

JTAC STAFF REPORT

SUBJECT: RTP-SCS Technical Methodology Revisions

MEETING DATE: May 7, 2015

AGENDA ITEM: 4

STAFF CONTACT: Peter Imhof

RECOMMENDATION:

Review draft revisions to the technical methodology for estimating greenhouse gas emissions in the updated Regional Transportation Plan-Sustainable Communities Strategy (RTP-SCS).

SUMMARY:

SBCAG staff is seeking technical advisory input on proposed revisions to the statement of technical methodology for estimating greenhouse gas emissions that SB 375 requires each MPO to submit to the Air Resources Board (ARB) at the outset of the RTP-SCS update process. For the most part, SBCAG intends to follow the same methodology in the next RTP-SCS cycle that it followed in the last one. However, there are some items that require updating in the text of the technical methodology memo previously submitted and some differences in methodology have been proposed and discussed at the MPO and State level.

This staff report provides background and summarizes both the constants and changes in the methodology that SBCAG is proposing. SBCAG intends to use the technical methodology memorandum to clarify, document and gain ARB's acceptance of SBCAG's intended approach, which we judge important before embarking on an update of the SB 375 targets with ARB.

DISCUSSION:

At the outset of the RTP-SCS update process, SB 375 requires each MPO to prepare a description of the technical methodology that it will use to estimate GHG emissions and to send it to the Air Resources Board (ARB) for review.

Prior to starting the public participation process . . . , the MPO shall submit a description to the state board of the technical methodology it intends to use to estimate the greenhouse gas emissions from its sustainable communities strategy and, if appropriate, its alternative planning strategy.

Government Code Section 65080(b)(2)(J)(i).

In the course of developing the current adopted 2040 RTP-SCS, SBCAG prepared a technical methodology memorandum, as required, and sent it to ARB in November 2011, following joint technical advisory committee review. At the time it was written, SBCAG's regional growth forecast and upgraded modeling tools were still under development and there were a number of unknowns, both with respect to the tools themselves and with respect to critical inputs, such as the Regional Housing Needs Assessment (RHNA) inputs.

The proposed revisions update the technical methodology to reflect changes in the interim, including tools completed and now established data inputs. In addition, they address SBCAG's intended approach to some differences in methodology that have been proposed and discussed at the MPO and State level. SBCAG intends to use the technical methodology memorandum to clarify, document and gain ARB's acceptance of SBCAG's intended approach.

The attached draft document (Attachment 1) shows the proposed changes to the technical methodology memo previously sent to ARB in 2011 in strike-out/underline text. A bullet point summary of the proposed constants and changes to the technical methodology follows:

Proposed Constants

- Plan goals and objectives will likely remain unchanged.
- SBCAG will continue to use the adopted 2012 Regional Growth Forecast's socioeconomic projections as model inputs and in development of alternative land use and transportation scenarios for future years.
- SCS update will continue to apply the adopted 2014-2022 RHNA Plan currently in effect, which was also applied in the adopted 2040 RTP-SCS. The RHNA is on an eight-year cycle, while the RTP-SCS is on a four-year cycle.
- SBCAG will revise the SB 375 Public Participation Plan as needed, but it will likely remain functionally identical to the outreach plan used in the last cycle.
- The base year for land use and travel demand modeling will remain 2010 and for air quality modeling it will remain 2005, backcasted from 2010 data as in the adopted RTP-SCS.
- Forecast years (2020, 2035) and plan horizon year (2040) will remain the same. If necessary, we will add 2030 as a forecast year to ensure that the RTP meets all federal requirements in the event that anticipated changes to federal ozone standards trigger an air quality conformity determination.
- We will continue to use the existing UPLAN land use model running on the exiting raster-based model platform, although we will update land uses depicted in the model to reflect local land use changes adopted in the interim. A more advanced, polygon-based UPLAN model platform is currently under development by the original model developers; however, migrating to this new platform would be resource-intensive. Whereas generous Proposition 84 funding was available to MPOs in the last RTP-SCS cycle for model upgrades, SBCAG is not aware of any similar dedicated funding source to support such work in the current cycle.
- SBCAG will continue to use the existing, 4-step regional travel demand model, calibrated with 2001 California Household Travel Survey (CHTS) data. Unfortunately, the Santa Barbara region received an insufficient number of survey samples from the more recent 2012 CHTS to support model recalibration. In addition, as with respect to a land use model upgrade, funding is not available to complete a travel model recalibration.
- SBCAG's current land use model and regional travel demand model are fully integrated and multi-modal and SBCAG will not need to rely on off-model, post-process tools for scenario analysis and comparison.

Proposed Changes

- The methodology will integrate the new MAP-21 performance measures and targets.
- Interregional trip calculations will most likely utilize the new California Statewide Travel Demand Model (CSTDm) outputs, which appears likely to be the approach favored by the State, instead of the old averaging methodology. SBCAG has completed test model runs using initial published CSTDm data and we can support the new approach. However, we signal to ARB that we could also support continuing to use the averaging methodology, if a statewide consensus is not reached on the use of the CSTDm outputs.
- To calculate mobile source emissions from travel model outputs, SBCAG will use ARB's new Emissions Factors (EMFAC) 2014 model, now available in beta version, assuming it officially replaces the older EMFAC version. Again, SBCAG staff has done test runs with the beta version and is comfortable with the results.

The revised draft methodology is intentionally silent on the subject of updated SB 375 targets. ARB has indicated its intention to update targets for the smallest five MPOs, including SBCAG, this year. However, any target update process is distinct from the methodology for estimating GHG emissions. Although we judge it important to obtain ARB acceptance of SBCAG's proposed methodology before embarking on an update of the SB 375 targets with ARB, we think it unnecessary to address the target updates themselves in the technical methodology.

Following technical advisory committee review, SBCAG intends to send the revised technical methodology to ARB together with a summary of changes.

Attachment:

1. Draft revised RTP-SCS Technical Methodology

\\sbcapcd.org\shares\Groups-SBCAG\meetings\Joint TTAC & TPAC Meetings\2015\05 May\TPAC\Draft\Item 4 RTP-SCS Technical Methodology Revisions\Item 5 RTP-SCS Tech Methodology Revisions.doc



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TECHNICAL METHODOLOGY FOR ESTIMATING GREENHOUSE GAS EMISSIONS IN THE SUSTAINABLE COMMUNITIES STRATEGY

OCTOBER 2011

Member Agencies

Buellton ■ Carpinteria ■ Goleta ■ Guadalupe ■ Lompoc ■ Santa Barbara ■ Santa Maria ■ Solvang ■ Santa Barbara County



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MAY 2015

Member Agencies

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This memorandum describes the general approach to estimating greenhouse gas emissions which the Santa Barbara County Association of Governments (SBCAG) will follow in ~~its~~the forthcoming update of its Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS). SB 375 provides:

Prior to starting the public participation process adopted pursuant to subparagraph (F) of paragraph (2) of subdivision (b) of Section 65080, the MPO shall submit a description to the state board of the technical methodology it intends to use to estimate the greenhouse gas emissions from its sustainable communities strategy and, if appropriate, its alternative planning strategy.

Government Code Section 65080(b)(2)(J)(i).

In accordance with the requirements of SB 375, this memorandum was prepared for, and will be submitted to the California Air Resources Board (CARB) for review. ~~The memorandum also addresses the steps outlined in CARB staff's July 2011 paper describing CARB's SCS review methodology and is intended to present an SBCAG's intended approach to for SCS preparation that will, and to supply the information needed for CARB's review. By describing the technical approach to development of the SCS, this memorandum is also intended to garner CARB's acceptance and endorsement of the SBCAG approach early in the process.~~

The approach described in the memorandum is based on SBCAG's ~~current work program and SBCAG staff's current understanding of~~ Overall Work Program, as well as available tools and information. ~~Staff has increased its familiarity with these tools and this since the completion of the first round of the RTP-SCS, but some inputs and other relevant information are still under development and. Due to these possible changes in inputs, this approach may therefore change as SBCAG staff refines its understanding. Also, certain details, such as the specific performance measures shown in Table 2 below, are provided by way of example, but still require SBCAG Board approval before a based on SBCAG's current adopted RTP-SCS, but the final list can be stated may still change.~~

Completing the SBCAG SCS

Work tasks for completing the SCS were taken directly from the requirements for Sustainable Communities Strategies as contained in Government Code Section 65080(b)(2)(B).

Task 1: Identify the general location of uses, residential densities, and building intensities within the region

- a. . Forecast future population ~~and~~, employment and households for the SBCAG region as a whole for the 2020 and 2035 target years as part of SBCAG's updated ~~based on the~~ Regional Growth Forecast (RGF). ~~The RGF) adopted in December 2012. In the next RTP-SCS, SBCAG will contain growth estimates of population, employment, and households continue to rely on the socioeconomic projections in the 2012 RGF that were applied in SBCAG's adopted 2040 RTP-SCS. The 2012 RGF is based on the 2010 decennial Census 2010 residential and related socioeconomic data information and has not changed.~~
- b. Populate the UPlan regional land use model with the socioeconomic and land use data ~~to create a~~ from the 2012 RGF for the Base Year 2010 scenario of existing land uses, residential densities and building intensities within the Santa Barbara County region. The land use model will replicate existing General Plan land uses using generalized land use categories

corresponding to major use categorizations and specifying allowable densities and intensityintensities of development.

Completion of ~~these~~~~this~~ work ~~tasks~~~~task~~ will paint a picture of existing land uses and possible future land use scenarios within the Santa Barbara County region and will help to inform the public during the public outreach phase. This work task will rely heavily on the development of the base year estimates in the ~~Regional Growth Forecast~~~~2012 RGF~~, as well as the development of the ~~regional~~ land use and travel ~~demand~~ models being prepared~~currently in use~~ by SBCAG's consultant~~SBCAG~~.

Task 2: Identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth

- a. The ~~UPlan~~ land use model will be used to allocate ~~forecast~~~~forecasted~~ growth to future land use scenarios. Since the development of these scenarios will begin with ~~the~~ model allocation of ~~forecast~~~~forecasted~~ growth, all future scenarios considered will accommodate the forecasted population and employment ~~for~~~~in~~ all target years.
- b. Using the ~~UPlan~~ land use model to allocate growth ~~forecast~~~~forecasted~~ in the RGF, ~~develop~~ ~~a~~~~staff will build on the~~ range of future land use scenarios ~~developed previously, which were~~ based on public input ~~which accommodate, and considered~~ the forecasted population and employment for all target years. Each land use scenario ~~will provide~~~~provides~~ for residential, commercial and industrial land use capacity sufficient to accommodate ~~forecast~~~~forecasted~~ population and employment growth, beginning with existing base year land uses and re-designating land as may be needed to accommodate ~~forecast~~~~forecasted~~ growth and future needs.
- c. Select a preferred alternative from among the range of future scenarios developed as described above.

SBCAG's ~~updated~~ RGF will ~~contain~~~~contains~~ estimates of population and employment growth out to the year 2040, which is ~~consistent with~~~~will remain~~ the planning period of ~~horizon for~~ the RTP. The RGF also accounts for net migration, household formation, and employment growth factors. Forecast years corresponding to SB 375 target years 2020 and 2035 will be included.

Task 3: Identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region

- ~~a. In its role as the MPO for the region, SBCAG will receive the Regional Housing Needs Assessment (RHNA) Determination from the State's Department of Housing Community and Development (HCD).~~
- ~~b. SBCAG will then prepare a RHNA allocation methodology and report that will ultimately be approved by our local Technical Planning Advisory Committee and Board of Directors.~~
- ~~c. The RHNA allocation will be incorporated and accounted for within each of the different future scenarios of the SCS. The RHNA allocation will be reflected in the 2020 and all later target years.~~

~~SBCAG is expected to receive its RHNA Determination in early 2012. Staff will then initiate the RHNA allocation process. The distribution~~The allocation of the eight-year projection of the regional housing need for the region is one of the key requirements that will be included in each of the future alternative transportation/land use scenarios of the SCS. In its role as the MPO for the region, SBCAG received its Regional Housing Needs Assessment (RHNA) determination from the State's Department of Housing and Community Development (HCD) in late 2011, and subsequently adopted the 2014–2022 Regional Housing Needs Allocation Plan in July 2013. Whereas the SCS is updated on a four-year cycle, the RHNA is updated on an eight-year cycle corresponding to every other SCS update. Since there is no new RHNA in this SCS cycle, this SCS update will continue to apply on the adopted RHNA plan currently in effect, which was also applied in the adopted 2040 RTP-SCS.

Task 4: Identify a transportation network to service the transportation needs of the region

- a. SBCAG's RTP will include development of a fiscally constrained transportation network. The sub-tasks involved in developing the transportation network within the RTP are outlined below:
 - i. ~~Development~~Refinement of ~~the previous RTP's~~ set of goals, objectives, and performance measures ~~to be~~ which are used to evaluate the performance of ~~the various scenarios of~~. Performance measures will be amended to include, in particular, new Moving Ahead for Progress in the 21st Century Act (MAP-21) performance measures and targets.
 - ii. Incorporate recommendations from relevant regional, corridor and subregional studies to update multi-modal highway, rail, and transit networks. Update regional arterial network as needed to reflect changes from local general plans. Compile a fiscally unconstrained, unranked list of projects by category.
 - iii. Establish project evaluation criteria category type (highway, transit, rail, etc.).
 - iv. Develop or revise cost estimates for all projects, including those projects on local streets and roads.
 - v. Apply project evaluation criteria from sub-task iii to projects identified in sub task ii to produce listing of ranked projects by category.
 - vi. Use ranked projects list from sub task v to prepare a fiscally unconstrained integrated transportation network and identify future transportation system management and monitoring systems to be included in the RTP scenarios.
 - vii. Develop updated revenue projections for local, state and federal funding sources.
 - viii. Prepare a fiscally constrained RTP network, incorporating ranked projects from sub-task vi, that can be funded based on the projected funding identified in sub-task vii.
- b. As needed, develop and analyze additional multi-modal (transit, HOV, managed lanes, bicycle, pedestrian, etc.) network alternatives in the future network scenarios described in Task 1 above.

The transportation network developed within the RTP will serve as the primary indicator of the transportation needs of the Santa Barbara County region. As noted in the California Transportation Commission's RTP Guidelines:¹

While the SCS requirements for the RTP do not change the process used to establish the transportation needs for the region, the SCS forecasted development pattern and transportation network, measures, and policies should complement one another to reduce regional GHG emissions from light duty trucks and automobiles. Decisions to expand or modify the transportation system should be made in recognition of the effects of transportation on development location and density, and also in recognition of the following relationships between land use and transportation:

- Transit investments need supporting levels of land use density and intensity.
- The speed of the network and the cost of travel may influence the location choices of new development.
- Placing land uses closer together and minimizing unnecessary barriers to circulation increases travel choices such that transit, walking, and bicycling become viable while also reducing transportation sector energy use and GHG emissions.

Task 5: Gather and consider the best practically available scientific information regarding resource areas and farmland in the region

~~Complete a~~ **Continue to incorporate the** Regional Greenprint for the region. ~~This will include mapping~~ **into scenario analyses. The Regional Greenprint includes** areas of sensitive species, habitat conservation, state parks, historic sites, flood zones, forests, and farms subject to Williamson Act restrictions, ground water basins, septic system problem areas, Local Agency Formation Commission Spheres of Influence, and other areas.

The Regional Greenprint ~~will ultimately serve~~ **serves** as a visual aid and mapping tool to define constraints to future development. The definition of such constraints will accordingly shape the development of the future alternative land use scenarios.

Task 6: Set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce GHG emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the GHG emission reduction targets approved by ARB

- a. Alternative land use/transportation network scenarios will be defined ~~in~~ **by** the UPlan land use model and ~~evaluated using~~ **in conjunction with** the TransCAD **regional** travel demand model and EMFAC 2014 air quality model to determine ~~their~~ **scenario** performance ~~against~~ **using** predetermined performance measures ~~and a~~ **targets**. Indicators will be set up to compare the base year **scenario** with each of the future scenarios for each target year to determine attainment of ~~the ARB~~ **ARB's GHG emissions** reduction ~~target~~ **targets and applicable MAP-21**

¹ Regional Transportation Plan Guidelines, California Transportation Commission, April 2010.

performance targets. Tables 1 & 2 illustrate how the performance indicators and measures will be utilized.

b. Staff will prepare a summary of the results of the scenario performance analysis for public workshops in the second phase of public outreach to focus the discussion on reaching consensus on a preferred transportation/land use alternative.

b.c. With decision-maker input and feedback from public outreach, a preferred scenario will be selected by the SBCAG Board from among the range of scenarios studied, taking into account scenario performance, especially with respect to the ARB reduction target, including MAP-21 performance measures and targets and GHG emissions relative to ARB's SB 375 targets..

~~Staff will then prepare a summary of the results for public workshops in the second phase of public outreach to focus the discussion on reaching consensus on a preferred transportation/land use alternative.~~

Table 1
SCS Scenario Comparison – ARB Performance Indicators [Example – Table will be the same for 2035]

Indicator	2010 Base Year	2020 Scenario 1		2020 Scenario 2		2020 Scenario 3		2020 Scenario 4	
		Value	% Change from 2010						
Population									
Employment									
Households									
Passenger vehicle trips									
Passenger vehicle miles traveled (VMT)									
VMT per capita									
Passenger vehicle greenhouse gas (GHG) emissions (carbon dioxide – CO ₂)									
Passenger vehicle GHG emissions per capita									
Commute trip mode share % Drive alone % carpool % Shared Ride % Transit % Bike % Walk									
Residential density # Housing units per residential acre developed Population per residential acre developed									
Distance of housing and employment from transit % of households within ¼ mile of transit stops % of job sites within ¼ mile of transit stops									
Total bike/walk trip mode share									
Ozone precursor emissions (all vehicles) Reactive organic gases (ROG) Oxides of nitrogen (NO _x)									

Table 2

SCS Scenario Comparison – SBCAG Goals and Performance Measures [currently examples only – still need to be approved by the SBCAG Board]²

Goals and Performance Measures	2010 Base Year	2020 Scenario 1		2020 Scenario 2		2020 Scenario 3		2020 Scenario 4	
		Value	% Change from 2010						
<u>ENVIRONMENT</u>									
On-road fuel consumption per capita									
% Ag land and open space converted per year									
<u>MOBILITY & SYSTEM RELIABILITY</u>									
Average total trip travel time									
Average work trip (commute) travel time									
Congested VMT									
% of total auto travel during congested conditions									
Peak periods									
All day									
% of total transit travel in congested conditions									
Peak periods									
All day									
% of Freeway Congested weekday VMT by Travel Speed on freeways									
% of VMT traveling from 0 to 35 mph									
% of VMT traveling from 35 to 55 mph									
% of VMT traveling above 55 mph (V/C ratios > 0.75)									
Congested weekday VMT on all other roadways (V/C ratios > 0.75)									
Congested Lane Miles									
Congested AM and PM peak period lane miles (V/C ratios > 0.75)									
Daily vehicle delay per capita									

² Subject to change.

<u><i>EQUITY</i></u> New affordable housing units by affordability level									
<u><i>HEALTH AND SAFETY</i></u> Total bike and walk trips Ratio bike + walk trips to total trips									
<u><i>PROSPEROUS ECONOMY</i></u> Avg. commute reduction, time Avg. commute reduction, distance Avg. commuter cost savings									

Task 7: Allow the regional transportation plan to comply with Section 176 of the Federal Clean Air Act

- a. The updated RTP-SCS is expected to be adopted in 2013~~2017~~ and will plan to a horizon year of 2040. This horizon year has been selected to meet the 20-year forecast requirement stipulated by federal transportation regulations and emissions standards.
- b. For the purposes of establishing an ozone emissions budget, the RTP will include an “action-baseline” test utilizing “no build” scenarios for the future target years (2020, 2030, 2035, and 2040). By regulation, the future scenario years may contain no gaps exceeding 10 years.
- c. Staff will review the transportation control measures (TCMs) in the State Implementation Plan to determine their current status within with respect to the regional transportation plan RTP.

According to local County Air Pollution Control District (SBAPCD) staff, possible changes in the federal ozone attainment standard could affect the SBCAG region's attainment status. However, these changes may not occur within the time period of the current RTP/SCS. SBCAG staff will formulate the RTP to anticipate possible new, more stringent ozone standards.

Key Components of the SCS

Public Participation Plan

Public outreach and input will be crucial in developing scenarios for the SCS. SB 375 requires that each MPO adopt a public participation plan for the development of the SCS. The RTP & SCS Public Participation Plan will serve as an addendum to SBCAG's agency-wide Public Participation Plan-2007, which fulfills the federal requirements for public participation. The SBCAG Public Participation Plan identifies a public outreach process for the RTP and SCS that will be carried out over three phases:

1. *Scoping Phase.* SBCAG will convene meetings with advisory committees and interested stakeholder groups. During the meetings, staff will describe the planning process, explain the significance of SB 375, and outline the general planning “problem” (how to meet the targets for reduction of greenhouse gases and provision of housing required by the Regional Housing Needs Assessment), explain what types of land use and transportation methods the region could use to meet the targets, and provide example scenarios with rough estimates of how much greenhouse gas reduction and appropriate housing provision such examples would provide. (Fall/Winter 2011~~2015~~)
2. *Alternative Transportation/Land Use Scenarios Phase.* SBCAG will involve the interested parties in evaluating various possible future development patterns and alternative transportation/land use scenarios for the region. SBCAG will provide a description of the scenarios it developed after incorporating the input received in the RTP/SCS scoping phase. This will include an explanation of the results of the travel and land use model analysis of each scenario, and how well the scenarios achieve the greenhouse gas and housing targets, as well as the adopted performance measures. Visual representations from CommunityVIZ or other comparable software UPlan will be used to help participants visualize various alternatives. (Spring/Summer 2012~~2016~~)
3. *Draft RTP/SCS and Preferred Transportation/Land Use Scenario Phase.* During this phase, SBCAG will provide the draft RTP, including the SCS and, if applicable, Alternative Planning Strategy (APS), for review and comment. The draft documents will identify the preferred alternative, based on and taking into account information received as part of the previous phases. (Fall/Winter 2012~~2016~~)

The Public Participation Plan was adopted by the SBCAG Board in August 2011. ~~SBCAG will~~ **SBCAG intends to revise the Public Participation Plan in summer 2015 and** initiate its first phase of public outreach in fall ~~2014~~ **2015**. The RTP and SCS alternative transportation/land use scenarios will be developed by SBCAG staff following the scoping public outreach phase in winter ~~2012~~ **2015**. Based on technical analysis of the scenarios and input from the public, SBCAG's advisory committees, Board of Directors, local City Councils and the County Board of Supervisors, the preferred transportation/land use alternative will be selected in summer/fall ~~2012~~ **2016**, and the preferred alternative will ultimately be incorporated into the draft RTP and evaluated in the associated Environmental Impact Report (EIR), along with the alternative scenarios. The RTP and EIR are scheduled to be released in spring ~~2013~~ **2017**.

RTP and SCS Goals, Objectives and Performance Measures

SBCAG staff ~~is currently in the process of working~~ **worked** with SBCAG member agencies to develop a set of policy goals and objectives for the RTP and SCS- **in conjunction with the adopted RTP-SCS**. The planning goals ~~will serve~~ **erved** as the overall vision for the direction of the RTP, while the objectives ~~will serve~~ **erved** the concise strategies for accomplishing the goals. Once the goals and objectives ~~are~~ **were** finalized, performance measures ~~will be~~ **were** selected to allow decision-makers and the public to evaluate differences between the alternative planning scenarios in the RTP and the SCS. **SBCAG staff anticipates that** the RTP and SCS goals, objectives, and performance measures ~~are currently in development and are scheduled for adoption~~ **adopted** by the SBCAG Board of Directors ~~in fall 2014~~ **will not substantively change, with the exception of the addition of new MAP-21 performance measures and targets**.

~~Updated~~ MAP-21 Requirements

The most recent federal transportation legislation, Moving Ahead for Progress in the 21st Century Act (MAP-21), which was enacted in 2012 and updates the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), introduced some changes to metropolitan planning requirements. It amended, among other sections, 23 U.S.C. Section 134. The Federal Highway Administration (FHWA) describes some of the changes to the metropolitan planning process on its website³:

- MPOs and States must establish performance targets that address national performance measures established by the Secretary that are based on the national goals outlined in the legislation.
- MPOs may elect to develop multiple scenarios for consideration in development of the metropolitan transportation plan. If the MPO chooses to develop these scenarios, it is encouraged to consider a number of factors, including, among other items, potential regional investment strategies and assumed distribution of population and employment.

Most importantly, the FHWA is required to establish performance measures (bullet point one above) through a rulemaking to assess performance in twelve areas generalized as follows:

1. Serious injuries per VMT;
2. fatalities per VMT;
3. number of serious injuries;

³ <http://www.fhwa.dot.gov/map21/qandas/qaplanning.cfm>

4. number of fatalities;
5. pavement condition on the Interstate System;
6. pavement condition on the non-Interstate NHS;
7. bridge condition on the NHS;
8. traffic congestion;
9. on-road mobile source emissions;
10. freight movement on the Interstate System;
11. performance of the Interstate System; and
12. performance of the non-Interstate NHS.

The adopted RTP-SCS embraces a performance-based approach involving the development and comparison of multiple, alternative planning scenarios, as recommended by the FHWA. However, the previously adopted RTP-SCS did not explicitly establish performance measures and targets related to the numbered measures above, due to the final rules not being released in time. SBCAG staff expects that the rulemakings, anticipated to be finalized at the end of 2015, will allow integration of the new federal performance measures and targets into the RTP-SCS. These new performance measures and targets will need to be integrated into the RTP-SCS in a way that is consistent with the requirements of SB 375 and the State's mandated GHG targets. It is possible that the need to balance these new federal requirements with State requirements may constrain SBCAG's ability to achieve as aggressive GHG reductions as compared to the previously adopted SCS.

Regional Growth Forecast

The RGF ~~will provide~~ provides a countywide forecast for population and employment growth to the year 2040 in five-year increments covering the SB 375 target years of 2020 and 2035 for use in long-range regional planning. The forecast ~~will serve~~ serves as an input towards the development of future land use and transportation scenarios considered by the SCS, travel forecasts, air quality impact analysis, regional housing needs, and demand estimates for sewer treatment plants and other facilities. The forecast ~~will contain~~ contains an overview of future population, employment, and household growth to 2040. ~~A draft RGF is expected to be completed in fall 2011, with public workshops to be convened through the winter 2011-2012. The final RGF is anticipated for adoption~~ was adopted by the Board in spring ~~December~~ 2012.

Travel Demand Modeling

Current Status

SBCAG currently maintains a countywide regional travel demand model that runs on the TransCAD platform. Staff applies and maintains the model in-house and works in close cooperation with State, regional and local agencies to forecast traffic growth, assess demand for transportation infrastructure improvements, and evaluate corridor alignment alternatives.

The SBCAG model is a ~~traditional four~~ 4-step, trip-based travel demand model (~~that performs the four~~ following classical modeling steps ~~consisting of~~: trip generation, trip distribution, mode choice, and ~~trip~~ assignment). The mode choice model is a ~~multi-layer~~ nested logit model that is employed to analyze and predict choices of

travel mode. Mode choice outputs include auto (including drive-alone and carpool), transit, bike, and walk trips. Once transit trips are estimated, they are assigned to the transit route network. The 2001 Caltrans Household Survey for Santa Barbara County provides crucial travel information on trip purpose, modes, trip lengths, frequency, and other travel characteristics including time-of-day distributions for model calibration and validation. ~~Peak hour traffic is modeled under three time periods (A.M., P.M. and midday).~~ From the peak and off-peak mode choice models, the time of day models split the trips into 7 distinct time periods: AM (7-9 AM), Late AM (9 AM-12 PM), Lunch (12-2 PM), Early PM (2-4 PM), PM (4-6 PM), Evening (6-8 PM), Late Evening (8 PM-12 AM), and Night (12-7 AM)..

Model Improvement Plan

~~In September 2009, SBCAG submitted an application for Proposition 84 funding to the~~ The travel demand model was improved using Strategic Growth Council for improvements to the regional travel demand model. ~~The funding was ultimately awarded and staff is working~~ Proposition 84 funds.. Staff worked with a consultant to make upgrades to the model to comply with the requirements of SB 375 and to ensure consistency with the updated RTP Guidelines, including. These upgrades included:

- TAZs and demographics data were developed based on 2010 Census block geography and data. Other datasets used include ACS block group 2005-2009 demographics, 2010 InfoUSA employment data, ACS Public Use Micro Sample (PUMS) data and 2009 Longitudinal Employment Dynamics (LEHD) data.
- A “4D” variable ~~add~~ was added-on to the regional travel demand model that ~~will take~~ takes each of the four “D’s” (Density, Diversity, Design, and Destination) into account during the trip generation, trip distribution, and mode choice model runs. This ~~will allow~~ addition allowed SBCAG’s regional model to respond to changes to various land use scenarios. For example, the model ~~will account~~ accounts for the various mix of land use types within traffic analysis zones (diversity). Also, the model ~~will be more~~ is sensitive to transportation improvements that have traditionally not been accounted for in the past. ~~For example, the model will incorporate,~~ including walkability factors into the trip generation model. To model the 4D variables correctly, the number of TAZs in the model was expanded from 281 to 1188 zones.
- Times, speeds, capacities and other network attributes were re-estimated for the model update to better reflect existing conditions. TAZ-to-TAZ highway and transit network skims were estimated from the networks.
- Trip generation models were updated to generate individual persons and households within the county. Population synthesis was used to generate persons and households in a manner similar to the process in activity-based models. An auto ownership model was then estimated for each individual household based upon the household size, and included 4D variables.
- The ability to perform sensitivity tests on the model parameters and variables, such as local and system-wide housing and employment growth, income variations, ~~model results with 4D variables turned on and off to measure effects,~~ changing transit frequencies, value of time, auto operating costs, and gas prices.

Due to funding and data limitations, SBCAG is not proposing to recalibrate the travel demand model in advance of the 2017 RTP-SCS update. Unfortunately, the small number of samples (435) obtained for the Santa Barbara region from the most California Household Travel Demand Survey are inadequate to support model recalibration. In addition, whereas generous Proposition 84 funding was available to MPOs in the last RTP-SCS cycle to pay for model upgrades, SBCAG is not aware of any similar dedicated funding source to support such work in the current cycle.

Base and Forecast Years for Modeling

During the original SB 375 target-setting process, CARB set the year 2005 as the base year for which all MPOs would measure their net change in greenhouse gas emission emissions per capita. Consistent with the base year used for the regional target setting and per ARB staff's direction, SCBAG will continue to use 2005 as the base year for modeling purposes. Updated In the adopted RTP-SCS, 2005 data will be derived from more current 2010 data, backcast to 2005. The SBCAG model employs, as an input, the socioeconomic data produced by the RGF. A number of factors led to the selection of the year 2010 as the basis for updated base year calculations. One of the major features of the updated RGF is the availability of the 2010 Census data. Another factor is the collection and availability of origin-destination surveys on local transit routes for each of the major transit operators in the County. 2010 data will also be able to more accurately reflect the current economic conditions that have been in effect since 2008. This data will enhance the transit network capabilities of the regional model. adopted RGF is its use of available 2010 Census data. .

SBCAG also completed a regional traffic data collection program at over 200 roadways throughout the County in April 2010. The sample sites selected directly correspond with the sites that are monitored by the State Department of Transportation as part of the Highway Performance Monitoring System program. In addition, Caltrans has recently made its count station data available via the Performance Monitoring System (PeMS) website. The data collected from the regional count program and from the PeMS site will be placed within the GIS module of the TransCAD platform and will be available was used for the model's base year calibration process.

Both of the data sets mentioned above contain count data for 24-hour time periods for at least 7 days, so true peak period estimations can be performed and, therefore, more time periods can be modeled. The expansion of time periods will make the model more sensitive to congestion effects by the time of day and allow the model to discern between the heavy congestion of the P.M. periods versus the more moderate congestion experienced during the "shoulder" periods (such as 2:00-4:00 P.M. or 7:00-9:00 P.M.).

Forecast years to be modeled in the RTP and SCS will include years 2020 and 2035, consistent with what has been recommended by CARB for the regional target setting. SB 375. The RTP will also consider 2030 (to meet the federal requirements of 40 CFR Section 93.106 that not more than a 10-year gap may exist between model years) and 2040 (the plan horizon year).

Inter-regional and External-to-External Trip and VMT Assumptions

"Inter-regional" (IX-XI) and "external-to-external" (X-X) trips will be currently defined within SBCAG's adopted SCS as presented in ARB's *Recommendations to the Regional Targets Advisory Committee (RTAC) Pursuant to SB 375*, as follows:⁴

⁴ Recommendations of the Regional Targets Advisory Committee (RTAC) Pursuant to Senate Bill 375,
<http://www.arb.ca.gov/cc/sb375/rtac/report/092909/finalreport.pdf>

Inter-regional trips begin in one MPO region and end in another MPO region after crossing their shared boundary.

External-to-external trips begin outside of an MPO region, travel across some portion of the region, and end outside of the region (through trips).

In the adopted RTP-SCS, SBCAG utilized the RTAC-developed a methodology for external and inter-regional trips during the target-setting process. The methodology, as described in the RTAC report, is outlined below:

For the first trip type (inter-regional trips), the Committee recommends that the travel associated with an MPO-to-MPO trip generally be split equally between the two MPOs. In most cases, each region has an equal opportunity to affect emissions from trips that regularly cross over their shared boundary and therefore should equally share responsibility for reducing those emissions. However, ARB may adjust trip assignments in extraordinary cases based on consultation with affected MPOs.

In general, however, the Committee recommends that an MPO should not be responsible for through trips and should take responsibility for half of the trip that has either an origin or destination with the MPO region.

~~SBCAG quantified inter-regional travel in its report to the RTAC in May 2010.⁵ As stated in SBCAG's report to the RTAC, our region experiences a significant number of interregional commute trips from Ventura County due to the high cost of housing in the South Coast area of Santa Barbara County. The South Coast region also draws a significant number of tourism-related trips, particularly during the spring and summer seasons.~~

~~SBCAG will work~~ SBCAG previously worked with its neighboring MPOs (SLOCOG and SCAG) to determine the fair share of inter-regional trips and VMT to include in the SCS, as supported by data, according to the guidelines adopted by the RTAC. While this effort was successful, new methodologies have been discussed regarding inter-regional travel estimation.

Updated Methodology

Two alternative estimation methodologies have been considered and presented by the Inter-Regional Travel (IRT) Technical Group jointly headed by the California Department of Transportation (Caltrans) and California Air Resources Board (ARB). These two methodologies involve estimating inter-regional travel by using:

1. Existing GPS data; or
2. California Statewide Travel Demand Model outputs.

The second of these two options has gained the most traction up to this point. The CSTDM is a calibrated and validated model using large survey samples for the state, whereas GPS data does not provide key trip mode or purpose information.

California Statewide Travel Demand Model

⁵ ~~Preliminary Analysis of Alternative Greenhouse Gas Emission Reduction Strategies for the SBCAG Region, SBCAG, May 6, 2010.~~

The California Statewide Travel Demand Model (CSTDM) Version 2.0 is a multimodal, tour-based travel demand model that can forecast all types of travel as well as interregional trips. It incorporates statewide networks for roads, rail, bus, and air travel. It used the 2012 California Household Travel Survey, the 2010 United States Census and incorporated regional data and projects consistent with adopted RTP-SCSs for zonal land use, employment, and population for model calibration and base year assignment.⁶

The CSTDM 2.0 is designed to bring a better estimate of interregional trips to regional travel demand models and to provide long distance travel estimates across multiple regions. The CSTDM 2.0 provides model travel behavior for every resident of California as well as trip volumes and trip length distribution by trip purpose. The CSTDM 2.0 has been updated to provide future year datasets for 2015, 2020, 2035, 2040 and 2050. It has also been updated to a 2010 base year to take advantage of 2012 household travel survey data regarding interregional travel, census data and updated population and jobs forecasts post the 2008 recession.

SBCAG staff has received preliminary inter-regional travel estimates and has combined them with the SBCAG regional model VMT outputs for internal trips to derive total vehicle miles traveled (VMT). The preliminary inter-regional travel estimates from the CSTDM are consistent with the regional model IX-XI outputs. After reviewing this data, SBCAG staff supports the use of the CSTDM for inter-regional travel estimation, but is also comfortable using the prior RTAC 50-50 sharing methodology for interregional trip estimation.

Interaction with the Land Use Model

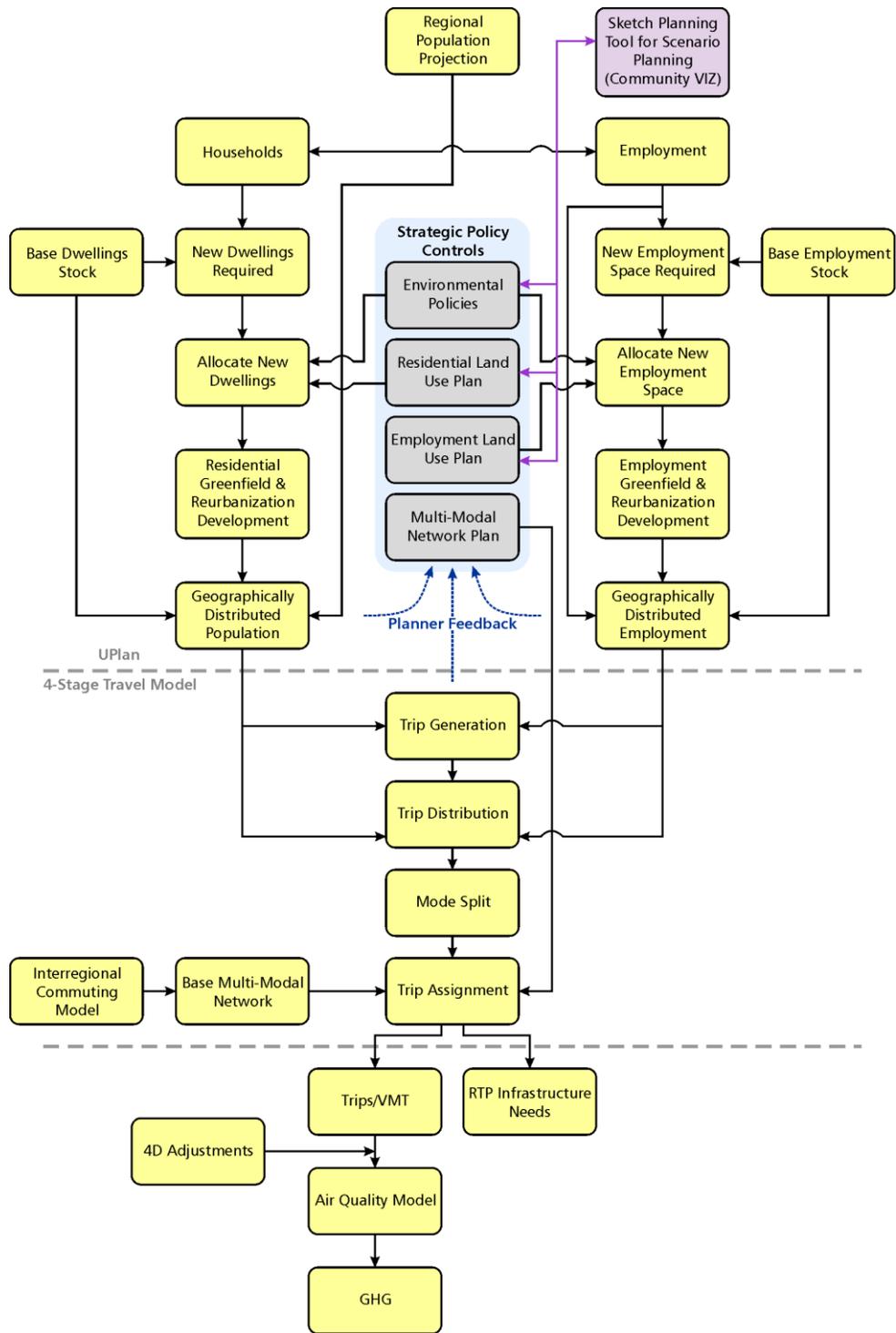
As noted above, in September 2009, SBCAG submitted an application for Proposition 84 funding to the Strategic Growth Council for improvements to the regional travel demand model. Within the application, one of the major data gaps identified by SBCAG was a lack of modeling capacity in addressing land uses at the micro-level, particularly on issues related to land use alternatives, transit-oriented development, density, mixed use, and the pedestrian environment. To address these gaps, ~~with the support of Prop 84 funding, SBCAG is currently working with~~ and its consultant ~~to develop~~ developed a land use model which ~~will allow~~ allows for evaluation of alternative future land use planning scenarios on the transportation network.

Under the scope of work approved by the SBCAG Board, the consultant ~~will integrate~~ integrated the land use model (UPlan) with the travel demand model by writing software to connect the two software products seamlessly through the model interface. The UPlan model database ~~will be~~ was built and integrated with the UPlan software and will be run as part of the travel demand model stream. A flow chart illustrating the interaction between the land use model and the travel demand model is shown in Figure 2.

⁶ http://www.dot.ca.gov/hq/tpp/offices/omsp/statewide_modeling/cstmd.html

Figure 2 – Interaction between UPlan Land Use Model and SBCAG Travel Demand Model ⁷

⁷ Caliper Scope of Work, SBCAG Staff Report to Board of Directors, April 21, 2011.
Final 2040 Regional Transportation Plan and Sustainable Communities Strategy, Appendix D-11; Adopted
August 15, 2013.
<http://www.sbcag.org/Meetings/SBCAG/2011/03%20March/approved%20March%20mins.pdf>



Off-Model Methodologies to Measure Greenhouse Gas Emissions

- ~~During the regional target-setting process, SBCAG performed an assessment of its modeling capabilities. This later proved helpful in identifying work that needed to be done for the Model Improvement Plan within the application for Prop 84 funding to the Strategic Growth Council. The model upgrade will be complete prior to completion of the RTP and SCS, so it is anticipated that many of the data gaps identified in the Model Improvement Plan will be filled. However, it is to be expected that the model cannot describe all types of traveler behavior, projects, and/or policies. For those factors that cannot be captured by the model, staff will fully document assumptions and methodologies used to derive the off-model greenhouse gas emissions estimates.~~ [Emissions](#) SBCAG's land use model and regional travel demand model are fully integrated and SBCAG does not need to rely on off-model methodologies for scenario analysis and comparison. However, to calculate project-specific emission reductions, we have the ability to use off-model tools to estimate emissions reductions on a project-specific level. Examples of documents from which SBCAG staff have utilized methodologies in the past include the following: [Multi-Pollutant Emissions Benefits of Transportation Strategies](#), Federal Highway Administration & ICF International, November 2006.
- [Benefits Estimates for Selected TCM Programs](#), U.S. Environmental Protection Agency, March 1999.
- [Carl Moyer Program Guidelines-Cost Effectiveness Calculation Methodologies \(Appendix C\)](#), California Air Resources Board, April 2011.
- [Land Use Impacts on Transport, How Land Use Factors Affect Travel Behavior](#), Victoria Transport Policy Institute, July 2011.

Sensitivity Analysis

As mentioned in ARB's document, *Description of Methodology for ARB Staff Review of Greenhouse Gas Reductions from SCS Pursuant to SB 375*, "Sensitivity analyses examine the effect that specific changes within a model have on model outputs. It involves systematically changing one model input variable at a time to see how sensitive the model outputs, such as VMT, are to changes in the variable."⁸ The ARB review methodology states that:

In performing its review, ARB staff will determine the most relevant variables or groups of variables to provide information on the resulting elasticities, and request that each MPO conduct sensitivity analyses. Depending on the SCS and the capabilities of the MPO model, ARB staff may request MPO-specific sensitivity tests of either individual strategies or groups of strategies. Staff will then review the model sensitivity results, and compare them with available empirical literature or other pertinent information to determine if the MPO's elasticities fall within a reasonable range.

Table 3 below shows policy categories and associated land use and transportation factors that are known to reduce greenhouse gas emissions. The table also shows SBCAG's capacity to analyze each land use and transportation strategy within the SCS. ~~Note that availability of sensitivity testing for "off-model" measures is still being assessed.~~

⁸ [Description of Methodology for ARB Staff Review of Greenhouse Gas Reductions from Sustainable Communities Strategies Pursuant to SB 375](#), California Air Resources Board, July 2011.

Table 3

SBCAG Capacity to Evaluate GHG Policy Variables and Reduction Measures in the SCS Sensitivity Analysis

Policy Category	Potential GHG Reduction Measure	Analysis Methodology Tool
Land Use Measures	Modify distribution of households, population, or jobs	UPlan / TransCAD
	Rebalance the mix of land uses	UPlan
	Increase the level of density	UPlan
	Improve the pedestrian environment	TransCAD
Road Projects	Add high occupancy vehicle (HOV) lanes	TransCAD
Transit Improvements	Construct new transit lines	TransCAD
	Increase service (e.g., increase transit headways, increase network connectivity)	TransCAD
	Upgrade transit service (e.g., change from bus to light rail)	TransCAD
	Improve accessibility (e.g., change bike/walk access distance to transit stations or stops, change auto access distance to transit stations)	TransCAD
Pricing Measures	Change in transit fares	TransCAD
	Change in auto operation cost	TransCAD

SBCAG ~~will coordinate~~ **coordinated** with ARB staff ~~during the previous round in order~~ to determine which measures to include in the sensitivity analysis and ~~will work in tandem with our consultant~~ **was able** to complete the analysis. **Additionally, SBCAG supplied ARB modeling staff with the updated regional travel demand model, which allowed for an evaluation of the model parameters directly by them.** Since GHG emissions are not a direct output of the travel demand model, the main indicator of output during the sensitivity analysis will be VMT. ~~Within its initial scope of work, our consultant has identified the following parameters and variables for sensitivity testing, in order of priority:~~

- ~~• Local and systemwide housing growth~~
- ~~• Local and systemwide employment growth~~
- ~~• Local and systemwide income variations~~
- ~~• Travel demand model results with 4Ds equations “turned on” and then “turned off” to measure the effect of the 4Ds variables~~
- ~~• Changing transit frequencies~~
- ~~• Value of time~~
- ~~• Auto operating costs~~
- ~~• Gas prices~~

Model Improvements and Current Limitations

The travel demand and land use models in their current forms represent a significant achievement for the SBCAG region. However, these models are not without limitations, principally that 2001 California Household Travel Survey (CHTS) data (now 14 years old) was used throughout the travel model development. Reliance on this older data was initially due to the delay of the 2012 CHTS data and the adoption timeframe requirements of the previous RTP-SCS round. Unfortunately, the Santa Barbara region ultimately received only 435 samples from the 2012 CHTS, a number statistically insufficient to support model recalibration. In addition, whereas generous Proposition 84 funding was available to MPOs in the last RTP-SCS cycle to pay for model upgrades, SBCAG is not aware of any similar dedicated funding source to support such work in the current cycle. As a result, due to funding and data limitations, SBCAG is not proposing to recalibrate the travel demand model in advance of the 2017 RTP-SCS update.

The current UPlan land use model platform also is limited in its raster-based form and it is being updated by its original developers to a polygon-based spatial structure. However, upgrading SBCAG's current UPlan land use model to the new UPlan platform would be resource-intensive and would require significant dedicated funding, which is not presently available. Therefore, at this point SBCAG plans to continue to utilize the existing UPlan land use model running on the older platform.

Emissions Modeling

Using the ~~output~~ **outputs** from the regional travel demand model (e.g., vehicle miles traveled (VMT), trips, VMT by speed class), SBCAG staff will utilize the California Air Resources Board's 2014 Emission Factors (EMFAC) model and the ~~Pavley I/Low Carbon Fuel Standard post-processing tool~~ to estimate greenhouse gas emissions for the RTP and SCS. The greenhouse gas emissions will be represented as tons of carbon dioxide (CO₂) per day. The two emissions modeling components are described below in greater detail.

ARB's Emissions Factor (EMFAC) Model

Two basic quantities are required to calculate a given emissions estimate: an emission factor and an activity factor. In general, the emission factor is the amount of emissions generated by a certain amount of motor vehicle activity. A countywide on-road mobile source emission estimate is calculated by summing the product of the vehicle activity (VMT and trips) and the emissions factors contained in the EMFAC emissions model developed by ARB.

The EMFAC model generates an output of carbon dioxide (CO₂) emissions, which will be used as the overall indicator of greenhouse gas emissions, ~~per the recommendations of the Regional Targets Advisory Committee~~. In order to calculate the CO₂ emissions within EMFAC, VMT, vehicle trips, and VMT by speed class distributions will be extracted from the travel demand model for the baseline and each of the target years (2005, 2010, 2020, 2030, 2035 and ~~2035~~ 2040) and alternative transportation/land use scenarios within the future years. This extracted information will then be input into the EMFAC model. The CO₂ emissions associated with vehicle starts are accounted for in the EMFAC model based on the distribution of vehicle starts by vehicle classification, vehicle technology class, and operating mode. EMFAC adds these vehicle starts to the running emissions to compute total on-road mobile source emissions. Then the CO₂ emissions for the four vehicle classes that meet the passenger vehicle definition ~~as specified by the Regional Targets Advisory Committee~~ can be extracted from the EMFAC output and reported:

1. Light-duty autos (LDA)
2. Light-duty trucks (LDT1) (less than 3,750 lbs.)
3. Light-duty trucks (LDT2) (3,751-5,750 lbs.)
4. Medium-duty trucks (MDT) (5,751-8,500 lbs.)

Pavley/Low Carbon Fuel Standard (LCFS)

~~Two regulatory measures that will significantly reduce emissions directly from passenger vehicles are the Pavley standards and Low Carbon Fuel Standard (LCFS). A brief description of these measures and current regulatory status is provided below in Table 4.~~

Table 4

Description of Pavley and Low Carbon Fuel Standard Control Measures

State Control Measure	Description	Current Status
Pavley Phases I & II: GHG emission standards for light-duty vehicles	The Pavley standards seek to reduce GHG emissions from light-duty vehicles to the maximum extent technologically feasible. ARB is currently enforcing the Phase I standards for model years 2009 and up. The standards will be strengthened under Phase II starting in 2012.	ARB is working with U.S. EPA and the National Highway Traffic Safety Administration to propose new GHG standards for model year 2017-2025 passenger vehicles. Studies indicate that the new standards are technologically feasible and will save consumers money over the life of the vehicle because lower fuel use accompanies reductions of GHG. Technologies to achieve the new standards include engine and emission control advancements, wider application of advanced hybrid technology and greater use of stronger and lighter materials. ⁹
Low-carbon fuel standard	The LCFS requires fuel providers to reduce the carbon intensity of transportation fuels sold in the state, dramatically expanding the market for alternative fuels. The LCFS will reduce carbon content in all passenger vehicle fuels sold in California by at least 10% by 2020 and more thereafter.	The LCFS was implemented statewide in early 2010

The most recently updated version of EMFAC (EMFAC2011) now incorporates these standards, so a post-processing is no longer required to calculate their effect.

When SBCAG staff used a post-processing tool to analyze EMFAC2007 outputs during the regional target setting analysis in 2010, it found that the implementation of the Pavley and LCFS measures would provide significant reductions in greenhouse gas emissions in future years in Santa Barbara County. For the SCS and RTP, SBCAG will assume that the Pavley and LCFS are in place for the future years and will utilize the EMFAC2011 model to account for the effect of these standards.

The most recently adopted version of EMFAC is the EMFAC 2011-SG. This version was used to complete the emissions analysis for SBCAG's currently adopted 2040 Regional Transportation Plan-Sustainable Communities Strategy. SBCAG has tested the beta version of the newly released EMFAC2014 and will use the updated version for the 2017 Regional Transportation Plan-Sustainable Communities Strategy, assuming it officially replaces EMFAC 2011-SG..

Demonstrating Compliance with the Regional GHG Target

The critical analysis of the SCS will be to demonstrate compliance with the regional GHG targets set by CARB. SBCAG will incorporate a regional GHG targets analysis into the second phase of the public participation/outreach phase of the RTP/SCS process. Compliance with the regional GHG targets will be a key

⁹ ARB Fact Sheet: Facts About the Advanced Clean Cars Program, July 11, 2011, http://www.arb.ca.gov/msprog/zevprog/factsheets/advanced_clean_cars_eng.pdf

factor in determining the preferred transportation and land use alternative during this phase. If a transportation/land use scenario does not meet the regional GHG target, it would need to be adjusted or removed from consideration. Table 5 illustrates how the regional GHG target analysis will be completed.

Table 54

Regional GHG Target Analysis (Example Table)

Scenarios	Base Year CO ₂ per capita	2020 CO ₂ per capita	Base Year-2020 Delta / % Change	2035 CO ₂ per capita	Base Year-2035 Delta / % Change
Baseline					
No Build					
#3 (tbd)*					
#4					
#5					
#6					
#7					

*Other future scenarios to be determined from public workshops, ad hoc committee and SBCAG board of directors.

Note that the analysis will only include the years for which the regional targets are required (base year, 2020, and 2035). The RTP will include additional scenario years (2020, 2030, 2040) to comply with federal law. It should also be noted that the RTP will also include estimates of CO₂ per capita for each of the scenario years for the preferred alternative.