



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

August 5, 2010

File Number 3100500

Mary Nichols  
Chair  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

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

Dear Chair Nichols:

SUBJECT: Response to ClimatePlan Analysis of San Diego Association of Governments' (SANDAG's) Senate Bill 375 (SB 375) Target Scenarios

Attached is SANDAG's response to the letter submitted to your agency on June 23, 2010, by ClimatePlan that seeks to clarify their statements regarding the work conducted by SANDAG for the SB 375 target scenarios. We believe the evaluation includes many inaccuracies; therefore, it is important for the California Air Resources Board (CARB) to consider SANDAG's responses as you finalize the process of setting regional greenhouse gas emission reduction targets per SB 375.

We look forward to continuing to work with CARB in the implementation of SB 375 as we develop our 2050 Regional Transportation Plan. If you have any questions, please contact me or Charles "Muggs" Stoll, Director of Land Use and Transportation Planning, at (619) 699-6945.

Sincerely,

*FOR* GARY L. GALLEGOS  
Executive Director

EAR/ama

Enclosure

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

June 23, 2010

Mary Nichols, Chair  
California Air Resources Board  
1001 "I" Street  
Sacramento, CA 95814

Re: Analysis of SB 375 Target Scenarios prepared by SANDAG, SCAG, MTC and SACOG

Dear Chairman Nichols,

On behalf of ClimatePlan, please find enclosed our analyses of the SB 375 scenarios presented to ARB by the four largest Metropolitan Planning Organizations (MPOs).

In order to aid the Air Resources Board in accomplishing its mandate to set regional targets, we evaluate the land use, transportation and pricing policies included in each of the MPOs' scenarios and attempt to assess the degree to which these scenarios truly represent what is ambitious and achievable.

Both ARB and the MPOs deserve to be commended for the hard work they have done over the past several months to inform this process and for their commitment to making so much detail information about the scenarios available and accessible to the public. This rich assembly of information helps us all to assess what is possible, not just in California, but as federal energy and transportation laws are crafted, to gain a more in depth understanding of how improved transportation and land use planning can contribute to overall environmental goals. Indeed, as with so many environmental issues, California's implementation of SB 375 will be closely watched and precedent setting.

**Most MPO Scenarios Underestimate Reductions, Particularly for 2035**

We are encouraged by the scenarios that have been produced for this process, and they mark an historic step in envisioning a more prosperous and sustainable future. However, most of the MPO travel models do not fully account for the good work that cities and regions have *already* been doing, and their scenarios stop short of ARB's ambitious achievable threshold for SB 375 targets.

Most of the MPOs' existing travel models simply were not designed to deal with GHG emissions, and they tend to underestimate the GHG reductions from smarter land use and transportation. The regions are working hard to transition to the next generation of travel models, but only SACOG's model comes close to accounting for what is possible.

Land use and transportation changes happen slowly, but the benefits accrue over time and add up to big savings in the longer term. Therefore we should see greater reductions in 2035 than 2020, and even greater reductions in 2050. The empirical evidence from across California and around the world supports this conclusion. We understand that all of the MPOs are continuing to learn what is possible as they create additional scenarios and

refine their technical analyses over the next several months and we strongly encourage you to support this process through September.

We offer these analyses to help inform your efforts in this precedent setting action. We encourage you to consider us as a resource throughout the process and we look forward to working closely with you to make sure California succeeds with implementation of SB 375.

Sincerely,



David Ausherman  
Renaissance Planning Group



Peter Hathaway  
Transportation Planning Consultant



Norm Marshall  
Smart Mobility

Encl: biographies

## SANDAG (San Diego)

### Did SANDAG study a range of scenarios to inform what is ambitious and achievable?

**Summary:** SANDAG's hybrid/ambitious scenario is fairly ambitious in land use, TDM, and TSM strategies, and reports ambitious results for transit. With its hybrid scenario, SANDAG reports the potential to reduce GHGs by as much as 19% by 2035. The ambitious transit results are laudable and should be supported by appropriate policies and investments. However based on the information presented we are concerned that these transit goals may not be supported. More ambitious strategies for walk and bike, land use, and pricing, plus less road expansion in outer suburban areas, SANDAG should be able to show equal or even better GHG reductions.

SANDAG examined three test scenarios, one focused on demand management (TDM), one on transit improvements, and one on pricing, each one in turn evaluated against two land use alternatives. SANDAG then created a hybrid scenario, with advice from its Board as to what to include, and this has de facto become SANDAG's most ambitious scenario:

- 1** Land Use: For SANDAG, a fully ambitious land use would enhance its Urban and Town Center growth strategy, at least for the outer years after the current housing recession has passed, to support the transit strategies discussed below and make them more realistic. San Diego's current housing stock is comprised of about 35% attached units, with that percentage gradually increasing over time. In the past decade, attached housing units have comprised 46% of new construction. For the 2007 RTP, 71% of new housing would be attached units going out to 2020 and 80% from then until 2030 (and 91% for the decade beyond, to 2040), and ten designated Urban Centers and 34 designated Town Centers would build up by absorbing much of the new growth. This represents an ambitious assumption, and the market, land supply, and land prices seem to support these trends.

- 2** SANDAG also examined an even more ambitious land use alternative, which would build out the existing eight Urban and 24 Town Centers to maximum density and put enough growth into ten designated new ones to reach at least minimum urban and town center density. This alternative would in effect accelerate attached housing unit trends and require more infill and redevelopment, and it would increase the amount of GHG reductions by about 8% for 2020 and 10% for 2035.

Road Network: SANDAG's hybrid/ambitious scenario makes no changes to rein in suburban and interregional highway expansion. A fully ambitious scenario would retract or scale back highway projects in outlying areas, particularly those designed to serve interregional commuting, in favor of interior road, transit, or walk and bicycle projects to improve accessibility to or within Urban and Town Centers. SANDAG plans to spend \$21 billion for highway expansion, for 32 HOV lane, managed lane, mixed flow lane, HOT lane, toll road, and interchange projects, plus another \$7 billion for arterial corridor projects, through its 2007 RTP. This represents a very aggressive highway expansion in size as well as early construction. While the Bay Area would spend more on transit than road expansion, and LA and Sacramento would spend 30%-40% more on road than transit expansion, SANDAG would spend 278% more on road expansion than transit expansion. With the addition of HOV and HOT lanes in many corridors, San Diego's freeways will have from 14 to 18 lanes on I-5 and I-15 into North County, twelve lanes on three other freeways, and ten lanes on much of the rest of the network; in comparison, twelve-lane

**3**

- 1** The SANDAG 2007 Regional Transportation Plan (RTP)<sup>1</sup> does not include any planning information beyond 2030 to 2040. The 2007 RTP and the supporting land use forecast only covers the time period from 2006 to 2030.

ClimatePlan refers to old land use assumptions in the Series 11 Forecast; under the 2050 Regional Growth Forecast (Series 12),<sup>2</sup> attached dwelling units compose 76 percent of the new growth in housing between 2005 and 2035. In addition, small-lot, single-family dwelling units, single-family lots smaller than 5,000 square feet, compose an additional 3 percent of total development from 2005 to 2035.

Based the 2050 Regional Growth Forecast, SANDAG expects approximately 50 percent of future job and housing growth will occur in Smart Growth Opportunity Areas. In addition, this forecast projects more than 70 percent of future job and housing growth will likely occur within the Transit Investment Area, defined as being the area with highest priority for future transit investments.

- 2** SANDAG does not have land use authority and therefore cannot "require" more infill and redevelopment through the Smart Growth Incentive Program (SGIP). The goal of the SGIP is to fund public infrastructure projects and planning activities that will facilitate compact, mixed-use development focused around public transit and that will increase housing and transportation choices.

The accepted 2050 Growth Forecast is an aggressive land-use forecast. The alternative land-use noted by ClimatePlan would only result in an additional 4 percent decrease (from 23.7 lbs / person to 23.6 lbs / person) in GHG per capita for 2020 and an additional 1 percent decrease (from 24.6 lbs / person to 24.4 lbs / person) in GHG per capita by 2035 using the 2007 RTP Revenue-Constrained Networks.

- 3** Today, thousands of Southern California and Northern Baja California residents commute to and from the San Diego region for work, school, shopping, and recreation. People choose to live outside the San Diego region, but work and recreate in the region for a number of reasons including quality of life, bi-directional commuter households, and residency status. Therefore, it is unrealistic to assume interregional commuting will be zero in the future. SANDAG staff and staff from the California Air Resources Board (CARB) discussed and agreed upon this approach for use in the 2050 growth forecast in a meeting on December 3, 2009.

Regarding highway projects in outlying areas, I-5 and I-15 toll lanes included in the 2007 RTP only would be built if they could pay for themselves through toll revenues.

<sup>1</sup> 2030 San Diego Regional Transportation Plan: Pathways for the Future. Approved by the SANDAG Board of Directors on November 30, 2007.

<sup>2</sup> 2050 San Diego Regional Growth Forecast. Accepted for planning purposes by the SANDAG Board of Directors on February 26, 2010.

### 3 continued

In the 2007 RTP, nearly 60 percent of the proposed investments identified as “highway expansion” are geared toward HOV and managed lanes (\$11.8 billion out of \$19.7 billion). These multimodal investments serve BRT routes, carpools, and vanpools. Net revenues from the HOT lane programs would be used for transit service in the same corridor. There is no evidence to suggest that the highway projects contained in the 2007 RTP would not be needed, even with expanded transit service that was assumed in the ambitious transit network scenario that was tested.

ClimatePlan states that SANDAG would spend 278% more on highway expansion than transit expansion. This calculation is incorrect. It appears that ClimatePlan divided the percent expenditures for road expansion for general purpose, HOV, HOT, and managed lanes (39%) by the percent expenditures for transit expansion (14%)<sup>3</sup>. The correct calculation is 178%. Even the correct calculation fails to consider the multimodal aspects of the highway investments and includes all local streets and roads investments for the San Diego region while it is unclear that the same was done for other regions’ calculations. SANDAG calculates that all highway expansion investments including HOV and ML (\$15.4 billion) are only 17% higher than transit expansion investments (\$13.2 billion) in the 2007 fiscally constrained RTP. This is lower than the LA and Sacramento regions. Furthermore, the letter does not identify the characteristics of the highways “elsewhere in California” when making the comparison to highways in the San Diego region. The reference to the Bay Bridge doesn’t relate in any meaningful way to the system of projects that are planned for the San Diego region. It is important to understand that the highway improvements referenced in the comment also include significant investments in managed lanes which accommodate multiple transportation modes.

---

<sup>3</sup> Preliminary Report on Metropolitan Planning Organization (MPO)/Air Resources Board (ARB) Senate Bill 375 (SB 375) Target Setting Analysis, Attachment C, Table 2, May 18, 2010.

freeways are quite rare elsewhere in California, the standard for major urban freeways is eight lanes, and even the new Bay Bridge will have only ten lanes, so San Diego would build 20%-40% more capacity on its freeways than regions with much greater population. SANDAG's county sales tax program (TransNet) expects to complete more than \$7 billion of the \$21 billion in highway expansion by 2014 using bonds.

- 4 Arguably SANDAG would overbuild its freeways, but it does to some extent tend to locate its freeway expansion strategically in the right places, on corridors that connect its Urban and Town Centers. Nine of the HOV, managed lane, and mixed flow projects (on I-5, I-15, and Routes 56, 76, & 78 to the north, I-8 and Routes 52 & 67 to the east, and Route 125 toll road to the southeast, costing \$11 billion) serve growth at the suburban edge; several of these projects are already committed, through Prop. 1B state bonds or the TransNet sales tax program, in particular the \$2.5 billion managed lanes on I-5 to Oceanside and I-15 to Escondido. Some of the suburban highway expansions would provide too much capacity to support more low density, single use suburban development than SANDAG intends be built, and might not be needed if more of that growth were redirected into Urban and Town Centers. The Route 241 toll road extension into Orange County plus HOT lanes on I-5 & I-15 to the north county line (cost of \$3.5 billion) would promote more interregional commuting and in no way fit with the spirit of SB375.
- 5 Demand Management (TDM): The main concern about SANDAG's TDM strategies is not how ambitious they are, but, as will be discussed below, whether SANDAG's model would verify them as realistic if it had the capability to do so. SANDAG proposes TDM strategies that would yield 180,000 more carpool riders (144% increase), increase of 1150 vanpools (175% more than the RTP), and a 15% reduction in white-collar work trips (compared to 5% in the RTP) as part of its hybrid/ambitious scenario. These represent ambitious objectives, and would be easier to achieve with higher growth in Urban and Town Centers.

System Management (TSM): SANDAG's TSM improvements represent a reasonably ambitious TSM approach, through investments that ensure better access to areas of higher growth, and help bus as much as auto access. SANDAG lays out seventeen additional TSM improvements in the hybrid/ambitious scenario, beyond the \$500 million designated for TSM improvements in its 2007 RTP, all to be built by 2020. All are auxiliary lanes or local improvements at congested locations. Four of the 17 are in suburban North County, but fifteen of the 17 directly serve Urban or Town Center access, where better accessibility and lower congestion would support compact growth.

- 6 Walk & Bike: For SANDAG, a more ambitious walk and bike program would raise the overall investment in walk and bike projects to perhaps \$2 billion (3.5% of the RTP), and change the focus to provide about \$2 million per year for each Urban and Town Center, enough for one substantial project annually on a continuing basis (which could be supplemented with developer-built projects as well). SANDAG in its 2007 RTP proposes only \$400 million investment in walk and bike projects, about 0.7% of the whole \$57 billion financial plan. This is too modest an investment for walk and bike, which probably comprise at least 4% of all trips today. The hybrid/ambitious scenario would increase walk and bike trips to school by 30,000 (20%), using dedicated federal funds, and test full buildout of the regional bikeway network, which serves bicycle enthusiasts and recreational riding but does little to support more local travel by walk and bike. San Diego needs to foster walk and bike travel as real options, particularly for short local trips in Urban and Town Centers.

- 4 Currently, SANDAG is developing a 2050 Regional Transportation Plan which will review all previous highway and transit network plans. SANDAG is committed to developing a comprehensive, sustainable Regional Transportation Plan which serves the diverse needs of the region's citizens and businesses over the next 40 years. I-5 and I-15 are the major north-south goods movement corridors, and improvements to these corridors are needed to maintain and enhance the economic prosperity of the San Diego region and the state. The SR 241 toll road is included in the SANDAG RTP as an inter-regional project. Referring to this project in the narrative is confusing because it implies that the entire \$3.5 billion cost of the SR 241 project is included in the SANDAG RTP, which is incorrect. Also, see response to # 3 regarding interregional commuting.
- 5 SANDAG has retained an independent consulting firm to review the methodology and model assumptions of the TDM and other strategies and the impact these assumptions would have on overall GHG reductions. Their preliminary analysis has already been used to inform the target-setting process and their full report will be available later this summer.
- 6 ClimatePlan assumption for non-motorized mode share in San Diego is too low. According to the 2006 Household Travel Survey for the San Diego region, 13.3 percent of total trips are nonmotorized. Nonmotorized trips comprise 3.6 percent of total home-based work trips.  
  
SANDAG staff believes the walk and bike program evaluated in the scenario testing does represent an ambitious alternative. It would lead to the full implementation of the recently adopted Regional Bicycle Network Plan, which would significantly increase access for bicycling and walking throughout the region. However, as stated above, SANDAG has retained a consulting firm to review the methodology and model assumptions of the nonmotorized transportation strategies and the impact these assumptions would have on overall GHG reductions.

- 7 **Transit:** If SANDAG's model provided greater confidence that a large shift from auto to transit use were realistic, the hybrid scenario would represent a very ambitious scenario. SANDAG through its 2007 RTP would invest \$9 billion for major transit expansion, for three new rail/guideway corridors, grade separations and double tracking on the four existing corridors, new bus rapid transit corridors, plus the existing 120-line express and local bus system, and then consume \$11-12 billion more for operating costs for the whole system going out to 2035. The light rail lines plus fifteen bus lines would run at frequencies of 10-minutes or less. This represents substantial transit service, particularly given the extensive amount of low density, single use residential and office/light industrial park territory in San Diego.
- 8 The hybrid/ambitious scenario proposes to add twelve new bus lines (10%), increase frequency of light rail trains, and add park-and-ride garages, and reports that daily transit ridership increases by 123%. This is a laudable goal, but the results are not supported by the information provided, for three reasons: no revenue stream exists to fund the additional operating costs, there may not be room for 123% more riders on a transit system that expands by less than 20%, and the apparent success in shifting trips to transit may not be all that it seems because of quirks in SANDAG's model discussed below. If the shift is overstated, SANDAG will need to concentrate more on its Urban Area Transit Strategy in its next RTP, including redirecting or increasing revenues to expand its system.
- 9 **Pricing:** SANDAG needs to consider a more realistic pricing scenario to achieve a fully ambitious approach, which could in addition provide funding for transit expansion. SANDAG in its 2007 RTP proposes to extend or add managed lanes on four corridors (I -5, I-15, I-805, & Route 52), and complete or widen three toll roads around the region (Routes 125, 241, & 11), within the framework of broader system expansion. In the hybrid/ambitious scenario, SANDAG would modify the RTP to build new HOV lanes as HOT lanes on three corridors (Routes 56, 78, & 94). Presumably all these toll facilities would use variable toll rates, and the extent of this toll system is more ambitious than in the other three major metro areas. To be consistent with SB 375, revenues generated by HOT lanes should be invested in transit, bicycle and pedestrian projects that reduce VMT. This is also an important equity consideration.

#### Does SANDAG's modeling completely account for GHG reductions?

**Summary:** The problems noted here tend to overestimate auto travel and VMT, and paradoxically may overestimate the shift to transit use. If fixed or adjusted, SANDAG would gain confidence in its estimated GHG savings for the hybrid scenario, and better understanding of effects of policy and investment choices on travel behavior. SANDAG could then verify its GHG reductions, and learn more about effectiveness of current and more ambitious strategies.

- 10 SANDAG uses a traditional 4-Step Transportation Model, which represented the state-of-the-art from about 1960 to the mid-1990s. The 4-Step Model analyzes: 1) trip generation (what trips do people need or want to make?); 2) trip distribution (where do they go for those activities?); 3) mode choice (do they travel by driving, riding, taking transit, bicycling, or walking?); and 4) trip assignment (what route do they take, with feedback that considers other routes during congestion). The typical 4-Step Model is based on traffic analysis zones, which provide an

- 7 The land-use scenario that was used in the target-setting analysis assumes that new development between 2005 and 2035 will largely consist of attached housing units and small-lot, single-family units. The analysis performed to date suggests that this pattern of development would support the types of transit investments being considered in the adopted 2007 RTP and in the more ambitious transit network scenario that was tested.

Shifts in transit ridership in the target-setting scenarios are largely a function of aggressive policies implementation, coupled with investment in transit facilities and services.

- 8 SANDAG has not made any claim that the hybrid scenario from May, 2010 is revenue constrained. This analysis will be completed over the summer to inform the target-setting process.

Traditionally, SANDAG has not constrained ridership on transit due to vehicle capacity in its transportation model. If overcrowding on a particular route occurs, SANDAG believes additional capacity could be added through alternative vehicles such as articulated buses or increases in the frequency of service.

- 9 The 2007 RTP assumes that net revenues from the HOT lane programs would be used for transit service in the same corridor. The SANDAG Board will be asked to provide direction on how to invest net revenues from HOT lane programs proposed in the 2050 RTP, which is under development.

- 10 The SANDAG Four-Step Transportation Model is considered state-of-the-practice by a peer review panel held under the Federal Highway Administration's Transportation Model Improvement Program.<sup>4</sup> SANDAG uses an enhanced Four-Step Transportation Model, which includes sensitivity to 4D measures like accessibility and urban form. It also includes a truck model, pricing sensitivity, and a feedback loop to further account for congestion.

SANDAG is currently developing an activity-based model for the RTP that will be adopted in 2015. While the transportation modeling community is moving toward activity-based models, they are still not state-of-the-practice. In the United States, only seven activity-based models are operational, and five are being developed.<sup>5</sup>

<sup>4</sup> SANDAG completed the Travel Model Improvement Program peer review in 2005. At the time, the panel felt that "SANDAG's current model is consistent with the state of the practice." Full Report: < [http://tmip.fhwa.dot.gov/resources/clearinghouse/docs/tmip/peer\\_review/sandag/](http://tmip.fhwa.dot.gov/resources/clearinghouse/docs/tmip/peer_review/sandag/)>

<sup>5</sup> *NCHRP Synthesis 406: Advanced Practices in Travel Forecasting*. Active: Columbus, New York, Sacramento, San Francisco / Bay Area (since publishing), Atlanta (since publishing), Lake Tahoe, Denver (since publishing). Development: Ohio, Oregon, Phoenix, San Diego, Seattle.

average behavior for the people within them. The 4-Step Model was designed to assess mobility and forecast congestion, and it can do those things adequately.

However, the 4-Step Model cannot assess very well, or at all, policy questions of today: How do demographics (age, income, household size) affect travel behavior? How do household size and land uses affect auto ownership and use? Why and how do people decide to chain activities together? To what extent do travel time and out-of-pocket cost affect travel choices? What would variable pricing of auto travel do to travel choices? How does people's travel behavior respond to TDM signals for carpooling, walking, bicycling, and telecommuting? How does local geography affect walking, bicycling, and walk-to-transit? What do local land use details, particularly mixed uses, mean to travel behavior? The 4-Step Model must use a post-processor, typically involving extrapolation, to estimate answers to these kinds of questions.

- 11** SANDAG's 4-Step Model encounters at least four problems in looking at these issues, which limit RTP analysis and have become critical to SB375 planning:
  - The model exaggerates the value of travel time. In assessing travel choices, the model trades off travel time versus out-of-pocket cost. This obviously affects whether a driver will use a HOT lane or toll road instead of free lanes, but it also affects the choice to travel by faster auto instead of slower but cheaper transit. SANDAG's model allows for three values of travel time, for lower (<\$39,200), middle (\$39,200-\$78,400), and higher (>\$78,400) income households. The income ratio among these groups is about 1:2:3, but the ratio of value of travel time among the same groups is about 1:5:20. For the middle group, value of travel time is reasonable at \$5-\$11 per hour; that means that for the lower income group, value of travel time is way too low, resulting in artificially high use of transit, and for the higher income group, value of travel time is way too high, resulting in almost no use of transit and excessive willingness to pay road tolls. This may explain the why so many trips shift from driving to transit in the hybrid scenario. SANDAG should reexamine and adjust its coefficients for value of time in its model.
- 12** • The model assumes some results without calculating them. The 15% TDM reduction in white collar work trips, walk and bike trips, and carpooling are all predetermined inputs to the model rather than outputs based on travel behavior calculations. With no signal from the model about travel behavior choices, SANDAG does not really know whether its policies and investments are as effective as it thinks they are, and it appears that the model may not remove the auto trips that are no longer made because of TDM, thus overstating traffic and congestion levels. SANDAG cannot get its model to do things it is not capable of, but it should consider a post-processor to make appropriate adjustments.
- 13** • The model fails to replicate actual use of HOT lanes. SANDAG seems to have adjusted its value of travel time to get I-15 managed lane use results more in line with what it expected, but the revenue comes out six times higher for 2006-2009 than was actually collected. It is interesting to observe that revenue forecasts for the Route 125 toll road were three times actual receipts, leading the toll road owner to file for bankruptcy. The model also allows for unlimited use of managed lanes, rather than preferential use for HOVs, so the managed lanes de facto perform as mixed flow lanes. Adjusting the value of time should fix this issue too.
- 14** • The model uses employment by acre, rather than actual number of employees or workplace square footage in calculations. This seriously limits the ability to analyze higher density employment areas or mixed use areas, and misrepresents employment in

- 11** ClimatePlan incorrectly identifies the transportation model's income category breakpoints. SANDAG models three household income categories: less than \$30,000, \$30,000 to \$60,000, and greater than \$60,000.<sup>6</sup> If you take the median range of each category (\$15k, \$45k, infinity), the ratio is 1:3:∞.

The value of time associated with commute trips is typically around 1/3 the average hourly rate. Using the three income categories specified above, the value of times in the mode choice model should range between \$0-\$4.80 for low-income, \$4.80-\$9.60 for mid-income, and \$9.60+ for high-income. SANDAG's commute value of times are \$2.00 for low-income, \$5.40 for mid-income, and \$12.90 for high-income.

ClimatePlan's ratio of travel time is incorrect and undocumented. The average travel time ratio between low-income and non low-income is nearly 1:1. In the 2007 RTP, SANDAG stated the 2030 revenue-constrained network resulted in an average travel time of 20 minutes per person for low-income and an average travel time of 19 minutes per person for non low-income.<sup>7</sup>

- 12** ClimatePlan's description of the SANDAG model is incorrect. Telecommuting is accounted for in the trip generation step of SANDAG transportation model. Trip generation is the first step in the transportation model, so model agents (i.e., travelers) make choices about carpooling, biking, walking, and transit later in the model process during mode choice. Mode choice and mode targets of white-collar trips are not predetermined inputs. Also see response to # 5 regarding the use of an independent consulting firm to evaluate the TDM assumptions being used in the modeling process.
- 13** Revenue projections versus actual use of the toll facilities (I-15 and SR 125) were incorrect largely due to the international recession and increase in unemployment throughout the San Diego region. With fewer people traveling to work, congestion on general purpose facilities decreased leading to lower demand for tolled facilities.  
The toll road owner for SR 125 performed their own independent toll and revenue projections. The initial SANDAG projections had no impact on the South Bay Expressway's bankruptcy filing.  
Since the 2007 RTP, SANDAG implemented more detailed procedures for the assignment of eight mode users, including drive alone toll and shared-ride HOV and toll users. Additionally, during the re-estimation of the mode choice model for FTA New Starts submittal, we reexamined the toll price sensitivity of the mode choice. Model calibration will improve as the region has a larger base of toll users to survey behavior and derive coefficients from.
- 14** ClimatePlan over simplifies how the SANDAG model incorporates land use. Employee-based nonresidential trip rates have been calibrated for 80 land use categories, including Office-Low Rise, Office-High Rise, Community Shopping Center, Neighborhood Shopping Center, and Arterial Commercial. Employee rates yield the same number of regional trips as acres rates, although they produce a different pattern of trip making across the region.

<sup>6</sup> 2030 Regional Growth Forecast Update: Process and Model Documentation. Page 82 <[http://www.sandag.org/uploads/publicationid/publicationid\\_833\\_3750.pdf](http://www.sandag.org/uploads/publicationid/publicationid_833_3750.pdf)>

<sup>7</sup> 2030 Regional Transportation Plan – Technical Appendices. Table TA 4.1—2030 Regional Transportation Plan Performance Measures

#### 14 continued

In addition, Centre City San Diego uses employee-based rates for all purposes. Centre City densities are much higher than regional averages so that acre-based rates underestimate travel. Centre City also has a greater potential for growth that is indicated by land use designations that determine acre-based trips.

Since the 2007 RTP, SANDAG has incorporated 4D measures of density and urban form into the trip distribution and mode choice steps of the model. Unlike other 4D post-processors, the sensitivities to 4D effects are now built into the SANDAG trip-based model, and can be used to provide comprehensive analysis of transportation and land-use policies and observed effects across multiple dimensions of travel behavior. The enhanced model is sensitive to changes in 4D characteristics and is based on sound travel forecasting principles.

certain zones such as Urban and Town Centers, which in turn implies continuance of single use medium density suburban land uses, contrary to the Urban and Town Center concept.