



# BUTTE COUNTY ASSOCIATION OF GOVERNMENTS

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August 30, 2011

Ms. Mary Nichols  
Chair  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95812

**Re: Butte County Association of Governments (BCAG) Sustainable  
Communities Strategy Technical Methodology**

Dear Ms. Nichols:

The purpose of this letter is to present BCAG's "technical methodology" to be used in the development of the 2012 Regional Transportation Plan / Sustainable Communities Strategy.

As required by the Sustainable Communities and Climate Protection Act of 2008, BCAG has prepared the attached document describing the technical methodology it intends to use for the purpose of estimating greenhouse gas emissions from its 2012 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS) and, if appropriate, an Alternative Planning Strategy (ACS)

As you may be aware, BCAG is currently in the process of developing and enhancing its regional models, which are expected to be completed later this year. Therefore, we anticipate the methodology contained in this document to evolve as these improvements are completed.

We look forward to working with ARB in order to insure that the methods presented will yield accurate measures of greenhouse gas emissions.

If you have any questions about the BCAG Technical Methodology, please feel free to contact myself or Brian Lasagna of my staff at (530) 879-2468.

Sincerely,

Jon Clark,  
Executive Director

Cc: Lucille Van Ommering, California Air Resources Board  
Jennifer Gray, California Air Resources Board

Enclosure

**Butte County Association of Governments  
2012 Regional Transportation Plan  
Sustainable Communities Strategy**

***Technical Methodology for Estimating  
Greenhouse Gas Emissions***



*The work upon which this publication is based was funded in whole or in part through a grant awarded by the Strategic Growth Council*

## **Purpose**

As required by the Sustainable Communities and Climate Protection Act of 2008, BCAG has prepared this document describing the technical methodology it intends to use for the purpose of estimating greenhouse gas emissions from its 2012 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS) and, if appropriate, its Alternative Planning Strategy (ACS). The report will be reviewed by the California Air Resources Board (ARB) in order to insure that these methods will yield accurate measures of greenhouse gas emissions.

It is important to note that the methodology contained in this document is expected to evolve as BCAG completes improvements to its travel modeling.

## **SB 375 Background**

In September 2008, Senate Bill 375 (SB 375), also known as the Sustainable Communities and Climate Protection Act of 2008, was enacted by the state of California. SB 375 prompts regions to reduce greenhouse gas (GHG) emissions from passenger vehicles through the coordinated planning of long range transportation plans. The new legislation requires all Metropolitan Planning Organizations (MPO) in California to develop a Sustainable Communities Strategy, which meets regional passenger vehicle GHG emissions targets, as an additional element of their regional transportation plans. BCAG's next scheduled RTP/SCS update is to be completed by December 2012.

As described in SB 375, the SCS will be an integrated transportation and land use plan which is intended to meet the regional GHG target for the years 2020 and 2035 while also accommodating the region's forecasted growth. If the SCS is unable to meet the regional GHG target within the required state and federal constraints for RTP development, then an Alternative Planning Strategy (APS) must be prepared. The APS will identify how GHG targets would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

In February 2011, ARB approved regional passenger vehicle GHG targets for all of California's 18 MPOs, including the Butte County Association of Governments (BCAG). The Butte County region's targets for the years 2020 and 2035, for this first round of the RTP/SCS development, are to maintain 2006 emission levels for the year 2020 (0% reduction) and to achieve a 1% reduction from 2006 levels for the year 2035. The metric used for preparing the reductions will be GHG emissions per capita.

## **Model Development**

BCAG was awarded both a Caltrans 5304 Planning Grant and Strategic Growth Council Model Improvement Plan Grant for the purpose of enhancing BCAG's regional modeling capabilities to assist in preparing and quantifying the region's 2012 RTP/SCS. The anticipated enhancements from each of these grants are included in the descriptions for

each model within the section below. The improvements from these grants are scheduled to be fully implemented by December 2011.

### **Modeling the 2012 RTP/SCS**

BCAG anticipates using 3 models to prepare the 2012 RTP/SCS and estimate the GHG emissions: (1) BCAG Regional Land Use Allocation Model, (2) BCAG Regional Travel Demand Model (a three-step transportation forecasting model), and (3) the latest emission factors (EMFAC) model from ARB.

#### **Land Use Allocation Model**

The BCAG Land Use Allocation Model is currently being developed by a team of project consultants from the University of California Davis – Information Center for the Environment (ICE), California State University, Chico – Geographical Information Center (GIC), and Fehr & Peers. The model is being developed utilizing the UPlan software platform, which has been implemented broadly across the state for various Blueprint planning efforts. UPlan is a rule based model which allocates future residential and employment growth while considering the region's existing land use plans, growth forecasts, and development attractions (e.g. transportation and infrastructure) and discouragements (e.g. resource areas, farmland, and floodplains).

The land use allocation model is currently being developed using the base year of 2010, to coincide with the latest available validated travel model and existing land use datasets. Land use scenarios will be developed for the GHG target years of 2020 and 2035. Once the scenarios are completed, the model outputs will be summarized by traffic analysis zone (TAZ) and used as inputs for the regional travel demand model.

#### **Travel Demand Model**

The BCAG Travel Demand Model uses the TransCAD software package to forecast travel activity. The transportation model requires two major inputs. The first input is the forecasted allocation of housing and non-residential land uses from the land use allocation model. The other input is the regional road network. Inputs are prepared for the emissions analysis year of 2006, the model base year (2010), and the GHG target years of 2020 and 2035.

The first version of this model was developed in 2007 and validated to the 2006 base year. The model is a three step travel demand forecasting model consisting of Trip Generation, Trip Distribution, and Trip Assignment. Currently, the model is undergoing an update which includes the following components.

- Validating the base year to 2010 consistent with the 2010 California Regional Transportation Guidelines
- Increasing sensitivities for age of head of household, number of workers, income household size, and cost of travel.

- Adding multiple time periods (daily, AM peak period, AM peak hour, PM peak period, PM peak hour, mid-day period, and evening period conditions)
- Implementing the 4D's (density, diversity, design, and destination accessibility)
- Adding a new transit forecasting component.

These new updates will be used in preparing and quantifying the 2012 RTP/SCS.

The travel model will output vehicle trips (VT), vehicle miles traveled (VMT), vehicle hours of travel (VHT), delay, and congestion, for both on and off peak travel periods and for various trip end types (e.g. II, XX, and IX-XI) for the base and GHG target years (2020 and 2035). A post-processor is then used to prepare the data for the vehicle emissions model (EMFAC). The post-processor divides the VMT into 13 separate speed bins set at 5 mile per hour intervals.

### EMFAC

ARB's latest emissions factor model (EMFAC) will be used to calculate the greenhouse gas, carbon dioxide (CO<sub>2</sub>), emissions output based on the provided VMT and speed bin classification from the travel model and post-processor. BCAG will utilize the annual option for CO<sub>2</sub> output as suggested by the RTAC report, unless ARB determines otherwise.

Once all trips are ran in EMFAC, BCAG will extract the total VMT and carbon dioxide (CO<sub>2</sub>) emissions for LDA, LDT1, LDT2, and MDV vehicle types. This ensures that only passenger vehicle (cars and light trucks) types are included in the emissions analysis.

In 2010, ARB released the Pavley 1 + LCFS post processor for EMFAC. The post processor reads the final outputs from the latest EMFAC model and applies the greenhouse gas emission benefits from the ARB adopted Pavley clean-car standards and Low Carbon Fuel Standards that reduce the carbon intensity of vehicle fuel. If determined appropriate by ARB, BCAG will utilize the post processor when preparing the emissions analysis.

### **Modeling Interregional Trips**

For the purpose of preparing the GHG emissions analysis for 2012 RTP/SCS, BCAG will subtract all emissions from through trips (X-X trips) and include 50% for trips that are shared (I-X, X-I trips) with neighboring jurisdictions, including the Sacramento Area Association of Governments (SACOG), BCAG's only neighboring Metropolitan Planning Organization (MPO). The percentage of VMT by interregional trip type (X-X, X-I, and I-X) will be calculated for the years 2006, 2020, and 2035. The EMFAC emissions will then be adjusted based on the percentages for interregional travel. This methodology is consistent with the recommendations of the Regional Targets Advisory Committee (RTAC).

## **GHG Emissions in the 2012 RTP/SCS**

As prescribed by the final ARB-RTAC report, BCAG staff will quantify the outputs from the modeling methods described in this document using the target metric in terms of a percent reduction in per capita greenhouse gas emissions (CO<sub>2</sub>) from base year levels. The baseline year for the BCAG GHG forecasts will be 2006, the closest available modeling year to the 2005 year included in the ARB-RTAC report.

Once the modeling updates are completed and the 2012 RTP/SCS is being developed, BCAG will work with the appropriate federal and state agencies to ensure its RTP/SCS conforms to all applicable state and federal regulations.