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June 4, 2010

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

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

Next Steps

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

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

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

Schedule for SB 375 Target-Setting Activities

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

GARY L. GALLEGOS
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	Model	2020 Level of Deployment	2035 Level of Deployment
1	System Efficiency & IDW Bottleneck relief projects	Revenue Constrained highway network	On	2020 Revenue Constrained highway network updated to include 17 additional projects: Plaza BI Fletcher Pkwy Centre City Pkwy Valley Pkwy Texas S/Mission Ctr University Ave Mast Blvd 49th St B St. Barham Dr. Governor Dr. La Jolla Village Dr 29th St. Manchester Ave 5th Ave	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	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 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		2020 Level of Deployment		2035 Level of Deployment	
Systems Development		On Model/Off Model		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	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

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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	
Bottleneck relief projects		Revenue Constrained highway network	On	Off	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					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		
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

2005 Baseline = 25.5 VMT / person		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)
Series 12 Forecast	2020	23.9 -6.1%	23.3 -8.5%	23.8 -6.8%	22.2 -12.9%		
	2035	24.9 -2.5%	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	2020	23.8 -6.7%	23.2 -9.2%	23.6 -7.4%	22.1 -13.5%		
	2035	24.6 -3.5%	24.0 -5.7%	24.4 -4.2%	23.2 -8.9%	21.6 -15.4%	22.1 -13.2%

Total VMT Estimates

2005 Baseline = 77,379 VMT		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)
Series 12 Forecast	2020	84,651 9.4%	82,492 6.6%	84,059 8.6%	78,559 1.5%		
	2035	100,093 29.4%	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	2020	84,071 8.6%	81,885 5.8%	83,489 7.9%	77,987 0.8%		
	2035	99,091 28.1%	96,766 25.1%	98,407 27.2%	93,577 20.9%	86,833 12.2%	89,085 15.1%