



September 11, 2012

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

Re: Fresno Council of Governments (Fresno COG) Sustainable Communities Strategy Technical Methodology

Dear Ms. Nichols,

Please find enclosed a summary of the technical methodology that the Fresno COG intends to use to estimate greenhouse gas emission reduction in the development of its Sustainable Communities Strategy and, if appropriate, its Alternative Planning Strategy, in the 2014 Regional Transportation Plan, as required by Senate Bill 375 (SB 375).

Fresno COG and the other COGs in the San Joaquin Valley have a long history of working together on various issues such as conformity, goods movement, model improvement, etc. The 2014 RTP and its Sustainable Communities Strategy will build on the success of such valley-wide coordination, and will include robust scenario planning, enhanced environmental justice analysis, expanded public outreach, and comprehensive technical analysis as described in the attached document.

While the ARB Board is still yet to consider the Valley's target recommendations, Fresno COG plans to strive to develop a sustainable communities strategy that will meet the ambitious and achievable targets that will be recommended by the Valley MPOs and approved by the ARB Board.

Should you have any questions about Fresno COG's Technical Methodology, please feel to contact me or Kristine Cai of my staff at (559) 233-4148.

Sincerely,

Tony Boren
Executive Director

Enclosure

- City of Clovis
- City of Coalinga
- City of Firebaugh
- City of Fowler
- City of Fresno
- City of Huron
- City of Kerman
- City of Kingsburg
- City of Mendota
- City of Orange Cove
- City of Parlier
- City of Reedley
- City of San Joaquin
- City of Sanger
- City of Selma
- County of Fresno



Planning Process

Fresno's 2014 RTP update is scheduled to be adopted in October 2013. Public outreach will be conducted to solicit comments and input for performance indicators, alternative scenarios, and policy goals and objectives. All the public outreach efforts will be guided by the 2014 Fresno COG Regional Transportation Plan Public Outreach Strategy. Performance indicators will be prioritized through a series of focus group meetings in September 2012; plan alternatives are scheduled to be developed by January 2013, followed by adoption of a draft SCS in spring of 2013. Draft EIR and its analysis will be completed in early summer of 2013. The EIR analysis will include the preferred draft SCS, and several other alternatives.

Growth Forecast

The growth forecast for Fresno County that the Fresno Council of Governments will use for target-setting and its RTP/SCS, was prepared by The Planning Center, an economic/planning consulting firm, in February 2012. This forecast was part of a San Joaquin Valley demographic study commissioned by the eight metropolitan planning organizations (MPOs) of the valley, in an effort to obtain recently-prepared projections. The latest State of California Department of Finance (DOF) projection at the time was released in July 2007 and did not take into account the 2007-2008 recession and the subsequent slow economic recovery which prompted the need for preparation of The Planning Center forecast.

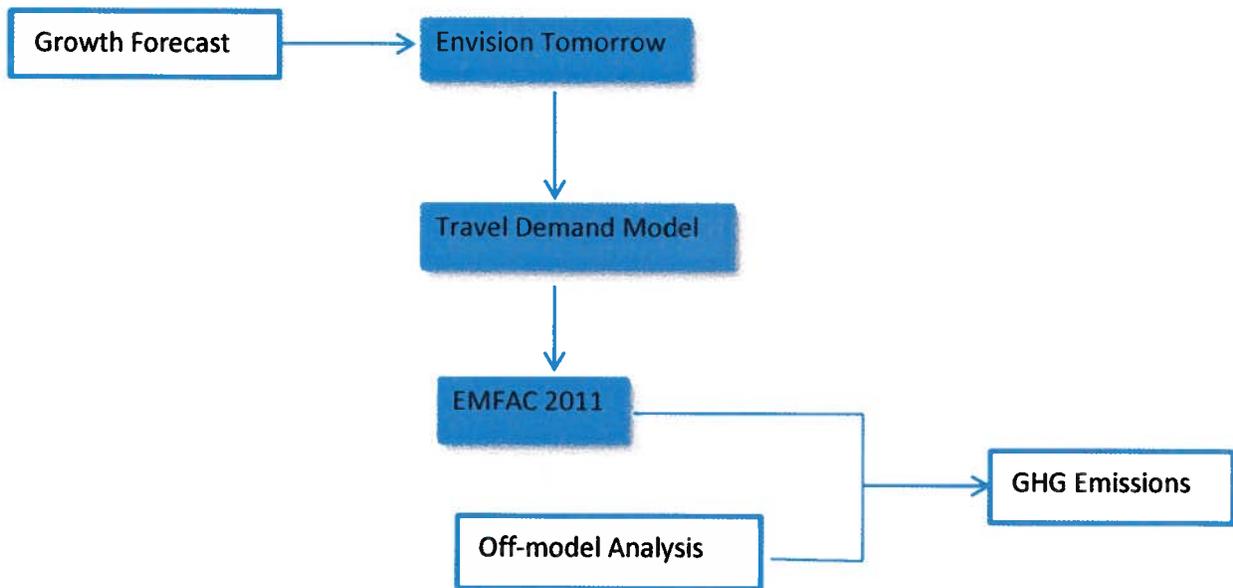
After the release of The Planning Center forecast, the DOF published an interim projection for Fresno County in May 2012, which differed from The Planning Center forecasts by less than one percent for every year between now and the forecast horizon year of 2050 which helped confirm the validity of The Planning Center work.

The Planning Center study includes three primary forecasts of population, households and housing units. Other projections developed by The Planning Center, e.g., age distribution, average household size, household income, household type, race/ethnicity, are derived from the three primary forecasts. The Planning Center forecasts are based on several different projections including household trend, total housing unit trend, housing construction trend, employment trend, cohort-component model, population trend, average household size trend, and household income trend. The least-squares linear curve forms the basis for all projections because the forecasts are long-term and curve-fitting techniques (e.g., parabolic curve, logistic curve) do not provide reasonable long-term results. Three measures evaluate the adequacy of each projection: mean absolute percentage error (MAPE), F-test, and t-test.

The Planning Center forecasts were prepared to the year 2050, so there is no need for extrapolation by the Fresno COG staff. These forecasts will be formally adopted by the Fresno Council of Governments Policy Board.

Modeling for 2014 RTP/SCS

Fresno COG will use Envision Tomorrow, a land use scenario planning tool, our 4-step travel demand model, and EMFAC2011 to complete the analysis of greenhouse gas emission effects for the 2014 RTP/SCS. Here is a diagram illustrating the relationship between these tools:



The analysis years for the GHG will be 2005, 2020, and 2035. The Horizon year of the 2014 RTP will be 2040. 2005 data will be interpolated from our existing base year 2008.

Envision Tomorrow – Land Use Scenario Planning Tool

Fresno COG will use Envision Tomorrow, a land use scenario planning tool, to develop and refine land use scenarios in the SCS development process.

Envision Tomorrow is a suite of planning tools that test different land use and transportation options at a range of scales. It consists of two primary tools: Prototype Builder and Scenario Builder.

The Prototype Builder is a return on investment (ROI) spreadsheet tool that can be used to model buildings and test the physical and financial feasibility of development. This tool allows the user to examine land use regulations in relation to the current development market and consider the impact of parking, height requirement, construction cost, rents and subsidies. The Prototype Builder tool takes inputs such as building physical characteristics, parking layout and costs, and other development costs such as construction, site acquisition, etc. Stakeholder inputs are also incorporated when building types and development types are created so that the modeled development fits the reality as well as the aspiration of the community.

The Scenario Builder is a GIS based application that lets the user “paint the landscape” by allocating different development types across the study area to create unique land use scenarios. The tool then allows real-time evaluation of each scenario through a set of user-defined indicators. The indicators measure such things as the scenario’s impact on land use, housing, sustainability, transportation and economic conditions. General plans, specific plans, community plans, zoning maps, Assessor’s parcel data information, and environmental constraints if any are all inputs into the Scenario Builder tool. The growth forecast is allocated to locations as desired in this tool. The output from the Scenario Builder is then aggregated to TAZ level, and appropriate translation is conducted between the social economic categories in this tool and the traffic model.

Travel Demand Model

Fresno COG recently updated its 4-step transportation model to respond directly to the requirements of SB 375 and the California Transportation Commission (CTC) Modeling Guidelines.

The San Joaquin Valley Model Improvement Project (SJV MIP), funded by a grant of \$2.5 million from Proposition 84, included improvements to all the valley models with a move toward standardization on model inputs and processes. Standardization enhances the ability of MPOs to share data and resources. The model improvements included improving the models sensitivity to smart growth strategies, the integration of the 4-D elasticity process into each model, and improvement of interregional travel estimates.

Fresno model improvements that respond directly to the requirements of SB 375 and CTC requirements include but are not limited to:

- Sensitivity to land use and demographic characteristics that influence travel behavior improved.
- Traffic Analysis Zones (TAZs) added, detailed and improved in areas identified for potential higher density, mixed-use or transit oriented development.

- Land use and transportation system refinements in transit oriented developments, central business districts, and mixed-use developments improved.
- Added a vehicle ownership model to replace fixed vehicle ownership splits
- Added trip purposes for school and trucks.
- Sensitivity to travel modes improved (person trips, auto availability, mode choice/mode split, and transit assignment).
- Added auto operations pricing (fuel, maintenance, parking, toll, transit fare).
- Sensitivity to congestion improved through time of day refinements, influence on auto availability and distribution.
- Air Quality/Greenhouse Gas sensitivity to speed, trucks and interregional travel improved.
- Validation included both formal static and dynamic tests.
- Standardized processes (data, parameters, documentation/graphics/reports and other processes).
- Feedback loop improved
- Transit assignment has been updated to the new Voyager PT module.
- Master Network updated and improved.
- The 4-D elasticity process integrated into the model
- Improvement made to interregional travel estimates.

These improvements to the Fresno COG model have resulted in a much improved modeling process that is significantly more sensitive to smart growth development.

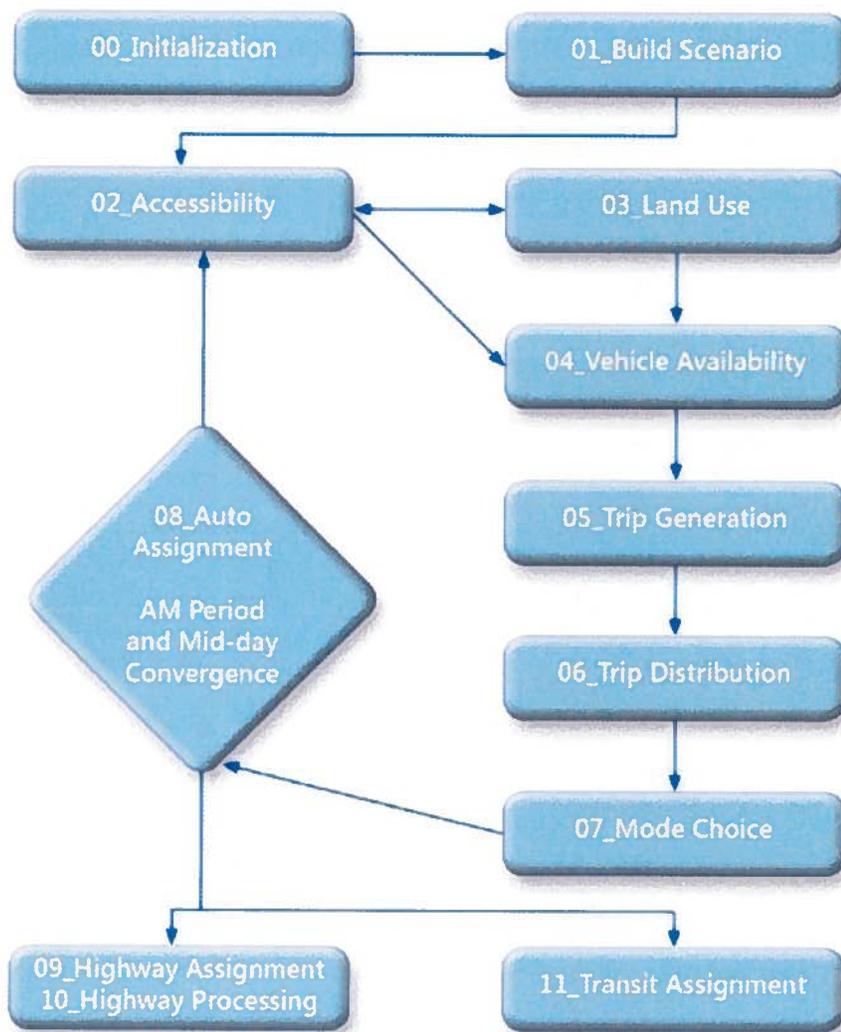
Forecasting Process

Specifically the Fresno COG forecasting process consists of four sub-models:

1. **Trip Generation.** This initial step calculates person or truck trip ends using trip generation rates established during model calibration, cross-classified residential data, employment, and student enrolment. This step also uses the demographics to determine the household passenger vehicle availability.
2. **Trip Distribution.** The second general step estimates how many trips travel from one zone to any other zone. The distribution is based on the number of trip ends generated in each of the two zones, and on factors that relate the likelihood of travel between any two zones to the travel time between the two zones such as distance, cost, time, and varies by accessibility to passenger vehicles, transit, and walking or biking.

3. **Mode Choice.** This step uses demographics and the comparison of distance, time, cost, and access between modes to estimate the proportions of the total person trips using drive-alone or shared-ride passenger auto, transit, walk or bike modes for travel between each pair of zones.
4. **Trip Assignment.** In this final step, vehicle trips or transit trips from one zone to another are assigned to specific travel routes between the zones. Congested travel information is used to influence each of the steps described above starting with vehicle availability.

A flow chart of the travel model process is shown below.



Much of the new model structure is interactive and dynamic. The accessibility, vehicle availability, transportation system (highway, transit, walk or bike networks), pricing, and socio-economic factors are used in multiple components of the model.

The “Ds” are applied after daily mode choice just before diurnal factoring, and apply to vehicle trips only.

Validation (Static and Dynamic)

The Fresno COG model validation consists of static validation in which the model is run to ensure that the output matches available counts and roadway speeds. The model is also dynamically validated in which the model is tested to determine how well the model responds to changes in land use and the transportation network.

Future Implementation

The Fresno COG model is validated to currently available information. In the near future the model will be re-calibrated/re-validated to additional 2010 census information and the 2010 California Household Travel Survey which is expected to be available in the next 4 to 6 months.

Adoption

The Fresno COG model will be approved for use in Fresno County by our Fresno County Model Steering Committee. The Model Steering Committee consists of both public and private engineers and planners and provides a forum for the formal review of model applications developed in support of local agency transportation planning activities. The review includes staff analysis of the consistency of model projections and the reasonableness of land use factors and growth assumptions used as the basis of the model. Fresno COG Policy Board will formally adopt the new Fresno COG travel model for use in Fresno County.

Emission Models

EMFAC2011 will be used in estimating greenhouse gas as well as other criteria pollutants in the 2014 RTP/SCS development.

EMFAC2011 is the latest installment of the EMFAC series of models, which is ARB's tool for estimating emissions from on-road vehicles. The model has been updated since EMFAC2007 and is now comprised of three separate modules

EMFAC2011 contains a new simplified tool, called EMFAC-SG that provides air quality planners, transportation planners, and other EMFAC users a tool for assessing emissions under different future growth scenarios. This includes conformity analyses of transportation plans and programs with the State Implementation Plans required by federal law, State Implementation Plan inventories, alternative growth scenarios associated with regional transportation planning for greenhouse gas reductions (SB375), and the like.

EMFAC 2011-SG will be used in conjunct with the Fresno COG travel demand model to estimate greenhouse gas emission in the SCS development. Fresno COG and the other Valley COGs are in discussion with ARB on the appropriate procedure to apply EMFAC11 at the time this memo is being written, and will continue to work with ARB, the San Joaquin Valley Air Pollution Control District, and the other Valley COGs on developing an appropriate GHG modeling procedure.

EMFAC 2011-SG was also used in Fresno COG's 2012 target setting process to calculate average fleet fuel economy for Fresno County, which was in turn used in the estimation of vehicle operating cost, a major input to the travel demand model. Similar methodology will be applied in the SCS development process.

Off-model Emission Adjustment and Post-processing

Similar to all the other traditional 4-step travel demand models, Fresno COG's traffic model is not sensitive to the impact of TDM/TSM projects, such as ITS, bike & pedestrian projects, and rideshare programs. In these instances, Fresno COG will rely on "off-model" techniques based on literature reviews, collaboration with other MPOs, and consultation with ARB's Policies and Practices Guidelines. Any such "off-model" techniques applied in the SCS development will be documented as part of the RTP/SCS documentation.