	26 square miles of infill and revitalization in activity centers and intensity corridors
Clovis - 5 square miles Scattered throughout Clovis	No increased densities	No increased densities	Density increases of 20-75%
Thirteen smaller cities	General plan uses at time of baseline development	Recent density increases in general plans	Recent density increases in general plans

Scenario Modeling Results

Due to the lack of a consistent methodology for calculating inter-regional trips as recommended by the RTAC, Fresno COG provides 3 versions of modeling results for the 3 scenarios studied using 3 different approaches to calculate inter-regional trips, as described in the Inter-Regional Trips section. The internal land use and transportation measures remain the same in the 3 scenarios. The results are also tabulated for before

and after the EMFAC post-processor was applied to reflect the vehicle efficiency and low carbon fuel measures.

Approach 1: Reporting all VMT within Fresno County boundaries minus through trips

Table 11
VMT from Cars and Light Trucks (LDA, LDT1, LDT2 & MDV) in thousands

		2005		2020		2035
Baseline		15,402		19,327		24,550
Alternative 1				18,523		23,765
Alternative 2				18,374		23,735

Table 12
Total GHG Emissions (tons/day)

Before post-processor						
		2005		2020		2035
Baseline		7,210.01		8,904.93		11,352.47
Alternative 1				8,510.39		10,931.85
Alternative 2				8,458.57		10,929.47
After post-processor						
		2005		2020		2035
Baseline		7,210.01		6,527.04		7,310.82
Alternative 1				6,238.24		7,040.04
Alternative 2				6,200.31		7,038.51

**Table 13
Per Capita GHG (pounds/day)**

Before post-processor						
		2005		2020		2035
Baseline		16.07		15.74		16.00
Alternative 1				15.04		15.409
Alternative 2				14.95		15.406
After post-processor						
		2005		2020		2035
Baseline		16.07		11.54		10.31
Alternative 1				11.03		9.923
Alternative 2				10.96		9.921

**Table 14
Percent Per Capita Reduction against 2005**

Before post-processor						
		2005		2020		2035
Baseline				-2.04%		-0.41%
Alternative 1				-6.38%		-4.10%
Alternative 2				-6.95%		-4.12%
After post-processor						
		2005		2020		2035
Baseline				-28.20%		-35.87%
Alternative 1				-31.37%		-38.24%
Alternative 2				-31.79%		-38.26%

Table 23
Recommended GHG Emission Reduction Targets
for the Fresno MPO Region

		2020	2035
		Percent Per-Capita GHG Reduction from 2005	Percent Per-Capita GHG Reduction from 2005
Approach 1: Reporting all VMT within Fresno County boundaries minus through trips			
	Before post-processor	-6.38%	-4.10%
	After post-processor	-31.37%	-38.24%
Approach 2: Reporting VMT from internal travel and 50% IXXI trips. Inter-regional trips are limited to traveling within the San Joaquin Valley.			
	Before post-processor	-6.27%	-3.85%
	After post-processor	-31.30%	-38.08%
Approach 3: Reporting VMT from internal travel and 50% IXXI trips with. Inter-regional trips reported in this approach are traveling between Fresno County and the rest of the state.			
	Before post-processor	-5.76%	0.77%
	After post-processor	-30.94%	-35.06%

Fresno COG Staff Contacts:

Kristine Cai, 559-233-4148 ext. 215 or kcai@fresnocog.org
Kathy Chung, 559-233-4148 ext. 214 or kchung@fresnocog.org

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

Kern Council of Governments (KCOG)

- Sep. 2008 – SB 375 signed into law
- Oct. 2008 – COG establishes the SB375 Kern Climate Change Task Force
- Jan. 2009 – Kern Climate Change Summit held at the Petroleum Club in Bakersfield
- Mar. 2009 – COG adopts the SB375 Kern Climate Change Work Plan with a proactive approach as presented at the Summit.
- Jul. 2009 – COG completes 1 on 1 meetings with each local jurisdiction to gather latest general plans and assumptions the land use model that could reduce climate change emissions
- Sep. 2009 – ARB Regional Target Advisory Committee (RTAC)
- Sep.09-Jan.10 – COG holds 4 Climate Change Task Force Meetings to consider use of Model results available online at www.kerncog.org under the climate change menu.
- Jan. 6, 2010 – TTAC reviews timeline
- Jan. 19, 2010 – Newspaper display add announcing public meetings/workshop
- Jan. 20 – Modeling Committee/Climate Change Task Force – Decision to use spreadsheet method and use land use model as support data set
- Jan. 21 – COG Board reviews timeline
- Feb. 3 – TTAC 1st look
- Feb. 17 – Modeling Committee/Climate Change Task Force –Target Baseline Current Trends Methodology Approved
- Feb. 18 – Public Workshop at Kern COG
- Feb. 18 – COG Board 1st look – Draft Target Baseline Current Trends Methodology
- Mar. 1 – Submitted letter to ARB providing notice of Kern’s intent to submit Target by April 16
- Mar. 3 – TTAC 2nd look - Review Revised Timeline and Status of Climate Change Task Force
- Mar. 17, 9AM - Modeling Committee/Climate Change Task Force – Target Approved
- Mar. 18, 7PM – COG Board 2nd look – Review Status of TTAC and Climate Change Task Force Activity
- Mar 31, 10AM - TTAC 3rd look – Make Recommendation on Target to COG board
- Apr. 15, 7PM - COG Board 3rd look – Considers TTAC recommendation
- Jun. 30 – Statutory Deadline: ARB releases draft statewide target**
- *Jul. 15 – COG Board considers approval of 2010/11 RTP
- Sep. 30 – Statutory Deadline: ARB releases final targets for all 18 COGs in the State**
- Jul. 2014 - COG Approves 2014/15 RTP with an SCS that might meet the SB375 target

* This target setting process is being performed parallel to the preparation of the 2011 RTP. The targets will not be available in time for consideration in this RTP scheduled to begin public review April 30, 2010. The targets will be incorporated into the next major RTP scheduled for 2014.

At the February 17, 2010 meeting the Task Force and Modeling Committee approved the assumptions and methodology for proposing a current trends baseline to ARB for reducing travel. Action included revisions to the land use assumptions and identifying components and future activities as modified by the Task Force. The following assumptions have been included into the baseline for modeling proposed targets:

D. Changes to Baseline Assumptions

In a letter dated February 10, 2010 the Kern County Planning Department requested a re-distribution of households and employment in 2035 from the Rosamond/Willow Springs area to future developments proposed for Tejon Mountain Village and San Emidio Ranch. Kern COG has incorporated these requested changes with some minor modifications needed to ensure that they do not affect the countywide population total.

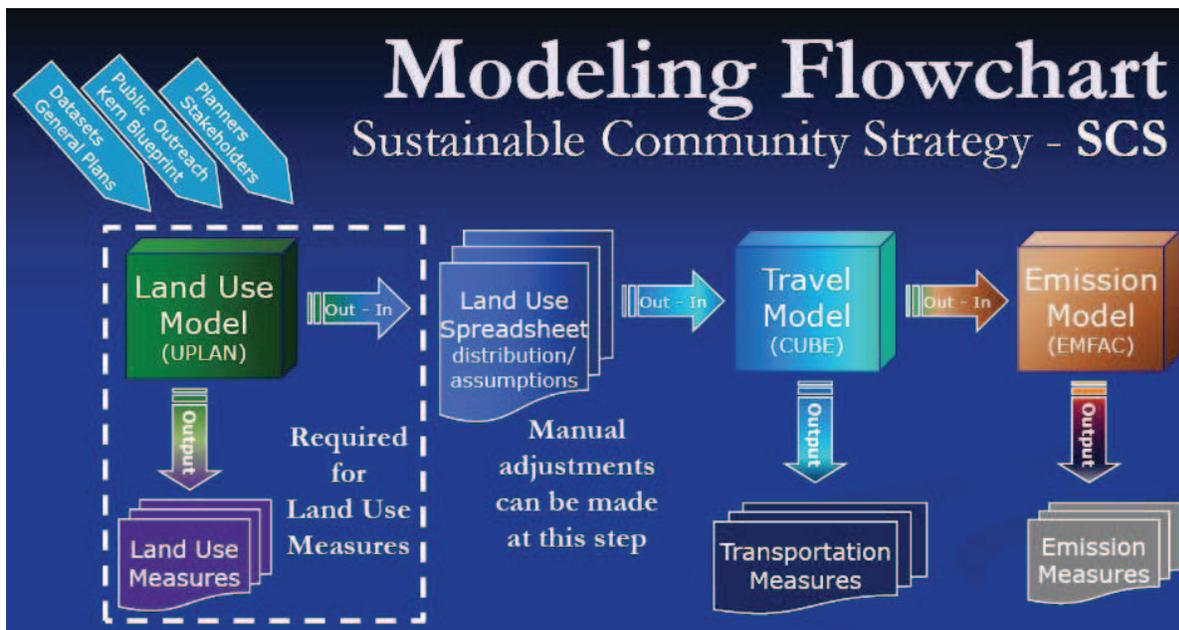
In a letter dated February 3, 2010 from Cox, Castle, Nicholson, an attorney for San Emidio Ranch, they requested 12,000 additional housing and enough employment for 4000 acres of commercial development. County staff proposed 167 households and 300 employees at that location. After much discussion, the County’s proposed change was approved.

Representatives from the development community, County Planning and others expressed concern that

the current adopted “zero-sum” method for allocation of the countywide growth may hinder the ability of the market to determine the best location for future development in light of SB375. A call for developing flexibility into the growth forecast distribution was made so as avoid potential negative economic and environmental justice consequences to communities.

E. Methodology

At the February 17, 2010 Task Force meeting staff presented a detailed methodology and some preliminary results. Only the methodology and assumptions were approved at that meeting.



The above method uses the land use model as a validation data set for the land use spreadsheet, and to generate some density factors required by the Travel model D-factor or 4-D modeling script. The Task Force consented to the methodology with the addition of the following components proposed by County Planning.

Methodology Components

- Standard – “Ambitious and Achievable “ % per capita emission reduction from 2005.
- Regional Targets = averaged into one Target (One County ARB Target)
Valley, Desert, Mountain
- Spreadsheet Method- Growth Forecast – Population 1, 321, 000 by 2035 (adopted by Kern COG on Oct, 15, 2009) Adjustments made by local planner input as a “zero-sum” Traffic Model for households and employment. Delegated to Kern Regional Transportation Modeling Committee.
- Remove 100% of through Vehicle Mile Trips
- Remove 100% of military installation Vehicle Mile Trip
- Remove 50% of trips to attractors outside the County.
- Remove 50% of wind, solar area, prisons, agricultural production trips, and other important rural employment areas (strategic employment resources) as contributions to out of county economy.
- Remove 50% of trips for large mining operations (regional aggregate areas) as contributions to out of county economy.

Future Programs and Policy Direction

- Establish methodology for Kern COG to provide information to cities and unincorporated communities on their own target for their area of control. How do they compare to the Regional Target; to the One County ARB Target? Create a performance monitoring plan that could be used for economic development marketing.
- The modeling committee consider a methodology for establishing a growth allocation based on level of entitlement (Highest – existing lots, Development Agreement with GP/Zoning, Approved Tentative Tract, GP/Zoning, General Plan only, not approved – Lowest) including historic growth and market driven factors.
- Review the established “zero sum “allocation of growth for policy implications related to the SB 375 Sustainable Communities Strategy and future actions by decision makers. Evaluate other methods of allocating growth.
- Review policy implications of the ARB determination that 50% of trips to attractors out of the county must be included in our reductions, although we may receive no economic benefit from the out of county land uses.

These components and Future Programs and Policy direction were incorporated by the Task Force action on February 17, 2010.

Other Issues Discussed By the Task Force

- Consider economic development to be incorporated into the process
- Consider regional revenue sharing or allocation mitigation
- Consider sub county targets
- Consider a method for frequent revisions to forecast distribution and alternative scenarios
- Consider better balance of housing in rural employment areas closer to existing communities with adequate shopping and amenities
- Inform the Board on the implications and concerns for the current zero sum method for allocating the adopted countywide growth including:
 - Unusual for California, the County and Cities of Kern have enough capacity in their general plans to absorb more than twice the growth forecasted by 2035. In using a zero-sum method, some areas with planned entitlements will not show growth until after 2035.
 - The countywide regional growth forecast is adopted every 3-5 years. An alternative to the growth forecast separate from the adopted one can create confusion and an opportunity for challenges to environmental documents as well as the regional air quality conformity analysis.
 - SB 375 adds new emphasis for developments to show up in the regional growth forecast for the Sustainable Community Strategy to avoid potential challenges to their project on climate change emissions. This is leading to concerns over the zero sum method currently in use for distribution of the growth forecast.
 - Kern’s first sustainable community strategy as a part of the RTP is scheduled for 2014, giving us some time to work on a solution to these issues, and improve the modeling.

F. Alternative To Current Trends (Methodology)

On February 25, 2010, Kern COG sent out a request for zero-sum adjustments to the current trends scenario that reflect current policies in local jurisdictions. The two largest cities in Kern (Bakersfield and Delano) responded, moving approximately 2,800 households (1.8% of the growth) and 1,800 (1%) jobs by 2035 from areas previously forecasted in the baseline scenario. A similar redistribution for 2020 included 1000 (1.7%) households and 500 jobs (.6%). The following maps illustrate the adjustments to the growth that were made to the Baseline Current Trends scenario for 2035.

Figure 1- Net Changes in Households to the Baseline Current Trend Scenario

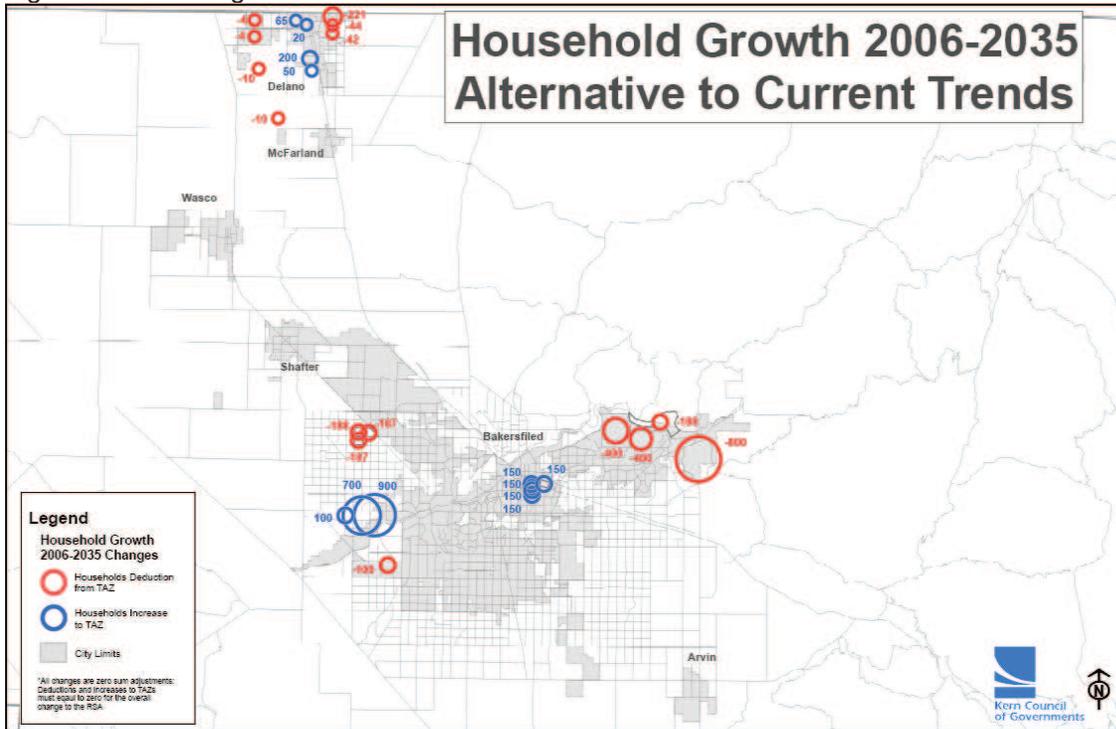
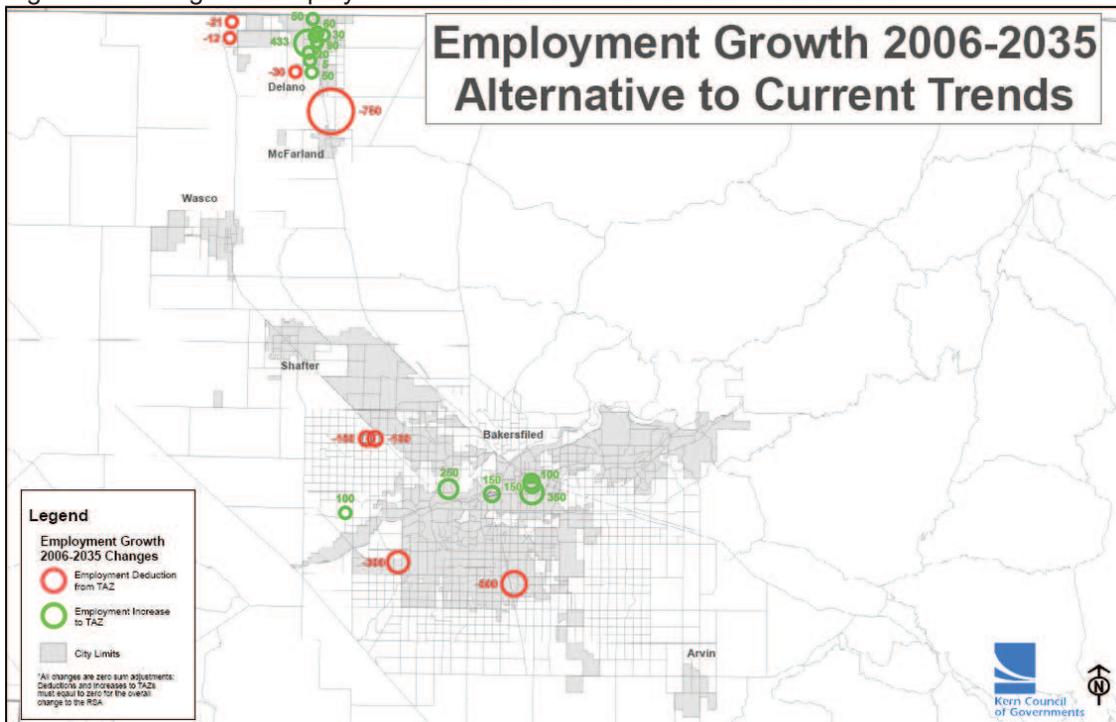


Figure 2 - Changes in Employment to the Current Trends Baseline Scenario



The full result of the model runs with this Alternative to the Current Trends can be found in Attachment 3.

G. Modeling Output

The ARB Regional Targets Advisory Committee (RTAC) Report recommends a minimum of 7 model scenarios:

- 1) **2005 Base Year** – This scenario was backcast from the transportation model 2006 validation year by using the .65% change in the Caltrans surveyed Highway Performance Monitoring System total vehicle miles traveled for Kern.
- 2) **2020 Baseline Current Trend (CT)** – Current spreadsheet distribution with county changes approved at the January Task Force meeting. 2020 is the first milestone year in SB375.
- 3) **2035 Baseline CT** – Current spreadsheet distribution with county changes approved at the January Task Force meeting. 2035 is the second milestone year in SB375.
- 4) **2020 Baseline CT No Build** – 2020 Baseline CT assuming nothing is built after 2015. As recommended by the RTAC report, the no build scenarios are helpful to illustrate what happens if we don't build anything except what is currently programmed.
- 5) **2035 Baseline CT No Build** – 2035 Baseline CT assuming nothing is built after 2015.
- 6) **2020 Alternative to Current Trend (ACT)** – 2020 includes a portion on the adjustments shown in figures 1 & 2.
- 7) **2035 ACT** – 2035 includes a portion on the adjustments shown in figures 1 & 2.

The results of these model runs are found in attachment 3. Steps 3 and 4 of the RTAC report recommend an alternative to the Baseline CT for proposing a target. Each scenario has been output into 10 columns. five of the columns use the current version of ARB's emissions model EMFAC. The second five columns use a post processor with EMFAC to account for the new Pavley I and Low Carbon Fuels standards in California.

The five columns account for exemptions that have been discussed in the preparation of the target and those recommended by the RTAC report. For example the first column includes all the travel in the model. The second column excludes all the external to external (XX) or through county trips, 50% of the internal to external and external to internal travel (IXXI), and 50% of the travel to and from the military bases in Kern. The rest of the columns go on to exempt 100% of the military base travel, travel to prisons, and wind farms.

Exemptions Not Included - The development of modeling scripts necessary for exempting 50% of solar employment, aggregate mining employment, agricultural production employment, and other strategic employment areas was not available in time to meet the current deadlines. Job growth in these areas are small when compared to wind energy and prisons and will not make a measureable change in the pounds per person target number. The recommendation to ARB will include a discussion of the need to exempt employment for these areas but will be excluded from the modeling because the small changes anticipated.

Travel Beyond the County Boundary - All of the travel in attachment 3 accounts for travel occurring within the boundaries of Kern County. The 8-valley COGs have retained Dowling and Associates to perform a special run of the statewide model to calculate their respective travel that occurs outside of each county. ARB and COG staff proposes to include 50% of that travel in the target as well. This outside county travel represents the external to internal trips being generated by employment attractors in the county. This method is consistent with the RTAC recommendation and similar methods being proposed by the larger MPOs. Early runs are showing an increase in passenger vehicle CO2 emissions of 2 .lbs per person or a 20% increase by 2035. COG staff will provide this information as an extra column in the summary spreadsheet as soon as it becomes available.

Fuel Pricing – Kern is also working on a fuel pricing adjustment. In March, the larger COGs in the state came up with some standard future fuel pricing components. Kern has performed sensitivity tests to determine if inclusion of fuel pricing is warranted at this time. Initial results indicate that an increase in fuel pricing from 13.5 cents/mile to 20 cents/mile resulted in a 1% reduction in travel by 2035. COG staff is still working to refine this initial result and intends to provide this information as soon as it is available.

H. Modeling Results

The county-wide average CO₂ emissions from passenger vehicle travel within the county is about 22 lbs/psn. in 2005 when accounting for the Paveley I and low carbon fuels standards. That amount is forecasted to decrease by 30.6% to 15.5 lbs/psn. in the 2035 Current Trends (CT) scenario and 30.9% to 15.2 lbs/psn. in the Alternative to Current Trends Scenario (ACT) – an improvement of .4%. A similar reduction is found when the RTAC exemptions (-50% IXXI, -50% military) are used resulting in a .45% reduction. When 100% of the military base travel is removed a .46% reduction in the ACT over CT occurs. These model runs illustrate that as the universe of travel decreases by subtracting areas of travel exemptions, the percent change caused by the repositioning of 2% of the households and 1% of the employment becomes slightly larger and more noticeable.

I. Target Options Considered

1. **RTAC recommendation using alternative to current trend (ACT) scenario** – The 2nd column of Attachment 3 contains the RTAC recommendation and shows a 29.2% reduction in CO₂ emissions for the ACT compared to 2005. The ACT which repositioned 2% of the households and 1% of the employment is .4% less than the CT.
2. **RTAC recommendation plus all local proposed exemptions using ACT scenario** – The 5th column of Attachment 3 contains the RTAC recommendation plus 100% of military, 50% of wind energy areas, and 50% of prisons removed, showing a 27.9% reduction in CO₂ emissions for the ACT compared to 2005. The ACT which repositioned 2% of the households and 1% of the employment is .47% less than the CT.
3. **Task Force recommendation using all proposed exemptions and CT scenario** – The 5th column of attachment 3 contains the Current Trends scenario plus all local proposed exemptions (Consent was given by the Task Force for this option on March 17, 2010).

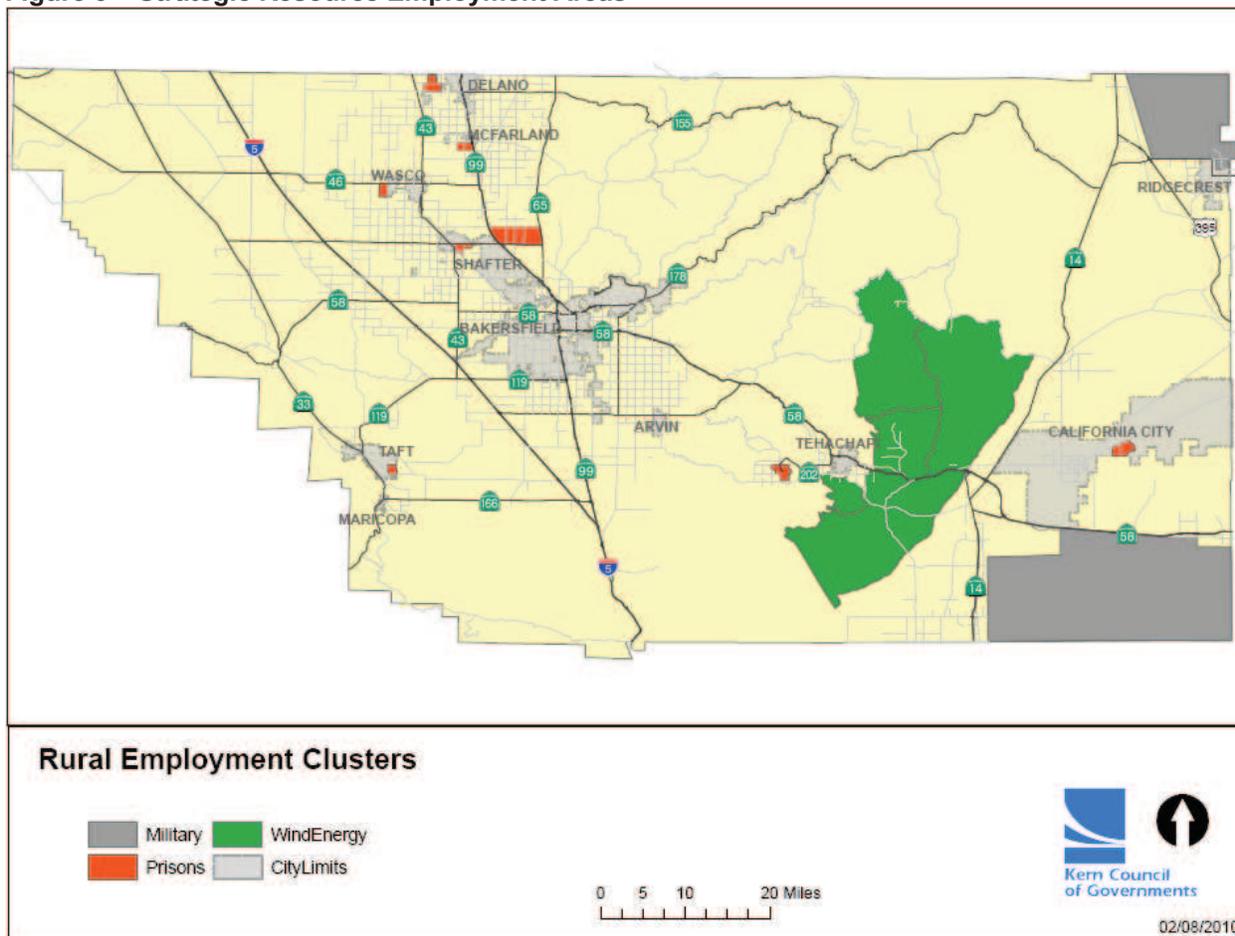
J. Reason Justification for Selecting Option 3

- **Current Trend Reflects Existing, Ambitious Local Plans and Policies** - Current adopted General Plans and Specific Plans as reflected in the Current Trends Scenario, already reflect existing anti-sprawl policies that are similar in CO₂ reduction when compared to the alternative. Local planners are incorporating the adopted Kern Blueprint principles into their plans, and one community is developing the first City-wide form-based general plan in the state. When given the choice to propose a target, Kern COG's member agencies agree that the current trends scenario should be used over the Alternative that was developed because it best reflects what local jurisdictions are already doing.
- **Strategic Resource Employment Area Exemptions** – Kern is unusual in California in that it is partially characterized by a reverse commute pattern to the outlying areas of Kern. Two-thirds of household reside in less than 10% of the area near the center of the County (Metro Bakersfield). One-third of the employment is in the outlying areas, however two-thirds of the employment growth is slated for areas outside of Metro Bakersfield. The larger growth sectors include military, wind energy and prisons. Other strategic resource employment categories in outlying areas include oil/mineral production, agriculture/ranching, food processing, warehousing distribution/intermodal centers, travel centers, recreation, etc. These jobs, vital to the State economic, and environmental well being, cannot be moved into a conventional infill location as envisioned by the writers of SB 375.
 - **100% Military Exemption** – The RTAC recommended exempting only 50% of the trips from military bases. Local governments have no control over Federal government decisions on military bases. These facilities are vital to national security and should be granted a 100% exemption from state climate change regulations.
 - **50% Wind Energy Areas Exemption** – The RTAC recommendation did not include an exemption for strategic resource employment areas such as wind energy. Wind energy production is expected to grow by 1,500 employees in high wind mountain pass areas of

the County. These areas tend to be more remote and require a considerable commute distance. It is not practical to provide work force housing in these areas nor relocate these employment areas to communities, yet the large increase of employment in these areas drags the per capita travel up and hinders other efforts to reduce overall trip lengths. In addition, these jobs provide major CO2 reductions under a different sector of AB 32. Therefore we propose an exemption for these trips.

- **50% Prison Exemption** – Critical to the states public safety efforts, prisons are an inappropriate land use for infill opportunity areas that SB 375 envisions. These non-compatible land uses further drag down the per capita VMT and CO2 reduction efforts. In addition, the employees at prisons rarely choose a residence in a community next door to the prison. Informal van pools are very common at these facilities, and are reflected in the higher auto occupancy rates in the Kern COG travel model.

Figure 3 – Strategic Resource Employment Areas



- **Balanced Greenfield Development** – Kern is a high growth area with a secure water supply. Containing 1/3rd of the area 8-county San Joaquin Valley region, Kern is anticipated to absorb considerable spill over from Southern California that could help 8-county region surpass the Bay Area as the second largest region in the state. The Kern regional blueprint indicated that the market demand for traditional single family housing was somewhere between 60 and 90 percent. The current trends scenario assumes the bulk of the growth on the periphery of existing urban areas. It is important to note that approximately 1/3rd of these households will likely be moving closer to their worksite than a downtown infill location could provide. This fact has a moderating influence on the effectiveness of redevelopment infill strategies in Kern. The key in these

greenfield/urban fringe areas is to provide a mix of housing/shopping and transportation opportunities that encourage walking, biking and transit use. In addition to the urban fringe, outlying community efforts to provide more housing with closer shopping opportunities and amenities in the outlying strategic employment areas will be a key Greenfield development strategy.

- **Best Management Practices** – In addition to land use changes the following other management practices are strategies being implemented in Kern. The modeling may not be fully sensitive to all of these practices, but it is assumed that these will be employed to make progress toward SB 375 goals
 - **Indirect Source Review (ISR) Rule** – The San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted the ISR Rule which charges a fee on new development that can be waived if certain air quality improvement strategies (transit access, bike/walk paths, etc.). Proceeds from the fee are used to purchase emissions reductions such as diesel retrofits. It is difficult to forecast the emission savings from this existing policy, however the modeling has incorporated the D factor process in an attempt to account for increased density, mixed use, walk, bike and transit access.
 - **Carpooling/Vanpooling** – The regional transportation model accounts for these modes in terms of vehicle occupancy. Kern Commuter Connection provides for online ride share services and the Census Bureau estimated that 17% of commuters carpooled between 2006-08. Vanpooling to outlying employment centers are already an integral part of the commute pattern as well. The model currently includes an vehicle occupancy assumption that reflects these characteristics.
 - **Transit Use** – The Metropolitan Bakersfield Transit System is currently modeled based on the funding assumptions in the Draft 2011 RTP. The boardings to total trips ratio in the model is 1 to 2%. The D factor sensitivity testing found that the model was sufficiently capturing increases in housing near transit and did not require a D factor adjustment.
 - **Transportation System Management** – Kern has invested extensively in traffic signal synchronization which is only partially captured by the transportation model. The major highway improvement projects are considering carpool lanes, ramp metering, and bike facilities etc. These are not currently reflected in the modeling.
 - **High Speed Rail (HSR)** – The current trends model shows some increased land use in downtown Bakersfield at the HSR station. The alternative quadrupled the growth in the downtown around the station. The model does not currently include a special generator to simulate boardings at the HSR station nor the deferral of through county trips (which are excluded from consideration based on RTAC's recommendations).

Conclusion – Without Pavley I and Low Carbon Fuels, The recommended Current Trends scenario is showing a 12% increase in greenhouse gas emissions. The Alternative to the Current Trends scenario only shows the emissions slowing by .7% to an 11.3% increase with the recommended 4D adjustments and the movement of more than 1% of the growth to infill areas. This lack of responsiveness in the model has a lot to do with Kern's unusually large geographic area it is modeling. The 8,200 square mile Kern Region (twice the area of L.A. County) is unusual because 95% of the area is dominated by non-urban land uses. Yet travel in the non-urban area is included in the region's travel model and emission results. Two thirds of the population and housing growth are in 5% of the region known as Metro Bakersfield. Two thirds of the employment growth is in the strategic resource employment areas outlying the Metro area. Because these areas are similar in make-up to the non-Metropolitan areas of the State, that SB 375 granted exemptions for, it makes sense to either grant an exemption for the travel activity requested by Kern, or permit our region a target that might be higher than other areas of the state because of our unusual situation. It is also important to note that even with the addition of travel beyond Kern's boundary, that the emission rates per capita are anticipated to be some of the lowest in the state. This is because of Kern's higher occupancy vehicle rates and lower trip making rates than some of the more affluent metropolitan areas of California.

Factor or Variable	Kern SB 375 Target Strategies (CO2 with Pavley/LCF)					Kern SB 375 Target Strategies (No Pavley/LCF)					Land Use Model(UPLAN)	
	All Trips	RTAC (-XX,-50%IX, -50% Mil)	(-XX,-50%IX,-100%Mil)	(-XX,-50%IX,-100%Mil,-50%Pris)	(-XX,-50%IX,-100%Mil,-50%Pris,-50%Wind)	All Trips	RTAC (-XX,-50%IX, -50% Mil)	(-XX,-50%IX,-100%Mil)	(-XX,-50%IX,-100%Mil,-50%Pris)	(-XX,-50%IX,-100%Mil,-50%Pris,-50%Wind)	All Trips	RTAC (-XX,-50%IX,-50% Mil)
Weekday CO2 Emissions by Passenger Vehicles Per Person (Pounds)												
Base Year (2005)	22.02	14.32	13.79	13.64	13.58	22.02	14.32	13.79	13.64	13.58	22.02	14.32
SB 375 Interim Year (2020 CT)	16.15	10.39	10.09	9.99	9.95	22.06	14.21	13.79	13.63	13.61	22.36	14.80
SB 375 Horizon Year (2035 CT)	15.28	10.17	9.93	9.84	9.80	23.71	15.79	15.41	15.26	15.22	23.94	16.14
Base Scen. Interim Yr. (2020 NoBuild)	16.11	10.35	10.05	9.95	9.91	21.98	14.13	13.73	13.61	13.55	--	--
Base Scen Horizon Yr. (2035 NoBuild)	15.43	10.31	10.07	9.98	9.95	23.94	16.02	15.62	15.49	15.41	--	--
Alt. Scen. Interim Yr. (2020 ACT)	16.11	10.35	10.05	9.95	9.91	21.98	14.11	13.73	13.61	13.55	16.11	10.35
Alt. Scen. Horizon Yr. (2035 ACT)	15.22	10.13	9.89	9.80	9.75	23.60	15.72	15.34	15.20	15.12	21.18	13.60
Percent Change in CO2 Per Person from 2005												
Base Year (2005)												
SB 375 Interim Year (2020 CT)	-26.7%	-27.4%	-26.8%	-26.7%	-26.7%	0.2%	-0.8%	0.0%	0.0%	0.2%	1.5%	3.4%
SB 375 Horizon Year (2035 CT)	-30.6%	-28.9%	-28.0%	-27.83%	-27.9%	7.7%	10.3%	11.7%	11.9%	12.0%	8.7%	12.7%
Base Scen. Interim Yr. (2020 NoBuild)	-26.9%	-27.7%	-27.1%	-27.0%	-27.0%	-0.2%	-1.3%	-0.4%	-0.2%	-0.2%		
Base Scen Horizon Yr. (2035 NoBuild)	-29.9%	-28.0%	-27.0%	-26.8%	-26.8%	8.7%	11.9%	13.3%	13.6%	13.5%		
Alt. Scen. Interim Yr. (2020 ACT)	-26.9%	-27.7%	-27.1%	-27.0%	-27.0%	-0.2%	-1.5%	-0.4%	-0.2%	-0.2%	-26.9%	-27.7%
Alt. Scen. Horizon Yr. (2035 ACT)	-30.9%	-29.2%	-28.3%	-28.17%	-28.22%	7.2%	9.8%	11.2%	11.5%	11.3%	-3.8%	-5.0%
Pct. Diff. between 2035 CT and ACT	-0.40%	-0.45%	-0.46%	-0.46%	-0.46%	-0.45%	-0.48%	-0.49%	-0.40%	-0.60%	-11.5%	-15.8%
Passenger Vehicle Weekday VMT per Person (Miles)												
Base Year (2005)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
SB 375 Interim Year (2020 CT)	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	30.2	30.2
SB 375 Horizon Year (2035 CT)	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.4	31.4
Base Scen. Interim Yr. (2020 NoBuild)	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	--	--
Base Scen Horizon Yr. (2035 NoBuild)	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	--	--
Alt. Scen. Interim Yr. (2020 ACT)	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	30.6	30.6
Alt. Scen. Horizon Yr. (2035 ACT)	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	28.2	28.2
2. MODEL OUTPUT DATA--CO2 and Vehicle Miles Traveled												
CO2 Emissions by Passenger Vehicles per Weekday--EMFAC2007 LDA, LDT1, LDT2, and MDV (Tons)												
Base Year (2005)	8,430	5,480	5,280	5,220	5,200	8,430	5,480	5,280	5,220	5,200	8,430	5,480
SB 375 Interim Year (2020 CT)	8,160	5,250	5,100	5,050	5,030	11,150	7,180	6,970	6,890	6,880	11,300	7,480
SB 375 Horizon Year (2035 CT)	10,090	6,720	6,560	6,500	6,470	15,660	10,430	10,180	10,080	10,050	15,810	10,660
Base Scen. Interim Yr. (2020 NoBuild)	8,140	5,230	5,080	5,030	5,010	11,110	7,140	6,940	6,880	6,850		
Base Scen Horizon Yr. (2035 NoBuild)	10,190	6,810	6,650	6,590	6,570	15,810	10,580	10,320	10,230	10,180		
Alt. Scen. Interim Yr. (2020 ACT)	8,140	5,230	5,080	5,030	5,010	11,110	7,130	6,940	6,880	6,850	8,140	5,230
Alt. Scen. Horizon Yr. (2035 ACT)	10,050	6,690	6,530	6,470	6,440	15,590	10,380	10,130	10,040	9,990	13,990	8,980
Total VMT by Passenger Vehicles per Weekday--EMFAC 2007 LDA, LDT1, LDT2 and MDV (Miles, in Thousands)												
Base Year (2005)	22,619	22,619	22,619	22,619	22,619	22,619	22,619	22,619	22,619	22,619	22,619	22,619
SB 375 Interim Year (2020 CT)	30,233	30,233	30,233	30,233	30,233	30,233	30,233	30,233	30,233	30,233	30,536	30,536
SB 375 Horizon Year (2035 CT)	41,758	41,758	41,758	41,758	41,758	41,758	41,758	41,758	41,758	41,758	41,503	41,503
Base Scen. Interim Yr. (2020 NoBuild)	30,083	30,083	30,083	30,083	30,083	30,083	30,083	30,083	30,083	30,083		0
Base Scen Horizon Yr. (2035 NoBuild)	41,486	41,486	41,486	41,486	41,486	41,486	41,486	41,486	41,486	41,486		0
Alt. Scen. Interim Yr. (2020 ACT)	30,163	30,163	30,163	30,163	30,163	30,163	30,163	30,163	30,163	30,163	30,955	30,955
Alt. Scen. Horizon Yr. (2035 ACT)	41,626	41,626	41,626	41,626	41,626	41,626	41,626	41,626	41,626	41,626	37,257	37,257

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

Kings County Association of Governments
(KCAG)

2. Baseline Emissions: 2007 RTP Model v. Draft 2011 RTP Model

Because SB 375 indicates that baseline data should be compiled using the model from the MPO's most recent regional transportation plan (RTP), staff completed some preliminary modeling work using the model from our 2007 RTP as the baseline. However, it was determined that the model from our draft 2011 RTP should be used for the purposes of baseline emissions development and target-setting processes.

3. Models, Model Improvements and Quantifying GHG Reductions

KCAG utilized our 4-step model to attempt to quantify any greenhouse gas emission reductions associated with local smart growth strategies. Dowling Associates worked to improve the 4-step model's ability to account for mode choice, transit-oriented development, mixed-use development in urban cores, vanpooling, and infill development ("the 4 Ds"). With this, KCAG hoped to be able to better understand how these smart growth strategies would impact our region.

Additionally, KCAG wants to impress upon all interested parties that there may be a variance in greenhouse gas emission reduction numbers associated with utilizing different assumptions for interregional (IX-XI) trips, updated modeling tools and different post-processors. California is at the forefront of this process, and, as we progress with implementation, existing data and studies will be replaced by more robust and comprehensive evaluations of land use planning and its impact on greenhouse gas emissions.

KCAG expects this to happen moving forward and hopes all interested groups understand that incorporating improved information and tools into future assessments may change the percent per capita reduction numbers, even if the smart growth land use policies remain a constant. The numbers presented in this document may change as more information becomes available, decisions are made regarding how to account for IX-XI trips, and as KCAG's model is improved.

4. Pavley I + LCFS Postprocessor

At this point in time, KCAG's draft proposed reduction targets do not take into account GHG reductions derived from the Pavley I +LCFS Postprocessor.

C. Target Setting and the Blueprint

The San Joaquin Valley Blueprint is a critical land use planning document in Kings County. When staff met with the local planners to evaluate smart growth strategies for the purposes of target-setting, the Kings County Locally-Preferred Blueprint Scenario was revisited to ensure that smart growth strategies were in keeping with the tenets of the Blueprint. The draft targets

proposed in the document have been designed with the Blueprint in mind and are reflective of the Blueprint principles.

D. Kings County's Smart Growth Strategies

In meeting with our member agencies, staff observed some trends in smart growth strategies in Kings County. Because bottom up implementation is a critical component of SB 375 moving forward, KCAG wanted to take the opportunity to highlight the strategies being incorporated into our region's smart growth efforts. These are the smart growth policies we see as context-sensitive for our area, which is still largely rural.

Modeling tools are a key component to understanding the ties between smart growth and greenhouse gas emission reductions. It is our hope that ARB evaluates these smart growth strategies so that Kings County planners (and planners in rural areas across the state) can better understand and quantify how these particular smart growth strategies reduce greenhouse gas emissions specifically in rural areas.

1. Infill Development

Infill development was at the crux of local planning efforts. There are undeveloped parcels within city limits that provide opportunities to provide mixed-use development where existing infrastructure is already in place. Infill development is probably the smart-growth strategy that will be used the most in Kings County. We are interested in seeing more information on the role infill development in existing urban centers plays in reducing greenhouse gas emissions.

2. Mixed-Use Development

Kings County has many vibrant downtown areas that are poised for renovation. These downtowns feature many historical brick buildings from the early twentieth century that are evocative of a bygone, "wild west" era of California history. Currently, these downtowns host restaurants, boutiques and professional offices and remain vital components of our communities. Many of the local jurisdictions are considering updating their zoning ordinances to facilitate more mixed-use development in downtown cores.

Mixed-use development would involve converting unused or underused second stories of commercial properties into lofts or apartments. Our scenarios are reflective of this increase in mixed-use development of this nature in our downtown cores. The revitalization of downtowns is a smart growth strategy being looked at across the board. The City of Hanford, for example, recently completed a Downtown East Hanford Planning Study which focuses on revitalizing part of its downtown into a walkable, sustainable mixed-use hub. In addition to our cities, the focus on downtowns is featured in Kings County's unincorporated communities as well. The Kings County 2035 General Plan provides an outline for focusing rural growth in the existing urban cores of unincorporated communities.

3. Transit-Oriented Development

Another component of our scenario is an increase in transit-oriented development. With the exception of the City of Corcoran, who operates their own dial-a-ride service, Kings Area Rural Transit provides transit service for the entire county and its cities. Several jurisdictions are looking at developing assisted living senior facilities and multifamily complexes near existing commercial centers and transit routes (including near existing transit stops and train depots).

As studies show that California's average age increases every year, the co-benefits of such planning strategies are evident. It is critical to plan for the elderly in a way that facilitates and improves public health, public safety, and access to different modes of transportation. Additionally, the City of Lemoore has planned rail stops in its general plan along the San Joaquin Valley Railroad in anticipation of potential light rail feeder service for the California High Speed Rail System.

4. Vanpooling

Kings County has an extremely successful vanpooling program that is currently operated throughout the region by the Kings County Area Public Transit Agency (KCAPTA). The vanpool program extends far beyond Kings County and the San Joaquin Valley into the counties of Monterey, Sacramento, San Luis Obispo, Santa Barbara, and Ventura. There is an effort underway to form a joint powers agreement (JPA) between some of these counties and form an agency separate from KCAPTA called CalVANS.

The JPA aside, the vanpooling program is immensely successful in Kings County and remains one of the most successful smart growth strategies in reducing vehicle miles traveled and vehicle emissions that is available to Kings County. Staff worked with the agency to outline projections of future vanpooling numbers. Equipment was recently added to each vanpool vehicle that reports a considerable amount of information regarding vanpool commuter trips and vehicle miles travelled (VMT). Staff will be meeting with the agency to obtain this information and intends to incorporate real-time vanpooling data into our future assumptions.

E. The Road to Sustainability

KCAG and its member agencies are committed to promoting and facilitating smart growth in a way that is contextually appropriate for the region. These draft proposed targets are reflective of the Kings County Locally-Preferred Blueprint Scenario and were derived from the bottom up with the participation of our member agencies.

The target-setting process has raised many questions. Moving forward, there are many questions that we would like to see answered regarding the

development of tools to better quantify GHG reductions associated with the smart growth strategies outlined in this document.

KCAG understands that this document is a step in a lengthy initial process. We also understand that, as models improve and more information is available, we may be able to more accurately capture the relationship between land use policy and GHG. We acknowledge that this initial submittal is a “work-in-progress” or living document in that respect. The information presented in this document can be viewed as a snapshot that reflects results derived from assumptions that will change in the future, such as member agency general plans, outputs from a 4-step gravity model and assumptions included in EMFAC 2007. As new information becomes available, new tools are released and models are improved, there will be changes in numbers from this initial submittal.

KCAG’s 2015 Regional Transportation Plan will contain our first Sustainable Communities Strategy. Between now and 2015, we anticipate that, with an improved model and different resources available to us for this purpose, we may be able to better calculate greenhouse gas emissions reductions associated with our smart growth strategies. This will likely give us different numbers than what is presented here. What is presented in this may change as technology improves - even though our smart growth strategies may remain constant.

VII. Draft Proposed Targets

There are three different sets of numbers presented below (Scenarios A, B, and C). The land use assumptions are the same for all of these scenarios. The only way in which they are different is in their calculation of interregional (IX-XI) trips. It was previously mentioned that Dowling Associates studied interregional (IX-XI) trips as they appear in the statewide model. This information was then incorporated into the baseline emissions submittal. Similarly, staff incorporated the statewide model interregional trip data completed by Dowling Associates for the San Joaquin Valley MPOs into the scenario. This information is presented below for illustrative purposes.

It is important to note that Scenario A is what KCAG is submitting as our proposed draft percent per capita reduction target. In contrast, Scenarios B and C are presented to underscore how incorporating difference pieces of data from the statewide model to account for interregional (IX-XI) trips produces different results. All of the other inputs remained constant as our GHG reduction numbers changed depending on how interregional (IX-XI) trips are accounted for.

At this point, it is unknown if any of the methodologies below are “better” than the other. Though Scenario A is reflective of our draft proposed targets, KCAG felt it was important to demonstrate how the reduction numbers change depending on how interregional (IX-XI) travel is calculated.

In keeping with the “Big 4,” KCAG excluded through trips (XX trips) when running all three scenarios. For Scenarios A, B, and C, the assumptions regarding through trips (XX trips) were derived from KCAG’s model. Additionally, KCAG understood that BDN outputs from EMFAC and not BUR outputs were to be used for the purposes of

establishing reduction numbers, of which the numbers below are reflective. Below is a quick summary of the through (XX) trip and interregional (IX-XI) trip assumptions used in each scenario:

- **Scenario A:** removes all through trips (XX) as calculated by KCAG’s model and includes all interregional (IX-XI) trips as they are calculated using KCAG’s travel demand model.
- **Scenario B:** removes all through trips (XX) as calculated by KCAG’s model and includes 50% of interregional trips (IX-XI) that start/end in Kings County and travel *only within the San Joaquin Valley*.
- **Scenario C:** removes all through trips (XX) as calculated by KCAG’s model and includes 50% of interregional trips (IX-XI) that start/end in Kings County and travel *throughout the state*.

KCAG Draft Percent Per Capita Greenhouse Gas Emissions Reductions Summary Table	KCAG Proposed Target: Scenario A	Informational: Scenario B	Informational: Scenario C
	XX Trips Excluded, IX-XI Trips from KCAG Model Included	Addition of 50% of VMT IXXI (outside MPO SJV only)	Addition of 50% of VMT IXXI (outside MPO all trips Statewide links)
Percent Per Capita Reduction in CO2 Emissions from 2005			
Base Year (2005)			
SB 375 Interim Year (2020)	-3.5%	-5.0%	-7.3%
SB 375 Horizon Year (2035)	-5.1%	-2.7%	-1.6%

As previously mentioned, it has not been determined if any of the above methodologies for factoring interregional (IX-XI) travel are “more correct” than the others. As illustrated above, how interregional (IX-XI) travel is accounted for has a direct relationship with GHG reduction numbers even as smart growth strategy inputs remained constant. It is important to understand the complexity of this issue and the totality of its implications moving forward. MPOs will need guidance on how to account for this in the future. It is important to consider all of these factors moving forward as we begin to develop our first Sustainable Communities Strategies.

VIII. Next Steps

KCAG greatly appreciates the opportunity we have been given to provide details about Kings County and its role in the statewide framework. We take great pride in our communities and hope this document has provided some additional details as to what makes us unique. As we move forward in the target-setting process, we look forward to the continued opportunity to work with the Air Resources Board and speak on behalf of our member jurisdictions.

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

San Joaquin Council of Governments (SJCOC)

SJCOG Target Setting Process

Baseline Development:

SJCOG staff utilized the SJCOG transportation model and ARB's Emissions Factor 2007 (EMFAC2007) model to develop greenhouse gas emissions estimates for 2005, 2020, and 2035 based on the September 2009, RTAC recommendation. San Joaquin County draft baseline greenhouse gas emissions estimates from passenger vehicles can be found in the table below.

	2005	2020	2035
Population (people)¹	650,458	809,685	989,774
Total Passenger Car Greenhouse Gas (CO₂) Emissions (lbs)	11,187,878 lbs	13,440,771 lbs	16,826,158 lbs
Baseline Passenger Car Greenhouse Gas (CO₂) Emissions Per Capita (lbs)	17.2 lbs per capita	16.6 lbs per capita	17.0 pounds per capita

*Numbers reflected in this table are estimates based on current ARB methodologies and are subject to change with ARB changes to methodology to calculate vehicle miles travelled.

Scenario Development:

SJCOG staff has developed greenhouse gas reduction scenarios for the years 2020 and 2035. To develop these scenarios, SJCOG staff began with the same data sets utilized as part of the Blueprint process. These data sets include: location of agricultural land, critical habitat, green belts, California Natural Diversity Database, Delta, Highway 88 area, general plans, and access to regional transportation plan projects, census block groups with residential growth, city boundaries, existing urban areas, and existing roadways. SJCOG staff worked with the local jurisdictions to understand planned growth within existing general plans or planned updates as well as general plan policies that may be beneficial to the reduction of greenhouse gas emissions. SJCOG staff also requested information regarding the development of climate action plans within any of the local jurisdictions that have been or will be incorporated into general plans.

SJCOG staff created a scenario based on input from the local jurisdictions that resulted in a countywide average density of approximately 3.88 dwelling units per acre in 2020 and approximately 4.73 dwelling units per acre in 2035. Both scenarios represent an increase in density from the current 3.23 dwelling units per acre.

SJCOG staff presented the 2020 and 2035 scenario results to the San Joaquin Planners group and received favorable input.

The results of the 2020 and 2035 scenario are displayed in the table below.

¹ SJCOG Board adoption November 2009

	2020	% Per Capita Reduction from 2005	2035	% Per Capita Reduction from 2005
Scenario Passenger Greenhouse Gas Emissions Per Capita	16.17 lbs per capita	6%	16.51 lbs per capita	4%

When comparing the SJCOG 2020 and 2035 scenario to scenarios developed by other MPO regions of the state, the SJCOG scenario is less aggressive than the state's large 4 MPOs whose scenarios represent a range from 7 to 15% reduction per capita (Sacramento Area Council of Governments, Southern California Association of Governments, Metropolitan Transportation Commission, and San Diego Association of Governments) mainly due to the impact of roadway pricing assumptions contained in their scenarios. The SJCOG scenario does however fall into a range similar to other medium size MPOs throughout the state (1 to 5% per capita reduction from 2005). When compared to other MPOs in the San Joaquin Valley, the SJCOG scenario again falls within the middle of the range. The preliminary scenarios developed by Fresno COG result in approximately a 5% reduction from 2005 and the preliminary scenarios developed by KernCOG result in a 9% increase from 2005.

Once the ARB board approves final targets, SJCOG will begin working with the local jurisdictions in the development of a Sustainable Communities Strategy in coordination with the 2014 RTP.

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

Butte County Association of Governments
(BCAG)

Butte County Association of Governments Sustainable Communities Strategy

Passenger Vehicle Greenhouse Gas Emissions Target Setting

-Methodology and Scenario Results-



Methodology

BCAG staff modeled three (3) scenarios using the BCAG Travel Demand Forecasting Model, ARB's EMFAC 2007 V2.3 emissions model and the recently available Pavley 1 + Low Carbon Fuel Standard (LCFS) post processor. As prescribed by the RTAC report, all results include the emissions for passenger vehicles (EMFAC categories LDA, LDT1, LDT2, and MDV) and exclude all through trips (trips which both originate and end outside the region but travel across some portion of the region).

Travel Demand Model

The BCAG Travel Demand Model has been validated to the 2006 base year and is consistent in form and function with the standard traffic forecasting models used in the transportation planning profession. The model is a three step travel demand forecasting model consisting of Trip Generation, Trip Distribution, and Trip Assignment and produces forecasts for daily, AM peak hour, and PM peak hour conditions. The model utilizes 20 land use categories for which 6 are residential in nature. The model does not include specific inputs for jobs rather it includes the existing and forecasted square footage of non-residential land uses (retail, industrial, office, etc.) in order to generate trip attractions. For more information regarding the existing BCAG Travel Demand Model, a complete copy of the model development report can be viewed at the following website: <http://www.bcag.org/Planning/Transportation-Forecasting/index.html> .

The existing model does not have the ability to model transit or other alternative modes of transportation such as walking or bicycling. Therefore, these have not been analyzed in any of the scenarios. It is anticipated that the BCAG travel model will have some capability to model these alternative modes during the development of the 2012 RTP – SCS.

Each scenario is run within the BCAG Travel Demand Model. Once ran for each scenario, the travel model generates the vehicle miles traveled (VMT) for the base and horizon analysis years (2006 and 2035) as well as divides the VMT into 13 separate speed bins set at 5 mile per hour intervals. The 2018 interim year is generated via interpolation from a post processing spreadsheet.

EMFAC 2007

ARB's EMFAC 2007 emissions model is then used to calculate the greenhouse gas, carbon dioxide (CO₂), emissions output based on the provided VMT and speed bin classification. For the purposed of this analysis, BCAG utilized the annual option for CO₂ output as suggested by the RTAC report.

Pavley 1 + LCFS

The ARB Pavley 1 + LCFS post processor reads the final outputs from the EMFAC 2007 model and applies the greenhouse gas emission benefits from the ARB adopted

Pavley clean-car standards and Low Carbon Fuel Standards that reduce the carbon intensity of vehicle fuel. Note, for scenario results without use of Pavley 1 + LCFS post processor see Appendix D.

Interregional Travel

For the purpose of this analysis, BCAG staff has subtracted all emissions from through trips (X-X trips) based on the relative percentage of VMT from 2006, 2018, and 2035. In addition, the portion of VMT from trips that either begin or end within the region but travel to/from neighboring regions (X-I, I-X trips) has been included for all portions of the trip within the BCAG region. See Appendix A for a summary of the calculated interregional VMT and CO₂.

Target Metric

As directed by the RTAC report, BCAG staff quantified the outputs from the Pavley 1 + LCFS post processor using the target metric in terms of a percent reduction in per capita greenhouse gas emissions (CO₂) from base year levels.

Analysis Years

The RTAC has chosen the base year of 2005, but BCAG has quantified the results based off the year 2006 since this is the earliest year available within the BCAG travel model. In addition, the RTAC has selected the years 2020 and 2035 as the interim and horizon years. The closest existing interim year to 2020 established for the 2008 BCAG RTP Air Quality Conformity Determination was 2018. Therefore, BCAG has utilized the following years for reporting 2006, 2018, and 2035.

Scenarios

As part of the target setting process, the RTAC report recommends that each MPO prepare an analysis of their adopted fiscally constrained RTP for both the Build and No-Build scenarios along with any alternative scenarios. The purpose of the scenarios preparation and analysis is to gauge the effectiveness of various approaches and to assist in identifying the most ambitious and achievable greenhouse gas reduction strategy for the region.

Each scenario described below was prepared utilizing the same regional growth projections (population, housing, and employment) established for BCAG's 2008 RTP. See Appendix B for a summary of the regional growth projections. In addition, both the '08 RTP Build and the Conceptual SCS scenarios utilize the same forecasted, capacity increasing, transportation network improvements approved in the '08 BCAG RTP and '09 Federal Transportation Improvement Program (FTIP). See Appendix C for a summary of the capacity increasing transportation network improvements.

'08 RTP Build

BCAG's 2008 RTP Build scenario is the existing fiscally constrained land use and transportation network prepared for the region's adopted 2008 RTP. The transportation model's future year land use data was developed with the assistance of the local jurisdictions and represents build-out of existing adopted general plans and development of recognized future land use plan study areas, as of June 30th, 2008. At the time the land use base was prepared, four (4) of the six (6) local jurisdictions in Butte County were at various stages of updating their local land use plans and general plans. These general plan and specific plan development activities occurring in the county by the local jurisdictions were reflected in the future year land use assumptions.

'08 RTP No-Build

The '08 RTP No-Build scenario is the '08 RTP Build scenario minus the transportation network improvements. This scenario contains the same land use and growth forecasts as the '08 RTP Build scenario, but, in theory, is generally representative of what would occur without any regional transportation improvements. The No-Build scenario is different than the "No-Project" alternative contained in BCAG's 2008 RTP – Environmental Impact Report, in that it does not contain the build-out of the previously adopted BCAG 2004 RTP. Typically with a modeled No-Build scenario, VMT is reduced based on the reduction of lane miles, but increases are seen in vehicle hours of delay which result in additional long term air quality emissions.

Conceptual SCS

The Conceptual SCS scenario incorporates the local jurisdictions newly approved preferred general plan land use scenarios and housing elements, as of January 2010. This scenario is strictly land use based and makes no modifications to the adopted 2008 BCAG RTP transportation network. In addition, the scenario utilizes the same regional growth forecasts as the previous two scenarios. The Conceptual SCS scenario is generally representative of the latest land use assumptions taking into consideration the new state requirements included in Senate Bill 375.

This scenario was developed in coordination with the local jurisdictions through the City/Town/County Planning Directors Group. Each jurisdiction's land use was reviewed from the 2008 RTP Build scenario and revised to include the latest planning assumptions. The majority of changes occurred within the Chico sphere of influence, the most populated sphere within the county, in which the City of Chico's 2030 General Plan Preferred Land Use Alternative was incorporated. With the inclusion of the recently developed housing elements, all jurisdictions saw some portion of larger lot single family housing transfer to smaller lot multi-family units.

The Conceptual SCS scenario analysis does not fully include the benefits from the increased mixes of land use with the jurisdictions new general plans and housing

elements. Nor does the analysis include benefits from alternative modes of travel (bike, pedestrian, and transit). Currently, the BCAG Travel Demand Model does not include these capabilities. For the purposes of this analysis, the assumption is the percentage of travel by alternative mode is unchanged from 2006 through the RTP horizon year 2035.

Modeling Results

Each of the three (3) scenarios modeling results has been included in the table below. The average 2018 reduction in per capita passenger vehicle CO2 emissions is 20.1% with an average 2035 reduction of 36.2%, from the 2006 base year. The Conceptual SCS scenario shows the greatest per capita CO2 reductions for the year 2018 and 2035 while the existing 2008 BCAG RTP Build scenario shows the least.

2008 BCAG RTP Build			
	2006 Base Yr	2018 Interim Yr	2035 Horizon Yr
Passenger Vehicle Weekday VMT	3,485	4,410	5,732
Population	217,209	267,599	346,818
Weekday CO2 (tons)	1,678	1,640	1,720
Per Capita CO2 (lbs)	15.45	12.26	9.92
% Reduction VMT Per Capita from '06		-2.7%	-3.0%
% Reduction CO2 Per Capita from '06		20.7%	35.8%

2008 BCAG RTP No-Build			
	2006 Base Yr	2018 Interim Yr	2035 Horizon Yr
Passenger Vehicle Weekday VMT	3,485	4,384	5,672
Population	217,209	267,599	346,818
Weekday CO2 (tons)	1,678	1,633	1,706
Per Capita CO2 (lbs)	15.45	12.20	9.84
% Reduction VMT Per Capita from '06		-2.1%	-1.9%
% Reduction CO2 Per Capita from '06		21.0%	36.3%

Concept SCS			
	2006 Base Yr	2018 Interim Yr	2035 Horizon Yr
Passenger Vehicle Weekday VMT	3,485	4,379	5,672
Population	217,209	267,599	346,818
Weekday CO2 (tons)	1,678	1,629	1,698
Per Capita CO2 (lbs)	15.45	12.17	9.79
% Reduction VMT Per Capita from '06		-2.0%	-1.9%
% Reduction CO2 Per Capita from '06		21.2%	36.6%

Notes:

VMT and CO2 from passenger vehicles (LDA, LDT1, LDT2, and MDV);

Trips based on intra-regional and inter-regional travel (no through trips);

Growth based on 2008 BCAG Regional Growth Projections 2006-2035

APPENDIX D

MODELING SCENARIO RESULTS EXCLUDING PAVLEY 1 + LCFS REDUCTIONS

2008 BCAG RTP Build			
	2006 Base Yr	2018 Interim Yr	2035 Horizon Yr
Passenger Vehicle Weekday VMT	3,485	4,410	5,732
Population	217,209	267,599	346,818
Weekday CO2 (tons)	1,678	2,086	2,695
Per Capita CO2 (lbs)	15.45	15.59	15.54
% Reduction CO2 Per Capita from '06		-0.9%	-0.6%
% Reduction VMT Per Capita from '06		-2.7%	-3.0%

2008 BCAG RTP No-Build			
	2006 Base Yr	2018 Interim Yr	2035 Horizon Yr
Passenger Vehicle Weekday VMT	3,485	4,384	5,672
Population	217,209	267,599	346,818
Weekday CO2 (tons)	1,678	2,077	2,675
Per Capita CO2 (lbs)	15.45	15.52	15.43
% Reduction CO2 Per Capita from '06		-0.5%	0.2%
% Reduction VMT Per Capita from '06		-2.1%	-1.9%

Concept SCS			
	2006 Base Yr	2018 Interim Yr	2035 Horizon Yr
Passenger Vehicle Weekday VMT	3,485	4,379	5,672
Population	217,209	267,599	346,818
Weekday CO2 (tons)	1,678	2,071	2,662
Per Capita CO2 (lbs)	15.45	15.48	15.35
% Reduction CO2 Per Capita from '06		-0.2%	0.6%
% Reduction VMT Per Capita from '06		-2.0%	-1.9%

Notes:

VMT and CO2 from passenger vehicles (LDA, LDT1, LDT2, and MDV);
 Trips based on intra-regional and inter-regional travel (no through trips);
 Growth based on 2008 BCAG Regional Growth Projections 2006-2035

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

**San Luis Obispo Council of Governments
(SLOCOG)**



June 18, 2010

James Worthley
SLO Council of Governments
1114 Marsh Street
San Luis Obispo, CA 93401

Subject: Additional Greenhouse Gas Emission Simulation Results for the 2010 SLO RTP / PSCS

Dear Mr. Worthley,

On June 8, 2010, the San Luis Obispo County Air Pollution Control District (APCD) submitted a table that summarizes modeled baseline (2008) and future (2020 and 2035) scenario CO₂ emissions for your organization to include in the RTP/PSCS.

Geoffrey Chiapella contacted me the next morning to discuss the results. He noted that by including the greenhouse gas (GHG) reductions associated with future more stringent CAFE and low-carbon fuel standards, it made it difficult to clearly understand the effectiveness that the potential SLOCOG development scenarios would have on GHG reductions.

In response to this concern, the APCD prepared two attached tables that are summarized below. As required by SB375, both tables demonstrate GHG emissions from automobiles and light duty trucks which include the first four of the thirteen vehicle classes that are modeled in the state's EMFAC2007 vehicular emissions model. As we noted in our previous letter, although SB375 does not require evaluation of the other nine vehicle classes, they account for about 17% of the total vehicular GHG emissions in the SLO County.

Table 1. Greenhouse Gas Emission Simulation Results for 2010 SLO RTP / PSCS with Pavley I + LCFS Corrections

- This table modestly updates the table that we submitted to SLOCOG on June 8, 2010 (i.e. slight title change, formatting change, and minor text changes in table footnotes 1 and 5)
- This table is a summary of the GHG emission benefits from the combination of emission reduction four factors:
 1. EMFAC2007 assumed future SLO County fleet and related emission factors;
 2. An adjustment of those emissions resulting from lower fuel use of automobiles and light duty trucks as a result of legislation (Pavley I) required improvements to the CAFE standards;
 3. A further adjustment of those emissions resulting from lower CO₂ emissions because of future low carbon fuel standards; and
 4. Impacts on vehicle miles traveled and vehicular speeds from future potential SLOCOG development scenarios.
- This table is limited to the CO₂ component of tailpipe GHG emissions, which is approximately 97 to 98% of these emissions.

Table 2. Greenhouse Gas Emission Simulation Results for 2010 SLO RTP / PSCS without Pavley I + LCFS Corrections in 2020 & 2035

- This table is a summary of the GHG emission benefits from the combination of emission reduction two factors:
 1. EMFAC2007 assumed future SLO County fleet and related emission factors; and
 2. Impacts on vehicle miles traveled and vehicular speeds from future potential SLOCOG development scenarios.
- This table includes a summary of the CO₂ component of tailpipe GHG emissions, for comparison to Table 1
- Since SB375 calls for GHG reductions in total, this table also includes a summary of the total tailpipe GHG emissions in terms of CO₂ equivalence. The other two tailpipe GHGs are nitrous oxide (N₂O) and methane (C₄), both of which are emitted at a much lower mass than CO₂, though they are more potent GHGs than CO₂.
- Relative to Table 1, Table 2 which does not include future reductions from Pavley I and LCFS, and therefore, it is somewhat easier to evaluate the GHG impacts of the future potential SLOCOG development scenarios.

The APCD requests a meeting with SLOCOG to review and discuss the results presented in the Tables, answer questions, and to determine how the results will be included in the 2010 Regional Transportation Plan / Preliminary Sustainable Communities Strategies.

Please contact me if you have any questions about this letter. Please contact me to schedule the proposed APCD/SLOCOG meeting.

Sincerely,



for Andrew J. Mutziger

AJM/ksj

cc Dennis Wade, ARB

Attachments

Table 1. Greenhouse Gas Emission Simulation Results for 2010 SLO RTP / PSCS with Pavley I + LCFS Corrections ¹

Land use & 4-D Improvements only ²	SLOCOG's RTP Scenarios						% Increase / % Reduction			
	2008EC	2020_s1	2020_s2	2035_s1	2035_s2		2008EC vs. 2020s1	2008EC vs. 2020s2	2008EC vs. 2035s1	2008EC vs. 2035s2
SLOCOG Provided VMT for II and Half IX & XI; no XX; Matches EMFAC's Weekday VMT ³	5,409,888	5,469,649	5,419,563	6,322,736	6,159,976		1.1%	0.2%	16.9%	13.9%
Average Daily VMT ⁴	5,139,579	5,196,353	5,148,771	6,006,816	5,852,188		1.1%	0.2%	16.9%	13.9%
Average Daily VMT per Capita	19.08	18.04	17.88	18.16	17.69		-5.5%	-6.3%	-4.9%	-7.3%
Annual CO ₂ Emission (MMT) ⁵	0.7357	0.5349	0.5300	0.5342	0.5200		-27.3%	-28.0%	-27.4%	-29.3%
Average Daily CO ₂ Emissions (kg)	2,014,167	1,464,575	1,451,125	1,462,444	1,423,657		-27.3%	-28.0%	-27.4%	-29.3%
Average Daily kg CO ₂ per Capita	7.48	5.09	5.04	4.42	4.30		-32.0%	-32.6%	-40.9%	-42.5%
Land use & 4-D Improvements and transit & TDM Improvements; w QRT ⁶										
SLOCOG Provided VMT for II and Half IX & XI; no XX; Matches EMFAC's Weekday VMT ³	5,409,888	5,414,929	5,328,517	6,109,041	5,946,834		0.1%	-1.5%	12.9%	9.9%
Average Daily VMT ⁴	5,139,579	5,144,367	5,062,274	5,803,798	5,649,696		0.1%	-1.5%	12.9%	9.9%
Average Daily VMT per Capita	19.08	17.86	17.58	17.54	17.08		-6.4%	-7.9%	-8.1%	-10.5%
Annual CO ₂ Emission (MMT) ⁵	0.7357	0.5296	0.5211	0.5161	0.5020		-28.0%	-29.2%	-29.8%	-31.8%
Average Daily CO ₂ Emissions (kg)	2,014,167	1,449,923	1,426,746	1,413,017	1,374,397		-28.0%	-29.2%	-29.8%	-31.8%
Average Daily kg CO ₂ per Capita	7.48	5.03	4.95	4.27	4.15		-32.7%	-33.8%	-42.9%	-44.4%
SLOCOG Provided Population Values	269,300	288,000	288,000	330,800	330,800		6.9%	6.9%	22.8%	22.8%
SLOCOG Quick Response Tool Reduction Rate (QRT) ⁵	-	-1.00%	-1.68%	-3.38%	-3.46%		-	-	-	-

¹ SLO County APCD staff prepared this table for baseline and SLOCOG identified future land-use development scenarios. The information in this table is directly comparable and is intended to facilitate preliminary Sustainable Community Strategies efforts that are part of SLOCOG's 2010 Regional Transportation Plan. The information is not a complete evaluation of vehicle greenhouse gas (GHG) emissions that occur in SLO County, but can be used to compare the effects of the potential development scenarios.

² The SLOCOG TransCAD model was used to provide vehicle miles traveled (VMT) and vehicular speed information (speed bins) inputs for the EMFAC2007 vehicular emissions model. The TransCAD model is a single mode vehicular model that accounts for VMT impacts of actual and proposed land use development. 4-D stands for design, density, diversity and destination; i.e. compact urban design in the allocation of new development.

³ SLOCOG TransCAD single mode transportation model provided VMT values that include 100% of the mileage from trips starting and ending in SLO County (II), 50% of the mileage from trips that start in SLO County and end in another county (IX), 50% of the mileage from trips that start in another county and end in SLO County (XI), 0% of the mileage of trips that pass through SLO County but start and end in other counties. The mileage not accounted for in the EMFAC emission simulations and is roughly 26% of the total mileage in the county.

⁴ The factor to convert 'Weekday value to Average Daily' is 347/365.25 and is based on ARB's recommendation for adjusting EMFAC's exclusive weekday emission output to average daily emissions.

⁵ Annual CO₂ emissions are extrapolated from the TransCAD weekday VMT information provided by SLOCOG and will be most accurate if that information is representative of the average weekday within the year. SB375 exclusively targets greenhouse gas (GHG) reductions from automobiles and light trucks (the first 4 of 13 vehicle classes in the EMFAC model). It should be noted that not including the other vehicle classes underestimates the total GHG emissions from vehicles in SLO County by about 17% (based on the 2008 Existing Condition EMFAC simulation). The EMFAC CO₂ emissions for the 2020 and 2035 simulations were adjusted with ARB's Version 1.0 Pavley I + LCFS postprocessor (www.arb.ca.gov/cc/sb375/tools/postprocessor.htm) to account for the benefits of legislative GHG reductions from future improved vehicle CAFE standards and low carbon fuel standards that are not included in the EMFAC2007 model. Therefore, this table demonstrates the combined GHG benefits from future legislation and proposed development scenarios. Note that based on modeling results, CO₂ is roughly 97 to 98% of the tailpipe greenhouse gas (GHG) emissions. The other two tailpipe GHGs are nitrous oxide (N₂O) and methane (CH₄) and were not included in this combined benefit evaluation based on ARB's recommendation.

⁶ The QRT is a post processor tool that SLOCOG uses to approximate the VMT reduction benefits of transit and transportation demand management (TDM) methods that the single mode TransCAD model does not include.

H:\PLAN\Climate Change\SB375\EMFAC\work\FinalTransCADRunsFromSLOCOG\APCDs_EMFAC_Summary_forSLOCOG2010RTP-PSCS_ver2_Table1.xls\EMFAC CO2 Summary For SLOCOG

Table 2. Greenhouse Gas Emission Simulation Results for 2010 SLO RTP / PSCS without Pavley I + LCFS Corrections in 2020 & 2035 ¹

	SLOCOG's RTP Scenarios					% Increase / % Reduction			
	2008EC	2020 s1	2020 s2	2035 s1	2035 s2	2008EC vs. 2020s1	2008EC vs. 2020s2	2008EC vs. 2035s1	2008EC vs. 2035s2
Land use & 4-D Improvements only ²									
SLOCOG Provided VMT for II and Hair IX & XI; no XX; Matches EMFAC's Weekday VMT ³	5,411,000	5,470,000	5,420,000	6,324,000	6,159,000	1.1%	0.2%	16.9%	13.8%
Average Daily VMT ⁴	5,140,635	5,196,687	5,149,185	6,008,016	5,851,261	1.1%	0.2%	16.9%	13.8%
Average Daily VMT per Capita	19.09	18.04	17.88	18.16	17.69	-5.5%	-6.3%	-4.9%	-7.3%
Annual CO ₂ Emission (MMT) ⁵	0.7366	0.7272	0.7240	0.8342	0.8122	-1.3%	-1.7%	13.2%	10.3%
Average Daily CO ₂ Emissions (kg)	2,016,744	1,990,889	1,982,270	2,283,920	2,223,590	-1.3%	-1.7%	13.2%	10.3%
Average Daily kg CO ₂ per Capita	7.49	6.91	6.88	6.90	6.72	-7.7%	-8.1%	-7.8%	-10.2%
Annual CO ₂ e Emission (MMT) ⁶	0.7609	0.7415	0.7383	0.8473	0.8250	-2.5%	-3.0%	11.4%	8.4%
Average Daily CO ₂ e Emissions (kg)	2,083,112	2,030,244	2,021,379	2,319,860	2,258,719	-2.5%	-3.0%	11.4%	8.4%
Average Daily kg CO ₂ e per Capita	7.74	7.05	7.02	7.01	6.83	-8.9%	-9.3%	-9.3%	-11.7%
Land use & 4-D Improvements and transit & TDM Improvements; w QRT ⁷									
SLOCOG Provided VMT for II and Hair IX & XI; no XX; Matches EMFAC's Weekday VMT ³	5,411,000	5,415,000	5,329,000	6,109,000	5,947,000	0.1%	-1.5%	12.9%	9.9%
Average Daily VMT ⁴	5,140,635	5,144,435	5,062,732	5,803,759	5,649,854	0.1%	-1.5%	12.9%	9.9%
Average Daily VMT per Capita	19.09	17.86	17.58	17.54	17.08	-6.4%	-7.9%	-8.1%	-10.5%
Annual CO ₂ Emission (MMT) ⁵	0.7366	0.72402	0.7083	0.8090	0.7838	-1.7%	-3.8%	9.8%	6.4%
Average Daily CO ₂ Emissions (kg)	2,016,744	1,982,270	1,939,177	2,214,971	2,146,023	-1.7%	-3.8%	9.8%	6.4%
Average Daily kg CO ₂ per Capita	7.49	6.88	6.73	6.70	6.49	-8.1%	-10.1%	-10.6%	-13.4%
Annual CO ₂ e Emission (MMT) ⁶	0.7609	0.7383	0.7223	0.8218	0.7963	-3.0%	-5.1%	8.0%	4.7%
Average Daily CO ₂ e Emissions (kg)	2,083,112	2,021,354	1,977,487	2,249,854	2,180,023	-3.0%	-5.1%	8.0%	4.7%
Average Daily kg CO ₂ e per Capita	7.74	7.02	6.87	6.80	6.59	-9.3%	-11.2%	-12.1%	-14.8%
SLOCOG Provided Population Values	269,300	288,000	288,000	330,800	330,800	6.9%	6.9%	22.8%	22.8%
SLOCOG Quick Response Tool Reduction Rate (QRT) ⁷	-	-1.00%	-1.68%	-3.38%	-3.46%	-	-	-	-

¹ SLO County APCD staff prepared this table for baseline and SLOCOG identified future land-use development scenarios. The information in this table is directly comparable and is intended to facilitate preliminary Sustainable Community Strategies efforts that are part of SLOCOG's 2010 Regional Transportation Plan. The information is not a complete evaluation of vehicle greenhouse gas (GHG) emissions that occur in SLO County, but can be used to compare the effects of the potential development scenarios.

² The SLOCOG TransCAD model was used to provide vehicle miles traveled (VMT) and vehicular speed information (speed bins) inputs for the EMFAC2007 vehicular emissions model. The TransCAD model is a single mode vehicular model that accounts for VMT impacts of actual and proposed land use development. 4-D stands for design, density, diversity and destination; i.e. compact urban design in the allocation of new development.

³ SLOCOG TransCAD single mode transportation model provided VMT values that include 100% of the mileage from trips starting and ending in SLO County (II), 50% of the mileage from trips that start in SLO County and end in another county (IX), 50% of the mileage from trips that start in another county and end in SLO County (XI), 0% of the mileage of trips that pass through SLO County but start and end in other counties. The mileage not accounted for in the EMFAC emission simulations and is roughly 28% of the total mileage in the county.

⁴ The factor to convert Weekday value to Average Daily is 347/365.25 and is based on ARB's recommendation for adjusting EMFAC's exclusive weekday emission output to average daily emissions.

⁵ Annual CO₂ emissions are extrapolated from the TransCAD weekday VMT information provided by SLOCOG and will be most accurate if that information is representative of the average weekday within the year. SB375 exclusively targets greenhouse gas (GHG) reductions from automobiles and light trucks (the first 4 of 13 vehicle classes in the EMFAC model). It should be noted that not including the other vehicle classes underestimates the total GHG emissions from vehicles in SLO County by about 17% (based on the 2008 Existing Condition EMFAC simulation). The EMFAC CO₂e emissions for the 2020 and 2035 simulations presented in this table are NOT adjusted to account for the benefits of the future legislative GHG reductions from future improved vehicle CAFE standards (Preveyl) and low carbon fuel standards. This future legislative is not included in the EMFAC2007 model. With these two future GHG reductions not included in this table, the impacts of the scenario changes is more readily observed.

⁶ ARB is currently recommending that metropolitan planning organizations (MPOs) use vehicular CO₂ tailpipe emissions in evaluating GHG impacts for RTP/PSCS updates. Based on modeling results, CO₂ is roughly 97 to 98% of the tailpipe greenhouse gas (GHG) emissions. The other two tailpipe GHGs are nitrous oxide (N₂O) and methane (CH₄), both of which are emitted at a much lower mass than CO₂, though they are more potent GHGs than CO₂. The combination of these three tailpipe GHG pollutants, corrected for CO₂ potency is referred to as CO₂e. CO₂ & CO₂e information is presented here because it is currently unclear whether future RTP/PSCS work will focus on CO₂ or CO₂e.

⁷ The QRT is a post processor tool that SLOCOG uses to approximate the VMT reduction benefits of transit and transportation demand management (TDM) methods that the single mode TransCAD model does not include.

H:\P_An\Climata Change\SB375\EMFAC\work\Final\TransCAD\RunFromSL\CO2\QRT_PSCS_v2_2_Table2.xls\EMFAC CO2 Summary for SLOCOG



1114 Marsh Street | San Luis Obispo, CA | 93401
Phone: (805) 781-4219 | Fax: (805) 781-1291
www.slocog.org

SB 375 Regional Greenhouse Gas Emission Reduction Target-Setting Report for the San Luis Obispo Region

Preliminary Analysis

(for submittal to California Air Resources Board)

DRAFT

May 19, 2010

San Luis Obispo Council of Governments

Executive Summary

In September 2008 the Governor signed Senate Bill 375 (SB 375), which encourages coordinated land use and transportation planning at the regional level to reduce greenhouse gas emissions from passenger and light duty vehicles. SB 375 requires all 18 MPOs in California to develop a Sustainable Communities Strategy (SCS) as an additional element of the regional transportation plan. The California Air Resources Board (ARB) is required to adopt regional greenhouse gas targets for each region for years 2020 and 2035. The SCS is meant to include a set of land use and transportation strategies that will, if implemented, reduce greenhouse gas emissions from passenger vehicles and meet the regional targets. If the SCS is unable to meet the regional target, then an Alternative Planning Strategy (APS) is to be prepared by the MPO that shows that it will meet the regional target.

The ARB-appointed Regional Targets Advisory Committee (RTAC) recommended a process for MPOs to work with ARB staff to allow MPOs to provide their own target methodology and modeling results for ARB to consider in the target-setting process.

In the process of preparing the *SLOCOG 2010 Regional Transportation Plan (RTP)*, the agency undertook a preliminary analysis of several planning scenarios based on the *Community 2050 Regional Blueprint's Regional Growth Strategy* with guidance from its SB 375/Sustainable Communities Strategy Joint Policy Committee and Working Team comprised of representatives from SLOCOG, LAFCO, APCD, the County of San Luis Obispo and several cities. During that process, land use and transportation scenarios for 2035 were examined to coincide with the planning horizon of the RTP. The outcome of that effort was the development of a *Preliminary Sustainable Communities Strategy (PSCS)* to (a) continue to build upon interagency coordination on issues of regional concern established in the *Community 2050* regional blueprint planning process, (b) develop land use and travel modeling tools integral to the implementation of SB 375, (c) identify current and future data needs, and (d) develop staff capacity with modeling tools.

A 2008 existing conditions land use scenario and four 2035 land use scenarios were examined as part of that process. A “business-as-usual” scenario identified a likely future development pattern based on trends of the recent past, which would be a continuation of a low density development pattern throughout the region. Three alternative land use scenarios were compared against the “business-as-usual” scenario. Each alternative scenario assumed progressive intensification in the target development areas – the existing commercial corridors, downtowns, and villages throughout the region – and progressively less rural residential development. The Working Team and Joint Policy Committee recommended the 2035 Scenario 2 as the “Preferred Growth Scenario”, as it best fit the test of being ‘reasonably anticipated’ and a scenario that was both ambitious and achievable.

Over the past several months, SLOCOG has participated in the target-setting process in coordination with planning staff from member jurisdictions, ARB staff, and planning and technical staff from other MPOs. In partnership with planning staff from member jurisdictions, SLOCOG staff developed two 2020 land use scenarios for purposes of the target-setting process. The assumptions for these scenarios is that they are consistent with the policy basis of both the 2035 Scenario 1



("Business-As-Usual") and 2035 Scenario 2 ("Preferred Growth Scenario") but the rate of growth will be slower during the earlier years.

This report outlines the assumptions and technical analysis used by SLOCOG in planning scenarios for three time periods: 2008 base year, 2020 interim and 2035 horizon years. Three models are used in this analysis: I-PLACE³S (a regional land use model), TransCAD (a regional traffic model), and EMFAC (a regional greenhouse gas emissions model). The final output of this three-model system is an estimated greenhouse gas emission figure for each of the scenarios tested. The primary metric used to evaluate the planning scenarios is greenhouse gas emission reduction per capita of a given land use and transportation scenario alternative when measured against the base case ("business-as-usual") planning scenario.

Summary of Traffic Model Results

Table ES-1 summarizes the overall change in vehicle miles of travel and greenhouse gas emissions (both total and per capita figures) for the 2035 horizon year as compared to the 2008 base year results.

Table ES-1. Baseline comparison of VMT and GHG figures between 2008 and 2035

Evaluation Criteria (2008 base year vs. 2035 horizon year)	2008 Base Year	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"	% Increase / % Reduction		
				2008 BY vs. 2035 S1	2008 BY vs. 2035 S2	2035 S2 vs. 2035 S1
Population	269,300	330,800	330,800	22.8%	22.8%	0.0%
Daily VMT (land use and 4-D improvements only)	8,016,501	9,293,131	9,068,851	15.9%	13.1%	-2.4%
Daily VMT per capita (land use and 4-D improvements only)	29.8	28.1	27.4	-5.6%	-7.9%	-2.4%
Quick Response Tool reduction rate (applied to Daily VMT to account for transit and TDM improvements)	--	-3.38%	-3.46%	--	--	--
Daily VMT (land use, 4-D and transit and TDM improvements)	8,016,501	8,979,023	8,755,069	12.0%	9.2%	-2.5%
Daily VMT per capita (land use, 4-D and transit and TDM improvements)	29.8	27.1	26.5	-8.8%	-11.1%	-2.5%
Daily CO ₂ emissions per capita (kg per capita)	12.2	11.4	11.2	-6.6%	-8.2%	-1.8%

Note: The Pavley II and Low Carbon Fuel Standard adjustments are not applied in this planning scenario process.

When accounting for land use and 4-D improvements only, 2035 Scenario 2 produces a 7.9% reduction in VMT per capita over the 2008 base year (29.8 to 27.4 VMT per capita), while 2035 Scenario 1 produces a 5.6% reduction in VMT per capita over the 2008 base year (29.8 to 28.1 VMT per capita). When also accounting for transit and TDM improvements using the VMT Quick Response Tool, 2035 Scenario 2 produces an 11.1% reduction in VMT per capita over the 2008 base year (29.8 to 26.5 VMT per capita), while 2035 Scenario 1 produces an 8.8% reduction in VMT per capita over the 2008 base year (29.8 to 27.1 VMT per capita). When comparing 2035 Scenario 2 to 2035 Scenario 1, Scenario 2 produces a 2.4% reduction in VMT per capita for land use and 4-D improvements only, and a 2.5% reduction in VMT per capita when accounting for transit and TDM improvements.

Table ES-2 summarizes the overall change in vehicle miles of travel and greenhouse gas emissions (both total and per capita figures) for the 2020 interim year as compared to the 2008 base year results.



Table ES-2. Baseline comparison of VMT and GHG figures for 2008 and 2020

Evaluation Criteria (2008 base year vs. 2020 interim year)	2008 Base Year	2020 Scenario 1 "Business-As-Usual"	2020 Scenario 2 "Preferred Growth Scenario"	% Increase / % Reduction		
				2008 BY vs. 2020 S1	2008 BY vs. 2020 S2	2020 S2 vs. 2020 S1
Population	269,300	288,000	288,000	6.9%	6.9%	0.0%
Daily VMT (land use and 4-D improvements only)	8,016,501	8,070,899	8,013,341	0.7%	-0.04%	-0.7%
Daily VMT per capita (land use and 4-D improvements only)	29.8	28.0	27.8	-5.9%	-6.5%	-0.7%
Quick Response Tool reduction rate (applied to Daily VMT to account for transit and TDM improvements)	--	-1.00%	-1.68%	--	--	--
Daily VMT (land use, 4-D and transit and TDM improvements)	8,016,501	7,990,190	7,878,717	-0.3%	-1.7%	-1.4%
Daily VMT per capita (land use, 4-D and transit and TDM improvements)	29.8	27.7	27.4	-6.8%	-8.1%	-1.4%
Daily CO ₂ emissions per capita (kg per capita)	12.2	11.4	11.3	-6.6%	-7.4%	-0.9%

Note: The Pavley II and Low Carbon Fuel Standard adjustments are not applied in this planning scenario process.

When accounting for land use and 4-D improvements only, 2020 Scenario 2 produces a 6.5% reduction in VMT per capita over the 2008 base year (29.8 to 27.8 VMT per capita), while 2020 Scenario 1 produces a 5.9% reduction in VMT per capita over the 2008 base year (29.8 to 28.0 VMT per capita). When also accounting for transit and TDM improvements using the VMT Quick Response Tool, 2020 Scenario 2 produces an 8.1% reduction in VMT per capita over the 2008 base year (29.8 to 27.4 VMT per capita), while 2020 Scenario 1 produces an 6.8% reduction in VMT per capita over the 2008 base year (29.8 to 27.7 VMT per capita). When comparing 2020 Scenario 2 to 2020 Scenario 1, Scenario 2 produces a 0.7% reduction in VMT per capita for land use and 4-D improvements only, and a 1.4% reduction in VMT per capita when accounting for transit and TDM improvements.

Summary of Findings and Conclusions

The following are key findings and conclusions that can be drawn at the completion of this preliminary analysis several planning scenarios:

1. No single variable can generate a significant shift in VMT alone. Noticeable shifts can be achieved through coordinated efforts effect change in: land use patterns, application of 4-D elements, transit, and TDM.
2. Land use shifts (and 4-D improvements) that resulted in a slight reduction in total daily VMT in the 2020 Scenario 2 (from the 2008 base year) may in part be attributable to an improved balance of jobs and housing in the Central County subregion for that time period (as compared to the overall time period of 2008 to 2035). This may warrant a closer examination of the relationship of jobs-housing balance in the region and total daily VMT in the scenario planning process of the Sustainable Communities Strategy in the next two years.
3. Population growth from 2008 to 2035 (22.8% increase) in the San Luis Obispo region outpaces growth in VMT in the region for both 2035 scenarios (15.9% increase for Scenario 1 and 13.1% increase for Scenario 2), resulting in a reduction in daily VMT per capita for both 2035 scenarios. Historically, growth in VMT has outpaced population growth. From 1970 to 2005, growth in vehicle miles of travel has outpaced growth in population by nearly three-fold in the United States.



4. Pricing adjustments are expected to have noticeable impacts on VMT, but are not easily adjusted by SLOCOG (including adjustments to parking costs, fuel cost or lane-pricing). An additional benefit would be the resulting revenues to further fund VMT-reducing improvements or incentives.
5. The SLOCOG VMT Quick Response Tool provides a low-cost approach to ascertain the affect of TDM and transit improvements on VMT without the very costly investment (potentially \$1 million or more) to build a sophisticated, mode-choice, travel demand model.
6. The process requires directions for consistency, especially for: handling of IX, XI, and XX trip, use of statewide projections at MPO boundaries, application of post-processor results, and a list of specific metrics expected from MPOs.
7. The smaller variation between 2020 Scenario 2 and 2020 Scenario 1 for daily VMT per capita results (a 0.7% difference) may reflect the slow pace of growth anticipated in the next decade. A modest variation in results between 2035 Scenario 2 and 2035 Scenario 1 for daily VMT per capita (a 2.4% difference) may reflect the assumption that many of the smart growth investments in existing corridors, downtowns and villages will take a longer time to realize; likewise, the VMT reduction expected from such projects may not show up until the later years in the planning horizon.
8. The modeling tools used in this scenario planning effort allow SLOCOG staff to reflect future housing and employment growth at the parcel-level, which allows for a relatively detailed reflection of a potential future land use scenario. However, there may be over-riding considerations made for SLOCOG's staff ability to accurately reflect the timing of future growth in the region relative to the 2020 interim year. This may impact the ability to present a likely reflection of a future growth in the region for the interim year, which could overstate reductions in total VMT and VMT per capita.

Organization of Report

The regional greenhouse gas target-setting report contains seven sections. Section 1 provides an overview of the work SLOCOG has completed to date as it relates to implementation of SB 375 including the preparation of a *Preliminary Sustainable Communities Strategy* as part of the concurrent preparation of the 2010 RTP.

Section 2 provides an overview of the modeling tools and data inputs, including a discussion of the development of the regional land use information system (an outcome of the *Community 2050* regional blueprint plan) that has facilitated a parcel-based and rule-based regional land use modeling process.

Section 3 provides an overview of the land use scenario development process, including a discussion of the growth allocation approach used in the development of the land use scenarios.

Section 4 provides a summary of the land use scenario results, including a comparison of the 2008 base year to the 2020 interim and 2035 horizon years for the following geographic levels: regional, four subregional areas, and six subregional “urbanized” or “future urbanized” areas.



Section 5 provides a summary of the assumptions and process used in the development and application of the regional traffic model, including the network improvements made for years 2020 and 2035 and the integration of 4-D variables to the modeling process.

Section 6 provides a summary of the results from the regional traffic model, including per capita results and a discussion of the application of the VMT Quick Response Tool to reflect the effect improvements in transit and TDM can have on VMT in the region.

Section 7 provides a summary of the key findings and conclusions drawn from this scenario planning effort.

Excerpt from MPO Submittal

Of

Target Setting Scenarios and Results

For the

**Santa Barbara County Association of
Governments (SBCAG)**



■ 260 North San Antonio Road., Suite B ■ Santa Barbara, CA ■ 93110
■ Phone: 805/961-8900 ■ Fax: 805/961-8901 ■ www.sbcag.org

Preliminary Analysis of Alternative Greenhouse Gas Emission Reduction Strategies for the SBCAG Region

**(For Submittal to California Air Resources Board)
(Draft)**

May 6, 2010

Santa Barbara County Association of Governments

Executive Summary

Introduction

At the request of Air Resources Board (ARB) and as outlined in the report by the Regional Targets Advisory Committee, the 18 Metropolitan Planning Organizations (MPOs) in California agreed to conduct analyses of the Green House Gas (GHG) emissions reduction benefits of various alternative planning scenarios. The purpose of this analysis is to assist ARB staff in developing GHG emission reduction targets by June 30, 2010 as part of the SB-375 implementation.

This analysis was conducted under guidelines developed by ARB and the four largest MPOs in the state. These guidelines placed five general conditions on the analysis:

1. Half of all trips (50%) that travel between MPO boundaries, in our case SBCAG and SLOCOG in the north, and SBCAG and SCAG in the south should be addressed by each MPO;
2. The analysis should separate out the benefits of state in-vehicle emission controls that will phase in over-time with vehicle fleet turnover (i.e., the Pavley / Low Carbon Fuel Standards (LCF) adjustments);
3. The composition of the scenarios and their constituent measures should be standardized to the extent possible;
4. The assessments should be based on existing modeling capabilities from existing data; and
5. Consistent base and forecast years and metrics in data reporting should be used.

This report outlines the assumptions and technical analyses used by SBCAG in conducting three planning scenarios to estimate the GHG emissions reduction for the future 2020 interim and 2035 horizon years. This report contains three major elements:

- Newly updated SBCAG travel forecasts for the 2005 Base Year, 2020 and 2035 for Santa Barbara County, based on the 2007 Regional Growth Forecast (2007RGF)
- Three alternative planning scenarios, including assumptions and methods of analysis
- Preliminary GHG emissions reduction estimates

Each of these scenarios further expands and enhances the implementation of various strategies and policies over-and-above the currently adopted RTP. Similar strategies and policy options are bundled together in order to visualize the potential GHG emissions benefits. The three scenarios are:

- Scenario A: Transportation Demand Management (TDM) and Transportation System Management (TSM)
- Scenario B: Transportation System Improvements (TSI) and Land Use
- Scenario C: Pricing and Disincentives

Table ES-1 summarizes overall change in GHG for the 2035 horizon year compared to the 2005 baseline.

Table ES-1: Baseline Comparison of VMT and GHG production between 2005 and 2035

Evaluation Criteria (2005 Baseline vs. 2035 Horizon Year)	2005	2035	Increase/ Decrease	% Increase / Reduction
Daily VMT	10,798,464	12,978,263	2,179,799	20.2%
Daily GHG Emissions (Tons) (No Pavley Adj.)	4,643.34	5,515.76	872.42	18.8%
Daily GHG Emissions per Capita (lbs) (No Pavley/ LCF Adj.)	22.24	22.62	0.38	1.7%
Daily GHG Emissions per Capita (lbs) (with Pavley Adj.)	22.24	14.62	-7.63	-34.3%

*Pavley/LCF refers to State mandated in-vehicle emission controls and Low Carbon Fuel use

Planning Scenario Evaluation

Scenario A: TDM and TSM Alternative

This scenario combines the expanded TDM measures (rideshare, Individual marketing, and flex work) recommended in the 2007 101 In-Motion report incorporated in the current SBCAG Model plus the additional post processing analyses to estimate GHG emissions reduction benefits. The following summarizes the GHG reduction benefits associated with this Scenario:

- Total daily vehicle trips = 1.658 million, representing a reduction of 5,955 (or 0.36%) daily vehicle trips
- Total daily VMT = 11.313 million, representing a reduction of 128,700 (or 1.1%) total daily VMT
- Reduced 0.09 lb daily CO2 per Capita with no Pavley adj. (22.53 lbs vs. 22.62 lbs 2035 baseline)
- Reduced 0.06 lb daily CO2 per Capita with Pavley adj. (14.56 lbs vs. 14.62 lbs 2035 baseline)

Scenario B: TSI and Land Use Alternative

This scenario combines an expanded transit services and commuter friendly train service, plus analysis of a growth impact analysis example. The following summarizes the GHG reduction associated with this Scenario:

- Total daily vehicle trips=1.661 million, representing a reduction of 0.1% (or 2,234) daily vehicle trips
- Total daily VMT=11.435 million, representing a reduction of 0.06% or 7,184 daily VMT
- Reduced 0.01 lb daily CO2 per Capita with no Pavley adj. (22.52 lbs vs. 22.62 lbs for 2035 baseline)
- Reduced 0.07 lb daily CO2 per Capita with Pavley adj. (14.57 lbs vs. 14.62 lbs for 2035 baseline)
- Increased 1,956 transit (person) trips (31,077 vs. 29,121) when compared to 2035 baseline
- Increased 3,129 ridership (boardings) or 8.1% when compared to 2035 baseline
- Signal synchronization improvements would provide an additional 4,094 lb daily GHG reduction or 0.01 lb daily CO2 reduction per Capita (with no Pavley adj.)

Land Use – Employment Reduction/Densification Impacts: As part of 101-In-Motion, an alternative growth and land use scenario was tested to assess impacts on overall trips and corridor congestion. The scenario examined the impact of reducing the employment forecast and concentrating all new development on existing sites vs. vacant land. This resulted in a significant reduction in traffic growth on the west end of the South Coast Highway 101 corridor by approximately 2 - 4% and an improved freeway level of service, by at least one service level (LOS E/F to LOS D/E), by 2030 to 2035 timeframe. Both these improvements would lower GHG emissions; however, changes in models and a newer land use plan approved by the City of Goleta make a detailed assessment and comparison infeasible at this time.

Scenario C: Pricing and Disincentives Alternative

This scenario assesses parking pricing policy options proposed in the draft City of Santa Barbara's General Plan, Plan Santa Barbara (PlanSB). The conceptual parking pricing provisions from PlanSB, though still under consideration by the City Council, were applied to the SBCAG model's 2035 forecast travel flows for downtown Santa Barbara area to estimate the GHG reduction benefits. (Technical details are provided in Appendix C):

- For the moderate parking policy provisions under PlanSB Alt. 1, approximately 97,700 VMT reductions would be expected in 2035, reflecting approximately 0.9% and 0.6% of GHG reduction per Capita without and with Pavley adjustments respectively.
- For the more aggressive parking policy provisions under Plan SB Alt. 2, approximately 172,000 VMT reductions would be expected in 2035, reflecting approximately 1.5% and 0.9% of GHG reduction per Capita without and with Pavley adjustments respectively.

Table ES-2 portrays the aggregate emissions after incorporation of the three alternative planning scenarios.

Table ES-2: Individual Planning Scenario Evaluation

Planning Scenarios	Ranking	No Pavley/LCF Adj.	With Pavley LCF Adj.
		Daily GHG Emissions Per Capita	Daily GHG Emissions Per Capita
Alternative A: TDM & TSM	1st	22.53 lbs	14.56 lbs
Alternative B: TSI & Land Use	2nd	22.52 lbs	14.55 lbs
Alternative C: Pricing & Disincentives	3rd	22.30 lbs	14.40 lbs

Cumulative GHG emissions reductions for all planning scenarios

Table ES-3 summarizes the GHG emission reductions for the 2035 horizon year for the alternative scenarios and discrete measures. The reference to “post processing” refers to the off-model techniques to estimate GHG reductions in areas where SBCAG model lacks capability or insensitive to a policy or factor. The adjustments are based on research inputs plus professional judgments to manually quantify the result. Those strategies that use post processing approach are documented in the Appendices.

As indicated in Table ES-3, total GHG emissions reduction by combining all strategies and options results in just 0.5 lbs per capita emission reduction by 2035 without Pavley adjustments. The total GHG emission per capita would be about 22.12 lbs (22.62 from 2035 baseline less 0.5 lbs cumulative emission reduction).

Table ES-3: Summary GHG Emissions Reduction for 2035 Forecast and Alternative Planning Scenarios

2035 Forecast and Alternative Planning Scenarios	Methodology	Vehicle Trips	VMT (Pass. Vehicles) 2/	Daily GHG Emissions Per Capita (lbs) (No Pavley Adj.)	Other Benefits
2005 Baseline (Modeled)	Model	1,331,802	10,798,463	22.24	
2035 Horizon Year (Modeled)	Model	1,663,729	12,978,262	22.62	
		Vehicle Trips Reduction	VMT Reduction (Pass. Vehicles) 2/	Daily GHG Reduction per Capita (No Pavley Adj.)	Other Benefits
Scenario A: TDM / TSM					
1. 101 In-Motion (TDM Package Option)	Model	5,955	128,700	0.07	
2. Commuter Challenges	Post Process	615	13,545	Inclusive	
3. Traffic Solutions Awareness Programs	Post Process	144	3,180	Inclusive	
4. Dynamic Ridesharing	Post Process	249	5,187	Inclusive	
5. Bottleneck Relief - Ramp Metering	Post Process	NA	NA	NA	Reduce delays, increase safety
6. Operational - Signal Synchronization	Post Process	NA	NA	0.01	Reduce a total daily GHG of 2 tons, reduce peak
CUMULATIVE		6,963	150,612	0.08	
Scenario B: TSI and Land Use					
1. Expand Transit System Services	Model	2,234	7,184	0.1	Increase 3,129 daily boardings
2. Expand Park-n-Ride Facilities	Post Process	551	26,737	Inclusive	
3. Expand Commuter-Friendly Train Rail Service	Model	Inclusive	Inclusive	Inclusive	
4. Land use (Employ't Reduction & Densification)	Post Process	NA	21,000	Inclusive	Reduced 2-7% vehicle trips on 101 during peak hour.
CUMULATIVE		2,785	54,921	0.1	
Scenario C: Pricing and Disincentives					
1. Parking Pricing Case Study 3/	Post Process	28,762	172,000	0.32	
CUMULATIVE REDUCTION (A + B + C)		38,510	377,533	0.50	

1/ Based on SBCAG Modeled output and include XX trips

2/ Based on a 50/50% Split IXXI approach and include 50% neighboring IXXI VMT.

3/ Based on PlanSB Alt 2.

Impact of State “Pavley/LCS” Controls on Vehicle Emissions

Assuming implementation of the State “Pavley” in-vehicle emission controls and use of Low Carbon Fuel Standard (LCFS) gasoline these two measures alone apparently will enable the SBCAG region to generate in both 2020 and 2035 less passenger vehicle emissions that were generated in 1990 (4,730 tons per day). This analysis is based on travel activity data from the SBCAG model run through the air quality emissions model, EMFAC, and the Pavley Post Processor distributed by ARB. These emission reductions dwarf savings from selected TDM, TSM, and other measures. While this analysis inherently assumes our existing vehicle fleet “turns over” to a newer, cleaner fleet, which may be optimistic given existing economic conditions, it does bode well for ongoing reductions in the contributions of passenger vehicles to CO₂ emissions.

Findings and Conclusions

- Preliminary analyses of the alternative planning scenarios indicates that the potential of these measures on GHG reduction is relatively small (less than 1% of VMT and GHG reduction) for the 2035 horizon year, and even less for the 2020 interim year, if the Pavley/LCF adjustments were not taken into consideration.
- Pavley and LCF adjustments will offer significant reductions to GHG production in future years.
- The parking pricing example has indicated significant potential in achieving GHG reduction benefits. However, since only three institutions in Santa Barbara County (the City of Santa Barbara, Santa Barbara City College, and UCSB) charge for parking, this alternative has limited applicability at this time for Santa Barbara County.
- The TDM alternative remains the best approach to reduce GHG emissions in the future since small changes in individual behavior can result in cumulative reductions in single occupant vehicle trips and vehicle miles traveled.
- At this time for the SBCAG region, technology advances and improvements in vehicle performance and fuel efficiency coupled with TDM strategies remain the best approach to reduce future GHG emissions.
- While transit system improvements examined alone appear to have limited GHG reduction benefits, the analysis by other MPOs indicate the combination of supportive land uses and fare policy options can achieve beneficial results. The effect of changes in land use on future emissions is yet to be determined and will be assessed during the development of the Sustainable Communities Strategy as part of SBCAG’s response to SB-375.