



CONNECTED 2050 REGIONAL TRANSPORTATION PLAN - SUSTAINABLE COMMUNITY STRATEGY TECHNICAL METHODOLOGY

NOVEMBER 2019

Introduction

This memorandum describes the general approach to estimating greenhouse gas emissions which the Santa Barbara County Association of Governments (SBCAG) will follow in its forthcoming 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 and will be submitted to the California Air Resources Board (CARB) for review. The memorandum also addresses the steps outlined in CARB's Draft Proposal for Updated Sustainable Communities Strategy Program & Evaluation Guidelines (March 2019) describing CARB's SCS review methodology and is intended to present an approach to SCS preparation that will 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 available tools and information. These tools and this information are still under development and this approach may therefore change as SBCAG staff refines its understanding.

Greenhouse Gas Emissions per Capita Targets

CARB set new greenhouse gas (GHG) emission reduction targets for regions statewide in October 2017. The SBCAG GHG emission reduction targets are shown in the table below.

SBCAG Region GHG Emissions Reductions per Capita Targets

2020	2035
-13%	-17%

RTP-SCS Analysis Years

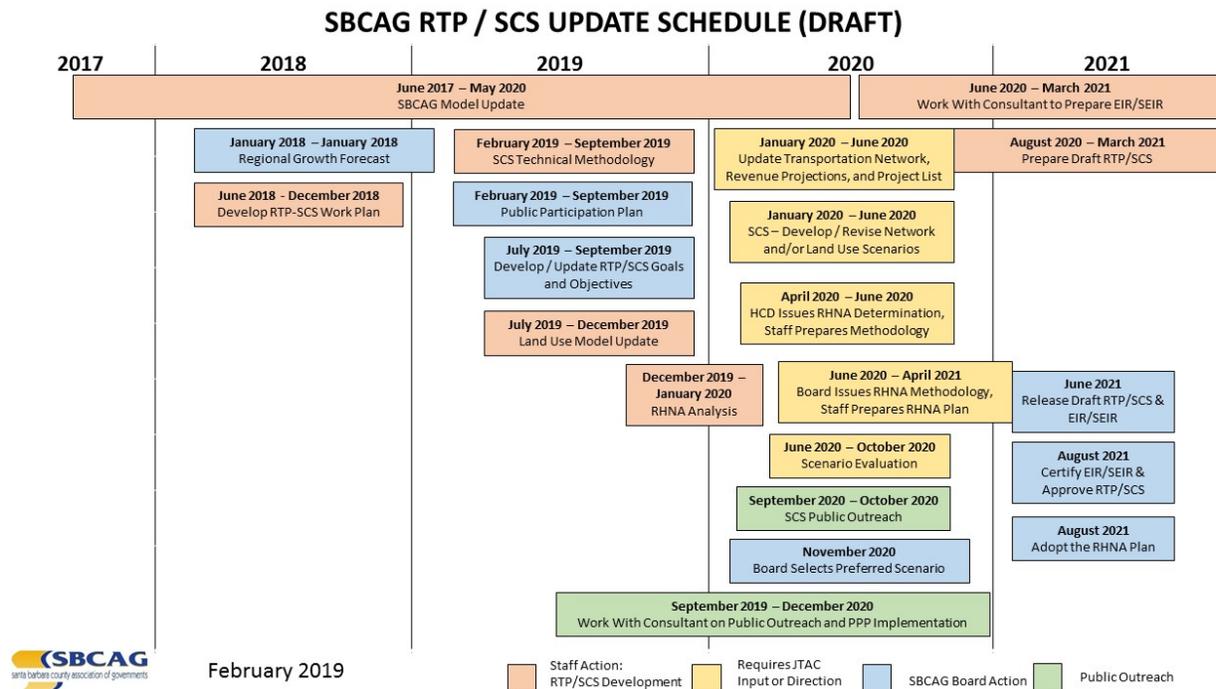
The following years will be included and modeled in the RTP-SCS.

SBCAG RTP-SCS Analysis Years

Year	Purpose
2005	Base Year for SB 375 GHG emission reduction target setting
2015	Base Year for RTP/SCS
2020	SB 375 GHG Emission Reduction Target
2030	RTP/SCS Interim Forecast Year
2035	SB 375 GHG Emission Reduction Target
2050	RTP/SCS Horizon Year

Schedule

The schedule for the RTP-SCS, including estimates for the public outreach process, is shown below.



Changes to the Local & Regional Planning Contexts

Some notable changes have occurred since the RTP-SCS was adopted in the summer of 2017. Most notably, increased gas tax revenues from the state are coming in to SBCAG and staff are looking to apply for some of the competitive grants under the Senate Bill 1 programs (such as the Congested Corridors Program). SB1 formula funds have enabled SBCAG to begin implementing a more robust Geographic Information Systems (GIS) program, prepare a vulnerability assessment and adaptation study to determine the potential for climate change effects on the regional transportation network, develop a bicycle plan and traffic and circulation study for the Santa Ynez Valley, and prepare a California Coastal Trail Study in the North County. Local jurisdictions have also implemented policies that will result in reduced GHG emissions, such as the implementation of Accessory Dwelling Unit (ADU) Ordinances and updated CEQA thresholds for transportation. Some of these changes are discussed in additional detail in the next section.

Overview of Existing Conditions

Senate Bill 1 (SB1) Funding

Senate Bill 1, the Road Repair and Accountability Act of 2017, was signed into law on April 28, 2017. This legislative package invests \$54 billion over the next decade to fix roads, freeways and bridges in communities across California and puts more dollars toward transit and safety.

These funds will be split equally between state and local investments. There are a variety of SB1 funding programs that will supplement programs and projects to increase transportation funding in the region, as shown in the table below.

SB1 Funding Programs

Program	SB County SB1 Funds Invested (May 2019)
Local Partnership	\$3.9 million
Local Streets and Roads	n/a
Solutions for Congested Corridors (US 101 Multi-Modal Corridor Project)	\$132.8 million
Trade Corridor Enhancement Program (US 101 Multi-Modal Corridor Project)	\$51 million
State Highway Projects	\$404.7 million
Extra funding for Active Transportation Program	\$28.2 million
State Rail Assistance*	\$2.3 million
State of Good Repair	\$748,900
Extra Funding for Transit and Intercity Rail Capital Program*	\$211 million
Extra Funding for State Transit Assistance	\$1.1 million
*Includes LOSSAN projects in the Pacific Surfliner corridor.	

A listing of where the SB1 funds have been programmed in the region is available on the Rebuilding California webpage [here](#).

Other Key Issues in Region

Housing

SBCAG's SCS, initially adopted in August 2013 and re-affirmed in the Fast Forward 2040 Plan in 2017, aims to shorten trip distances and reduce vehicle miles-traveled by (1) directly addressing regional jobs/housing imbalance by providing more housing on the jobs-rich South Coast and more jobs in bedroom communities in the North County, and (2) promoting more trips, both local and inter-city, by alternative transportation modes, especially public transit.

The issue surrounding the lack of affordable housing, particularly on the South Coast, influenced the development of the SCS and will likely continue to influence the development of the SCS moving forward in the next cycle. SBCAG's local jurisdictions have been working on local ordinances to encourage opportunities for new housing:

- Accessory Dwelling Unit (ADU) Ordinances – Most local jurisdictions in the region have adopted ADU ordinances, which allow for an addition of an accessory dwelling unit on single family lots, thereby increasing the potential for housing opportunities in areas that have typically been associated with lower densities.
- City of Santa Barbara Average Unit Density (AUD) Program – The aim of Santa Barbara's AUD Program is to support the construction of smaller, more affordable residential units near transit and within easy walking and biking distance to commercial services and parks. Increased densities and development standard incentives are

allowed in most multi-family and commercial zones of the City to promote additional housing. Rental, employer-sponsored, and limited equity housing cooperative units that provide housing opportunities to the City's workforce are especially encouraged. The program has an initial duration of eight years or until 250 units have been constructed in the High Density or Priority Housing Overlay areas, whichever occur first. As of October 2, 2019, 155 units had been completed within the High Density or Priority Housing Overlay areas.¹

Development of Updated CEQA Thresholds

The California Environmental Quality Act (CEQA) was recently amended to re-define the nature of environmental impacts from and relative to transportation. CEQA no longer defines "automobile delay" as an impact and mandates that local jurisdictions determine another metric, by June 2020. The Office of Planning and Research is strongly recommending the use of a VMT or VMT per capita metric for project-level analysis. The quantitative determination of VMT and thresholds for new development has the potential to determine a significant amount of positive benefits, such as reduced VMT or mitigation measures in the form of alternative transportation improvements.

Emerging Technologies

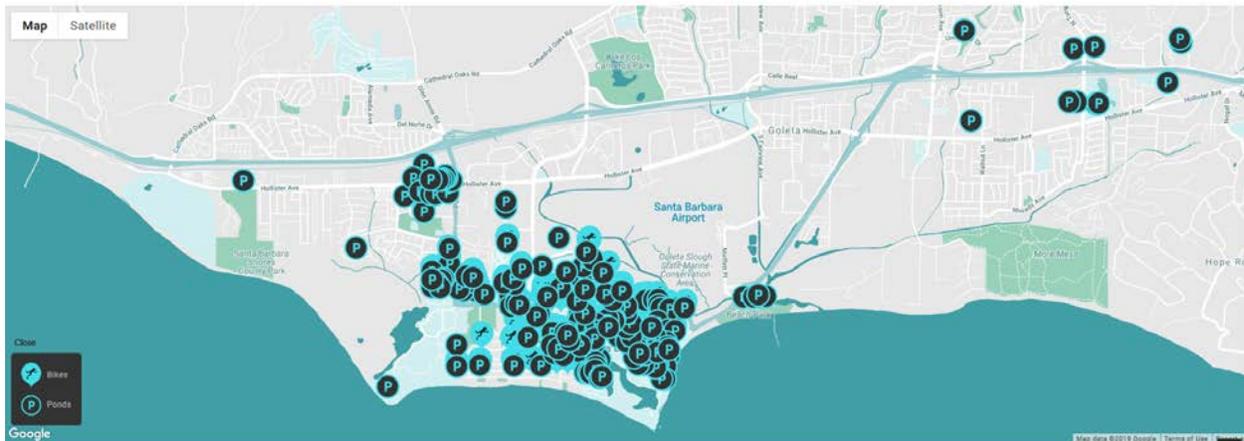
Shared mobility has been an emerging technology in the region. A bikeshare program is available in the unincorporated Isla Vista community, which is adjacent to the University of California Santa Barbara (UCSB). The County has contracted with HOPR to run the program in the unincorporated area. HOPR allows subscribers to utilize an app and reserve bikes in advance and find bikes utilizing a map within the app.

The City of Santa Barbara also approved a Shared Mobility Ordinance in May 2019 that allows for the development of a bikeshare program within the City limits.

Transportation network companies, such as Uber and Lyft, operate within the region and can be prominently seen in the downtown Santa Barbara area during peak hours. Utilization data specific for the TNCs specific to the Santa Barbara region is currently unavailable.

¹ https://www.santabarbaraca.gov/services/planning/aud_program.asp

UCSB Bikeshare Program – HOPR Screenshot



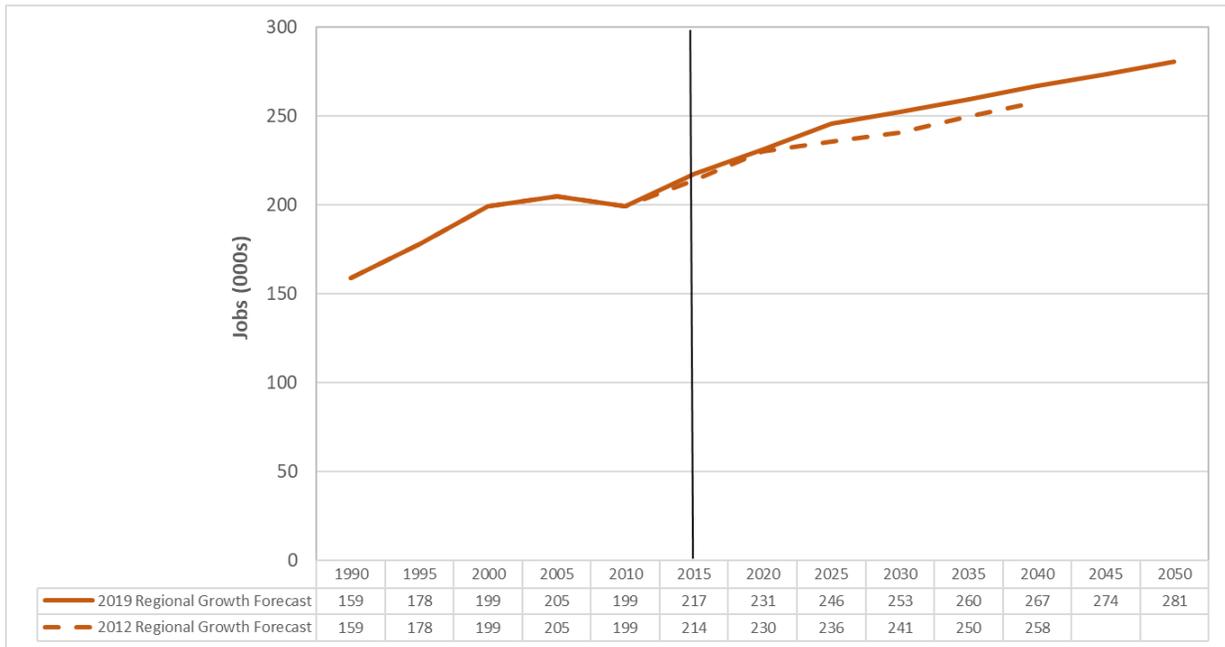
Population and Employment Growth Forecasts

Regional Growth Forecast

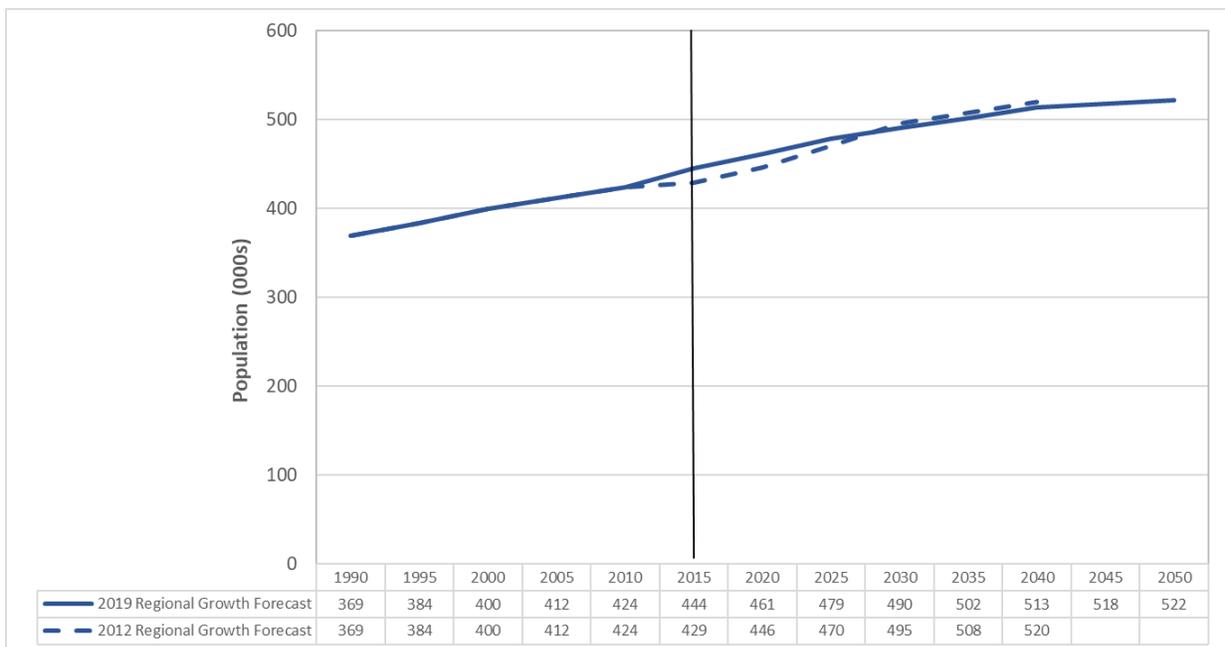
The SBCAG Board of Directors adopted updated growth projections for the region in January 2019. Comparison charts illustrating the changes relative to the assumptions used in the last RTP-SCS (RGF 2012) are shown below. The following conclusions were drawn when comparing the latest forecast (RGF 2019) to the RGF 2012:

- Due to a stronger job forecast in the short-term vs. a weaker job forecast in the long-term, the RGF 2019 is lower in the long-term and higher in the short-term than the RGF 2012.
- The population forecast is closely tied to projected job growth and closely trends in line with the job growth assumptions. The average five-year growth rate is less than 1%.
- The countywide household forecast is determined by applying household formation rates to the forecasted population. The average five-year growth rate fluctuates between 2-5% per year between 2020 and 2050.

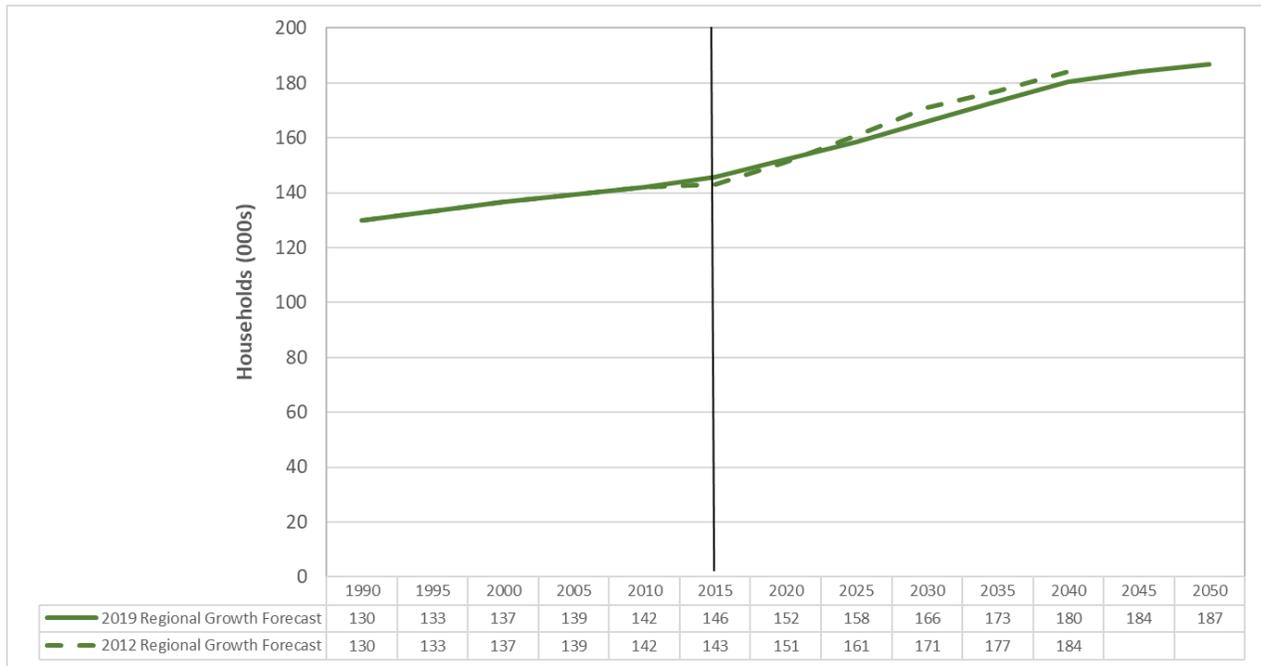
Jobs Forecast Comparison



Population Forecast Comparison



Household Forecast Comparison



RGF & the Land Use Model

SBCAG staff will be working with the UPlan Land Use Model to project future alternative land use patterns and scenarios. UPlan also allows for the input of theoretical maximum residential capacity available based on generalized UPlan land use categories. Additional information on the UPlan land use model is contained in the *UPlan Land Use Model* section below.

The land uses and capacities were reviewed by local planning staff during the last RTP-SCS cycle. The capacities may not necessarily reflect actual available capacity in adopted local General Plans. Adopted General Plans, not the RTP-SCS, determine allowable land uses and actual available land use capacity in each jurisdiction. The table below shows the residential land use capacities (by jurisdiction) assumed in the current land use model (Fast Forward 2040) along with the household demand forecast from the RGF 2019. SBCAG will be working to update the land use capacities in the UPlan model during the RTP-SCS cycle in the next fiscal year.

Land Use Capacity and Household Demand Comparison

Jurisdiction	UPlan Land Use Capacity	RGF 2017-2050	Total UPlan Land Use Capacity minus RGF
	Total Units	Total Household Demand	Remaining Units
Carpinteria	410	800	(390)
Santa Barbara	14,953	5,760	9,193
Goleta	6,611	2,050	4,561
Solvang	1,363	410	953
Buellton	1,322	680	642
Lompoc	6,199	4,470	1,729
Santa Maria	16,500	15,310	1,190
Guadalupe	1,014	800	214
Unincorporated Total	13,932	7,800	6,132
County Total	62,302	38,080	24,222

Source: Regional Growth Forecast, SBCAG, January 2019

RTP-SCS Strategies & Methodologies

The transportation and land use strategies in the RTP-SCS will be quantified almost entirely within the land use model and regional travel demand model. If necessary, SBCAG may rely on off-model quantification for some strategies. The RTP-SCS strategies that will be incorporated into the Plan are shown in the table below.

SBCAG RTP-SCS Strategies and Quantification Approaches

RTP-SCS Strategy	Quantification Approach
Selectively increase residential and commercial land use capacity within existing transit corridors	Land use model / Activity-based model
New transit capital projects	Activity-based model
Bike and pedestrian infrastructure	Activity-based model
Bike share programs	Off-model (if necessary)
Additional infrastructure for electric vehicle charging	Off-model (if necessary)

Land Use & Travel Model

UPlan Land Use Model

UPlan is an application that was developed at the Information Center for the Environment (University of California at Davis) which allows users to project future land use patterns. Users can also overlay environmental data with the urban footprint to identify potential conflicts. UPlan was designed for use in California and has been widely applied in land use and environmental planning.

In the previous two RTP-SCS cycles, SBCAG worked closely with its stakeholders to support UPlan as a tool for incorporating land use and smart growth into the travel forecasting process. For the inception of the SCS (August 2013) UPlan was utilized for both the allocation of the

Regional Growth Forecast and as the testbed of alternative land use scenarios. SBCAG staff will utilize a similar approach for this cycle, utilizing an updated version of UPlan (version 4). SBCAG staff will work with its consultant and the Joint Technical Advisory Committee (JTAC) to update the land use model parameters for the base year and future years for the RTP-SCS. For reference, the UPlan model parameters from the previous RTP-SCS cycle are attached.

Travel-Demand Model

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 4-step travel demand model that performs the following classical modeling steps: trip generation, trip distribution, mode choice, and assignment. The mode choice model is a 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. 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 Runs for RTP-SCS

SBCAG will be working closely with the model consultant, Caliper Corporation, to develop base year 2015 traffic estimates for the region in the 4-step model and to calibrate accordingly. Future model runs will be developed for analysis years 2020, 2030, 2035, and 2050 under a variety of different scenarios, to be determined under the public outreach phase.

New/Updated Features

Since the fall of 2017, SBCAG has been working with its MPO partners at SLOCOG and AMBAG, along with a consultant (Caliper Corporation) on the development of a Central Coast activity-based model (CCABM). The model is a work in progress at this time and will not be available for use for this cycle RTP-SCS. However, Caliper has agreed to export some parameters and functions of the CCABM for use in the SBCAG regional travel demand model update for the Connected 2050 RTP-SCS. These parameters are described below.

Expanded Traffic Analysis Zones

The updated SBCAG regional travel demand model (RTDM) will feature modified TAZs. Some TAZ boundaries and the total number of TAZs has increased slightly.

Population Synthesis

Caliper will export the ABM's enhanced population synthesis procedure and create a "hybrid" procedure that matches both households and individual characteristics and does so at multiple geographic levels. The data sets in the hybrid population synthesis module include:

- 2012-2016 Census ACS Block Groups
 - Population by age, gender
 - HHs by income, size, vehicles
- 2010 Census Blocks
 - Population, HHs
- 2012-2016 PUMS Micro sample
 - Seed HHs, population
- Database USA
 - Population and HHs

WHAT IS POPULATION SYNTHESIS?

Population synthesis uses simulation techniques to enumerate the entire residential population of a region, along with critical individual details such as age, gender, worker status, etc. It also groups individuals into households with their own characteristics of structure such as number of children, adults, workers, and income.

Updated Truck & Visitor Models

Caliper is currently evaluating an incorporation of the data from the statewide freight model for the Central Coast ABM. Given that the Central Coast is a major tourist hub, a separate visitor model has been developed. For the SBCAG region specifically, Caliper will integrate the existing visitor model from the 4-step regional model and update accordingly, using survey data from local visitors bureaus and chambers of commerce. The work that is being done on these models for the CCABM can be exported into the SBCAG RTDM.

Sensitivity Tests

Once the SBCAG RTDM is complete, sensitivity tests will be performed. SBCAG staff will work closely with the consultant and CARB staff to ensure that collaboration occurs early, if necessary. The consultant has indicated that region-wide and project-level tests will be performed. The table below shows some potential sensitivity tests that can be run for the SBCAG RTDM.

Potential SBCAG RTDM Sensitivity Tests

Category	Sensitivity Test	Model Input(s)	Scenario(s)	Output(s)
Land Use	Proximity to Transit	HHs within ¼ mile of transit stop	Increase 25, 50% Decrease 25, 50%	Vehicle trips by purpose Mode share Transit ridership VMT
	Job/Housing Balance	Number of jobs and housing units at the sub-regional level	Consultation with CARB staff	Vehicle trips by purpose Mode share Transit ridership VMT Peak hour VMT HBW trip length/ travel time
Transit and Active Transportation	Transit Frequency	Transit service headway	Increase 25, 50% Decrease 25, 50%	Vehicle trips by purpose Mode share Transit ridership VMT
	Transit Operation: Expansion, Extension, and/ or New Service	Transit operation miles	Increase 25, 50% Decrease 25, 50%	Vehicle trips by purpose Mode share Transit ridership VMT
	Active Transportation Facility	Walk/bike lane miles	Increase 25, 50% Decrease 25, 50%	Vehicle trips by purpose Mode share Transit ridership VMT
	Bike Share Facility	Mode share of bike trips	Increase 25, 50% Decrease 25, 50%	Vehicle trips by purpose Mode share Transit ridership VMT
New Mobility	Carpooling/ Ride-hailing/ TNC	Number of trips by carpool	Increase 25, 50% Decrease 25, 50%	Vehicle trips by mode Mode share VMT
Exogenous Variable	Auto Operating Cost	Auto Operating Cost	Increase 25, 50% Decrease 25, 50%	Vehicle trips by mode Mode share VMT

Induced Demand

As discussed above, the consultant will be conducting a variety of sensitivity tests in support of the SCS Evaluation Process. The SBCAG RTDM will also be tested to determine if it is sensitive to short- and long-term induced travel effects by adding and removing highway capacity.

Inter-Regional and External Travel

Assumptions regarding inter-regional and external travel will occur within the SBCAG RTDM. In the past two cycles, SBCAG utilized the “50/50” method for calculating inter-regional VMT, consulting with SLOCOG and SCAG to determine their inter-regional VMT and utilizing the 50% method. During the consultation process with CARB after the last RTP-SCS cycle was complete, SBCAG and CARB agreed that utilizing this methodology was no longer necessary and that the inter-regional travel estimates could be calculated within the travel demand model.

Emissions Modeling

Using the 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 to estimate greenhouse gas emissions for the RTP-SCS Plan. 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. In order to calculate the CO₂ emissions within EMFAC, VMT and VMT by speed class distributions will be extracted from the travel demand model for the baseline (2015) and each of the target years (2005, 2020, and, 2035) along with the other non-target scenario years (2030 and 2050) 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 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.)

The most recently adopted version of EMFAC is EMFAC 2017. However, in order to maintain compatibility with the previous plan and emission results, SBCAG is proposing to continue to utilize the same emissions model that was used in the prior RTP-SCS (Fast Forward 2040).

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 its public participation/outreach phase of the RTP/SCS process. Compliance with the regional GHG targets will be a key 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.

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 (2030, 2050) 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.