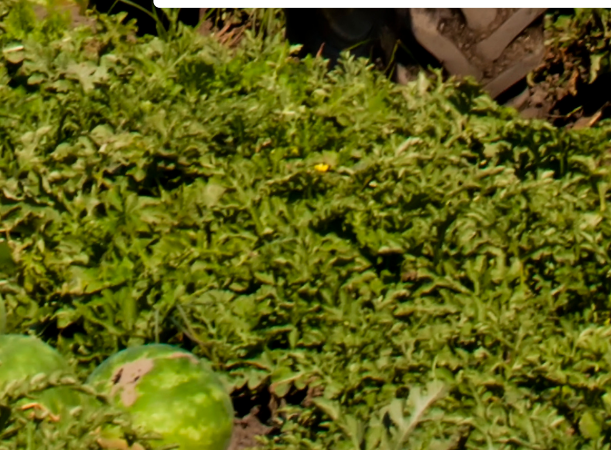
APPENDIX X

Technical Methodology Memorandum



REGIONAL TRANSPORTATION PLAN
SUSTAINABLE COMMUNITIES STRATEGY

SAN JOAQUIN COUNCIL OF GOVERNMENTS TECHNICAL METHODOLOGY TO ESTIMATE GREENHOUSE GAS

INTRODUCTION

This document describes the general approach to estimating greenhouse gas emissions which the San Joaquin Council of Governments (SJCOG) followed in its forthcoming Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS) update.

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).

The approach described in this document is based on SJCOG's current work program and SJCOG staff's current understanding of available tools and information. Tools and technical information were still under development when the needed analytical and policy pre-RTP work began with the Envision 2050 project. This technical methodology includes documentation of those efforts, as well as the tools used for greenhouse gas reduction calculations.

In line with the other regions located within the San Joaquin Valley Air Basin, SJCOG had a target date for adoption of the 2022 RTP/SCS Update of August 2022. In keeping with this schedule, regional travel demand model updates had been completed, and scenario development and testing began in July 2021. The public process for the RTP began in late September 2021 with the completion of the Envision 2050 project. The full RTP was released for public review in June 2022 and the final adopted by the SJCOG Board in August 2022.

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

SJCOG Region GHG Emissions Reductions per Capita Targets:

- 12% reduction in GHG per capita by the year 2020
- 16% reduction in GHG per capita by the year 2035

SJCOG has reviewed CARB's evaluation of the GHG quantification for the 2018 RTP/SCS and the recommendations for additional analysis in the 2022 RTP/SCS (SJCOG's third round SCS). Analysis years for the SCS are shown in Table 1. SJCOG staff worked to incorporate those

recommendations and consulted with CARB staff when draft results were released. Testing based on early versions of growth scenarios showed a downward trend in per capita GHG production between the plan base year and target year 2035 for scenarios based on updating of established land use and transportation investment strategies sufficient to approach the target of -16%. The SJCOG Board provided input as land-use scenario, strategies, programs, and project lists were developed, and ultimately provided direction for staff to rely on a set of assumptions that would both builds on the successes of previous RTP/SCS rounds and further improve the region's ability to achieve the -16% target, even as downward population projections made achieving the target more difficult.

Table 1 – Analysis Years Considered in SJCOG's RTP/SCS

Year	Purpose
2005	Base year for SB 375 GHG Emission Reduction Target Setting
2015	MIP2 Model Validation Year
2016	Base year for 2022 RTP/SCS
2035	SB 375 GHG Emission Reduction Target
2046	Horizon Year for 2022 RTP/SCS

OVERVIEW OF EXISTING CONDITIONS

The 2022 RTP/SCS was influenced by the recent COVID-19 pandemic with respect to telecommute option as a source of VMT reduction. The density goals envisioned by the region's various general plans are coming to fruition in the form of higher housing density and mix of uses from recent development proposals which is also no doubt in response in part to SB 743 VMT CEQA analysis requirements. Aside from the profound, and ongoing, effects of the COVID-19 pandemic, changes to the regional planning context since the previous RTP/SCS update in 2018 have been incremental.

POPULATION AND EMPLOYMENT GROWTH FORECASTS

A vital input to the SCS development process is an updated forecast of population, housing, and jobs. SJCOG developed a new forecast for this RTP/SCS based on the most comprehensive and up-to-date regional forecasts and projections available. This forecast, completed in September 2020, was the first completed with a state-of the-art econometric regional forecast model by Regional Economic Models, Inc. (REMI). The use of the REMI model allowed for integration of the dynamic relationship between local employment conditions and the migration of households in and out of the region. The forecasts were adjusted to account for Covid-19 effects, then newly released 2019 employment data, local employment changes attributable to the pandemic induced recession, and adjustments to account for known large projects then under development in the county. The detailed forecast report can be found as Appendix Q in the 2022 RTP/SCS. The forecast informs both the RTP/SCS scenario development process and the Regional Housing Needs Allocation (RHNA) to maintain required consistency between the two. Both the forecast and RHNA were completed with the assistance of the University of the Pacific Center for Business and Policy Research (CBPR).

San Joaquin County has historically exhibited growth rates well above those for the state and

nation. While this is still true, projected growth rates continue to drop. Table 2 below illustrates the trend using the year 2040 as an example.

Table 2 – Historic RTP Forecast Comparison

Forecast Series	2040 Population	Absolute Difference	Percentage Difference
2012 (2014 RTP)	1,070,486		
2016 (2018 RTP)	1,020,862	49,624	-4.64%
2020 (2022 RTP)	951,985	68,887	-6.75%

Milestone year demographics are presented below:

Table 3 – Population, Household, and Employment Data

Year	Population	Households	PPH	Employment	JPH
2016	732,185	227,784	3.21	319,545	1.40
2035	917,811	282,251	3.25	363,483	1.29
2046	994,257	304,665	3.12	390,469	1.28

A lower growth forecast restrains the opportunity to substantially change the overall land-use pattern in San Joaquin County. However, the current RTP/SCS presents a possible land-use pattern that could be achieved within the bounds existing general plans, and further make feasible additional opportunities for infill, mixed-use, and adaptive reuse development to increase the uptake of active transportation, electric vehicle, telecommute, and micro-transit to move toward a clean transportation system.

Draft 2022 RTP/SCS Scenario Descriptions

Unlike previous scenario development processes, where discrete scenarios of land-use density and intensity, combined with subtle shifts in funding allocation, were developed based on identified goals and strategies, this RTP reversed that process. Groups of goals and strategies were developed based on a variety of long-term and potentially disruptive technological, demographic, and environmental factors, then tested for their effect on a variety of metrics in multiple possible futures. This approach allowed strategies and goals to be intentionally tested and ranked before land-use scenarios were developed. Then, integrated land-use and transportation scenarios were developed, benchmarked and presented for consideration by the public and policymakers. Ultimately, one of these scenarios was prioritized and integrated into the existing RTP/SCS to build on previous success, while pushing the region further forward in meeting greenhouse emissions reductions and other important state and regional goals.

Unlike the two previous rounds of SCS development, a “trend” scenario is not included. The intention with this decision is to recognize that scenario development should be comparing the efficacy of a variety of possible solutions to identified future issue areas, not a “no change” trend

that wasn't reflective of the currently adopted RTP/SCS. Scenario themes were also guided by a general assertion of the location of growth within the region. To accomplish this prior to land use allocation, the SJCOG region was divided into a series of four Priority Growth Areas (PGAs): "Established Neighborhoods and Centers," "Urban Arterials," "High Quality Transit Areas," and "New Growth Areas." Describing scenario themes in terms of which PGAs would see the most growth, helped explain and differentiate scenario themes.

Of note is that each scenario included additional guiding datasets when land-use was developed or "painted." These include priority growth areas described above, areas of opportunity as defined California Tax Credit Allocation Committee (TCAC), areas of low VMT as estimated by the UrbanFootprint transport model, jobs-housing balance (placing jobs and housing together), and high-quality transit areas.

Stay the Course:
In this scenario, the region does not change course and makes investments based on the last regional plan. Some growth occurs in new growth areas identified in the region's General or Specific Plans, with no new identified infill develop over the last plan. Larger transportation investments are more heavily focused in managed lanes, ACE Rail, enhanced bus rapid transit.

This scenario performs best in a future with high AV adoption because it already includes many transportation investments that will help to manage broad AV use. These include managed lanes and expansion of the roadway network.

Remake Centers and Corridors:
Traditional employment centers and aging commercial corridors are remade into residentially focused neighborhoods. Growth is focused on urban arterials, existing neighborhoods, and job centers. Transportation focus investments in transit and bike/ped for infill locations along existing arterials, improvements/maintenance to local arterials to facilitate new types of development.

Scenario B was envisioned to best address climate migration and e-economy futures. With respect to climate migration, this scenario would provide more housing in transit-rich areas, making it more advantageous if large numbers of lower income households move to the region. If telecommuting continues, scenario B would also make good use of underutilized commercial lands in the region's commercial corridors. *20-Minute Neighborhoods:*

Planned new growth areas are redesigned to accommodate a greater mix of uses and modes. Commercial uses develop in traditionally residential areas. This scenario provides a broader range of daily destinations close to home and prioritizes transportation investments in transit and bike/ped for new growth locations that furthers internal circulation in these neighborhoods.

This scenario would likely perform best in a future with high telecommuting and learn-from-home rates. This is due to its relatively large unit sizes and re-imagined specific plan areas to include a broader range of services.

Commuter Villages:
Household and employment growth is incentivized in urban arterials near existing and planned

regional rail stations and near existing and planned high quality transit hubs. Transportation priorities will reinforce transit-oriented development by focusing on first mile/last mile connections to transit hubs (rail and bus transfer hubs).

Scenario D would perform best in a future with high AV adoption because by locating development near high quality transit, it provides a viable alternative to auto commutes. Similarly, it would perform worse in a future with high rates of telecommuting because it assumes continued interregional commuting.

More information on the scenario development process, including descriptions of all technical tools and datasets can be found in Appendix S of the 2022 RTP/SCS.

QUANTIFICATION APPROACHES

Table 3 – Strategy Quantification Approaches

RTP/SCS Strategy	Quantification Approach
Targeted infill/increase density in transit priority areas	Land-Use Model/Travel Demand Model
Enhanced Transit	Travel Demand Model
Enhanced Active Transportation	Off-Model
Van Pool Program	Off-Model
Rule 9410	Off-Model
Electric Vehicle Charge Program	Off-Model
Telecommute Program	Off-Model
TSM-ITS	Off-Model
Micro-Transit	Off-Model

LAND USE/TRAVEL DEMAND MODELING

SJCOG utilized the following tools to estimate GHG emissions for the 2022 RTP/SCS, each of which are described in more detail below:

(1) Scenario Planning/Land Use Model
(2) UrbanFootprint / TrendLab+
(3) MIP Travel Model
(4) EMFAC 2014 Emissions Factor Model
(5) Off-Model Adjustments

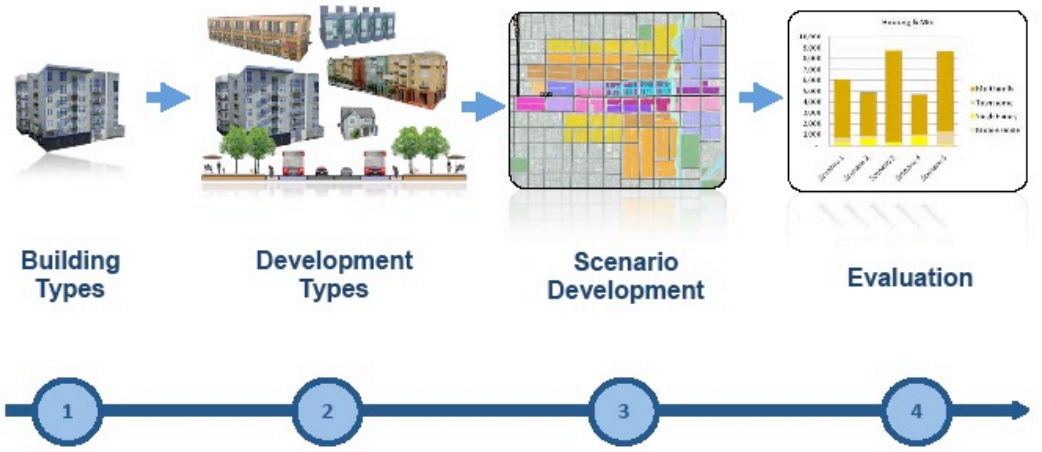
Scenario Planning/ Land Use Model

Scenario modeling allows evaluation of the impacts of the RTP/SCS policies on regional land use. In particular, the scenario planning approach is a way to explore what it would take to achieve the revised SB 375 per capita emissions targets. Scenario modeling tools use building blocks that describe the different types of land uses that exist within the metropolitan area or are planned for the future. The output of the scenario modeling tools forms the fundamental input to the MIP

transportation model, as well as stand-alone metrics of the comparative impact of policy and strategy tools.

Envision Tomorrow

Figure 1 – Envision Tomorrow



Envision Tomorrow is a suite of scenario planning tools that tests different land-use and transportation options. It consists of two primary tools: a Prototype Builder and a Scenario Builder, which work in unison to develop scenarios.

The Prototype Builder is a "return on investment" (ROI) spreadsheet tool that can be used to determine 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 various factors, such as parking, height requirements, construction costs, rents and subsidies. The Prototype Builder also considers inputs such as physical building characteristics, parking layout and costs, and other development costs such as landscaping, site acquisition, etc. Stakeholder input is utilized to create building types and development types so that the scenarios reflect existing conditions as well as possible future conditions. Building and development types can be created to represent the development aspirations of the community.

The Scenario Builder is a Geographic Information Systems (GIS) based application that lets the user "paint the landscape" by allocating various, created development types across a 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—by the user— to locations as desired in this tool.

Once the coordinated land use/transportation scenario is developed the output of that process is converted into transportation model inputs and run through the MPO MIP travel demand model to estimate vehicle miles traveled attributable to the MPO scenarios.

It is important to note that the output of the scenario planning tool does not yield VMT estimates in the same way that the travel demand model does. The TrendLab+ tool produces strategy evaluation metrics that demonstrate the relative impact of future strategies under varying future, and largely uncertain, conditions. These metrics include VMT, Transit Ridership, GHG Emissions, and Housing Costs. However, these are relatively crude measures designed strictly to quickly provide strategy comparisons for scenario development. They are not intended to replace standardized measures produced by more robust and widely accepted travel demand and air quality conformity models.

As described in the MIP Travel Model section below, the MIP process created standardized land-use input categories across all eight San Joaquin Valley MPOs. These standardized categories ensure consistent transportation modeling of household and employment types across all eight MPOs that yields a consistent process to estimate vehicle miles traveled (VMT).

Model Improvement Program (MIP) Travel Model:

Model Development

Beginning in 2010, the eight MPOs began a joint process to improve their travel demand modeling capabilities to help meet SB 375 requirements. This process, known as the San Joaquin Valley Model Improvement Program (MIP) was funded by a $2.5 million Strategic Growth Council Proposition 84 grant. Between 2010 and 2012, staff from each of the eight MPOs participated in monthly meetings with a team of technical consultants to upgrade the models and modeling processes. To enhance coordination efforts, staff from the Air Resources Board and the University of California Berkeley listened in on the monthly MIP meetings of the MPOs and technical consultants.

The MIP effort resulted in the delivery of substantially upgraded and standardized travel demand models to the MPOs in the summer of 2012. The new travel models were designed to better evaluate the types of land-use and transportation policies likely to be considered in the RTP/SCSs. Sensitivity to changes in land use and travel estimates was enhanced compared to previous models by – (i) refining each models' traffic analysis zone (TAZ) system to better capture mixed-use and transit oriented development; (ii) incorporating additional socioeconomic variables such as housing units by building type, household income, housing density, employee by detailed sector, and employment density; and (iii) adding a vehicle ownership component and improved sensitivity to travel characteristics.

In addition, the MIP resulted in the standardization of model software, inputs, and methodologies between the eight MPOs. The new models employ a common software package called CUBE, which will enhance the MPOs' ability to share data and resources with each other, as well as coordinate on model improvement and training efforts.

Improvements made to the model input data and each of the key components of the travel demand models (see Figure 2) include: vehicle ownership, trip generation, trip distribution, mode choice, and trip assignment, are discussed in more detail in the following section.

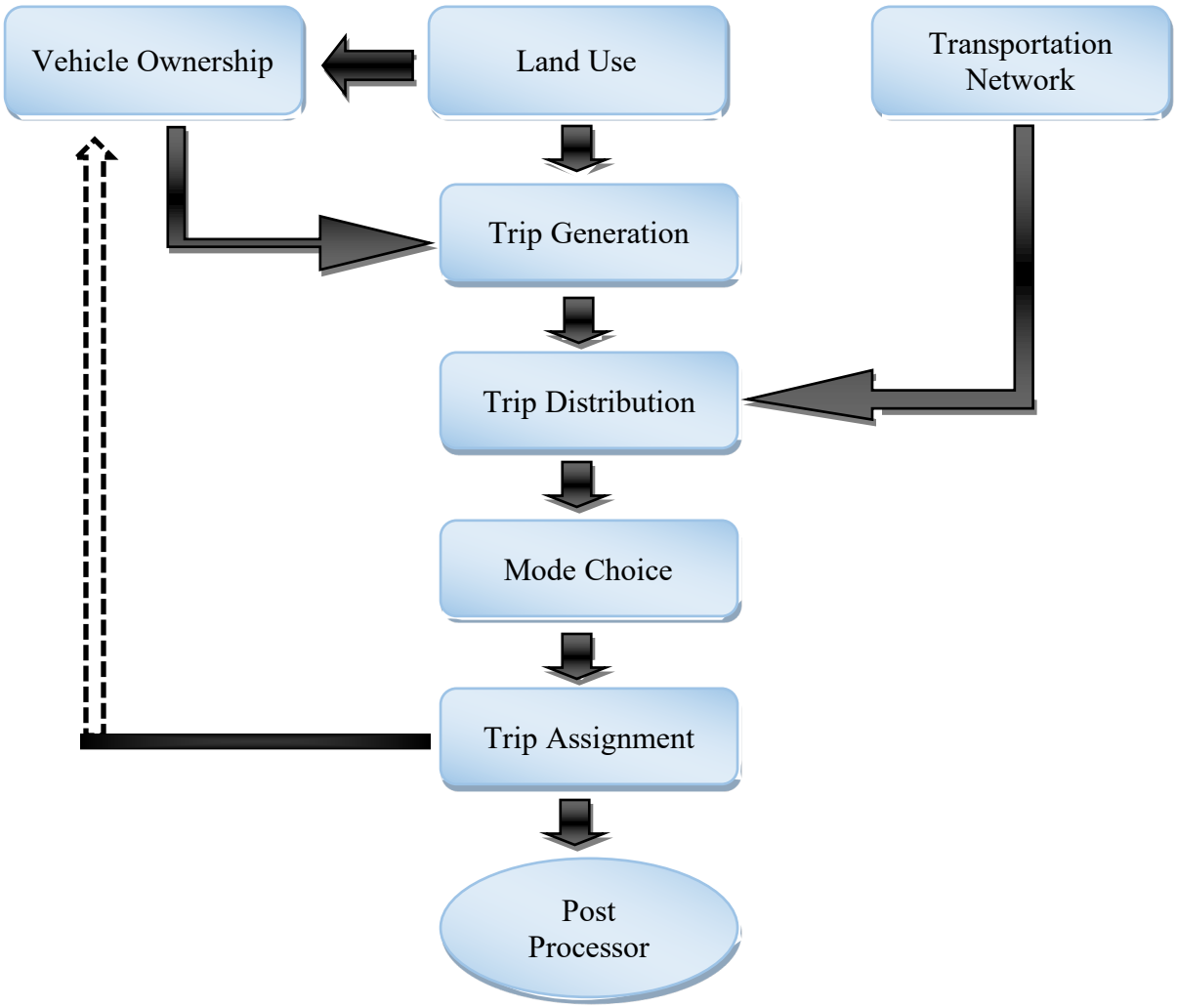
Subsequently, in 2014, a minor update to the models developed in 2012 began, known as VMIP 2. VMIP2 takes advantage of the 2010 Census, the most recent American Community Survey, the 2012-2013 California Household Travel Survey data, and enhances the model structure developed as part of the VMIP1. In addition to the updated data, VMIP2 implements changes to the model structure based on ARB feedback received. Model improvements that specifically address ARB's comments include the following:

- Auto ownership was updated to account for land use accessibility (auto, transit, walk, bike) and commute cost as a percentage of household income.
- Trip generation rates were revised depending on area type and accounting for the accessibility of land uses. Area type is recalculated with each model run to account for land use changes between scenarios.
- Trip distribution was updated to include correlation between household income and job salary for home-work trips.
- Mode choice was updated based on demographics from the latest household travel survey data (household size, income, autos owned) and incorporates average vehicle occupancy by purpose.
- In addition to counts and VMT, the model peak period contested locations was compared to observed NPMRDS data provided by FHWA.

Other key enhancements to model sensitivity and usability include:

- Land Use: simplified residential and employment categories
- Socio-economic: employee salary and household income relationship for home-work trips
- Interregional Travel: updated based on the newly released California Statewide Transportation Demand Model, and based on place and purpose, rather than having internal and interregional travel combined and distributed based on time\cost of travel
- Modified Assumptions: adjustments to employment density, intersection density, and access to jobs and houses

Figure 2 – San Joaquin Valley Model Improvement Program: Model Components



Data Input: The MIP models feature improved TAZ systems, socioeconomic data, land use and travel network characteristics. Improvements to the TAZ systems are designed to help capture more detailed travel movements throughout the region, which allows for more precise analysis of land use and smart growth effects. An updated version of the trip based Caltrans statewide traffic model was developed to help forecast interregional and intraregional trips. Improvements to socioeconomic, land use and transportation network data in the models better account for differences in vehicle ownership and trip generation factors, as well as standardize categories across the eight SJV MPOs.

Vehicle Ownership: The MIP model calculates the number of motor vehicles in a region based on demographic characteristics, auto operating cost, and accessibility. The output of this component is a critical input to the trip generation step, helping to capture the economic characteristics of each household. For VMIP 2, the vehicle operating cost was updated to include maintenance and operations costs based on feedback from ARB.

Trip Generation: The trip generation component estimates the number of person-trips for each activity, such as traveling to-and-from work, school, shops, and social/recreational events. The new models estimate person trips based on demographic and employment characteristics, increasing their capability to analyze the effect of socioeconomic factors on trip rates. Further, the new models increase the number of trip purposes from the typical three or five to eleven[1]. This change allows to distinguish the potential for alternative modes such as school and college trips. The new models also improve the trip generation step by allowing trip rates to vary by income, household size, the number of workers in a household, drivers, and vehicle ownership. This provides better information about regional travel patterns. For VMIP2, trip generation factors were updated to reflect the built environment and area type factors, and home-work trips were grouped by income range.

Trip Distribution: Trip distribution estimates the number of trips from one travel zone to each of the other travel zones in the county. The new models improve the sensitivity of changes to land use on trip distribution by better reflecting the attributes that influence a person's decision to travel. The MIP model provides the capability to consider additional factors such as trip purpose, person travel time by all modes, travel cost, congestion, and vehicle ownership. For VMIP2, trip distribution was updated to match household income and job salary and to better reflect interregional travel at a local scale.

Mode Choice: The MIP has an inbuilt mode choice model. This component is used to predict the probability of selecting a travel mode (e.g., auto, transit, bike and walk) for each trip in the region based on the income of the trip maker, the travel cost, time and accessibility of other modes, and improves the travel models' responsiveness to socioeconomic characteristics, land use, pricing and parking strategies. The mode choice model includes seven travel modes with a separate mode choice for walk and bike.

Trip Assignment: The trip assignment component estimates traffic volumes and travel times for each roadway in the network. The new models enhance the trip assignment component by including a new feedback mechanism between the trip assignment and the number of autos to enhance the ability to address induced travel demand. The feedback mechanism inputs congested travel times into the model, which helps to account for travelers who change their travel route and mode in response to congestion.

Model Calibration and Validation: In model calibration, each component of the model is calibrated to ensure that it produces accurate forecasts. Calibration is an iterative process where model settings are adjusted so the output of the model matches observed travel patterns.

Static validation is that process where the model is tested to ensure that the model output matches available traffic counts and roadway speeds. As part of the static validation process, elements of trip generation, trip distribution and traffic assignment modules may be adjusted.

Dynamic model validation tests the model to determine how well it responds to change. Dynamic testing includes testing the changes to the following:

[1] The additional trip purposes includes home-based K-12, home-based college, highway commercial, trucks-small, trucks-medium, and truck-heavy.

- Household location, density, diversity and other household attributes
- Employment location
- Roadway network
- Transit service

The MPOs performed calibration for each component of the model following the Federal Highway Administration and Caltrans guidelines, to ensure that the models produce reasonable forecasts. Model validation, a critical step in the development of any regional travel demand model, establishes the credibility of the model to predict future travel behavior. The MPOs performed both static and dynamic validation on the new models as recommended by Federal Highway Administration guidelines. Static validation includes – (i) trip generation rates, (ii) trip length frequency by purpose, (iii) average travel time by purpose, (iv) mode split by purpose, (v) traffic assignment by facility, and (vi) transit ridership. Dynamic validation included changing socioeconomic (household size, income, age distribution), land use (density, household location) and travel cost (auto operating cost and parking price) inputs.

Modeling Interregional Trips

The California Statewide Travel Demand Model (Statewide Model) was designed to capture the interactions of land use plans all across the State as they affect interregional travel. The model operates at a scale coarser than the SJV-MIP models. Its value is in placing local and regional travel in the context of total statewide activity. For the VMIP 2 update, interregional travel was updated to reflect the 2010 Statewide Model version. However, due to timing of the Statewide Model update, it does not incorporate the latest land-use from 2014 SJV RTPs.

For the VMIP2 model, AirSage data was used to evaluate county-to-county traffic volumes for the 8 SJV MPOs and aggregated volumes for counties outside of the San Joaquin Valley focusing exclusively on long distance trips. The Statewide Model was used to compare the magnitude of county-to-county traffic flows to AirSage. Once the magnitudes were determined to be comparable, the Statewide Model was used to develop through trips and station weights by purpose for each gateway. A process of interpolating or extrapolating, as appropriate, was implemented using the base and future year from the Statewide Model for multiple years. The Statewide Model was also used to determine the weighted average trip distance for external gateways to represent travel beyond the model area.

For the purpose of preparing the GHG emissions analysis for the 2018 RTP/SCSs, all emissions from through trips (trips without an origin and a destination in the MPO region) are excluded. In addition, the portion of VMT attributable to trips that either begin or end within the region but travel to/from neighboring regions (IX/XI) has been included for all portions of the trip within the MPO region.

Accounting for interregional travel, or travel that crosses MPO boundaries, continues to be a key issue for SB-375 implementation across the state. The issue is especially important when considering the area covered by SJV MPOs, which in aggregate experience a higher proportion of through traffic relative to other regions (as a percent of total vehicle miles traveled). Statewide

discussions to determine how to account for interregional travel across the state should continue.

It is vitally important that the current update to the Caltrans statewide model be fully completed in order for interregional trips to continue statewide conversations regarding interregional travel statewide. In addition, incorporation of SJV long-term transportation planning elements into the Statewide model is highly desired for the next update.

Base Year Updates

The update of the VMIP2's base year was discussed in the previous *Socio-Economic Data* section of this document. Data sources for the distribution of households and employment were:

- 2010 U.S. Census Block Level Data for Total Households
- 2015 5yr U.S. Census American Community Survey (ACS) Block Group Level Data for Housing Type Distribution
- 2013 5yr U.S. Census ACS Block Group Level Data for Near Term Household Growth Areas
- 2011 to 2015 1yr ACS for Trends in Countywide Household Growth
- 2015 Census Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES) Block Level Data for Employment Data by NAICS sector

As part of the 2022 RTP/SCS, SJCOG makes use of the same SB 375 base year (2005) as used in the 2018 RTP/SCS. It was created as a "back-cast" of the prior base year to 2005. When this process was originally completed, the depth of and recovery from the recession was speculative, thus appropriate growth rates to use for the back-cast by TAZ were difficult to determine. When updating the base year, full availability of 2010 block level Census data and 2015 ACS data at the block group level greatly enhanced the 2016 base year over the previous 2008 base year. For this reason, SJCOG took the step to examine available 2005 Census ACS and LEHD data sets for 2005 to construct a 2005 set based on historical data as opposed to the back-cast methodology previously employed. While this change in methodology does not significantly change overall county totals for households and employment, it does affect the distribution of socio-economic data to the TAZs, and thus VMT calculations. Moreover, technical corrections to the new 2005 SB375 base year revealed that modeled 2005 VMT was closer to the 2005 HPMS VMT. Data sources for the distribution 2005 households and employment were as follows:

- 2010 U.S. Census Block Level Data for Households (Overall & Units in Structure)
- 2000 U.S. Census Block Group Level Data for Households (Overall & Units in Structure)
- 2005 to 2009 1yr ACS data for Tends in Countywide Household Growth
- 2005 LEHD/LODES Block Level Data for Employment by NAICS sector

Emissions Modeling

SJCOG is using the latest version of ARB's emissions modeling software EMFAC2014 to complete GHG emissions estimates for the SCS scenario and the alternatives.

The latest EMFAC update includes an "SB 375 Emission Analysis" mode that estimates and reports CO2 emissions in tons per day from appropriate light-duty vehicle classes (LDA,

LDT1, LDT2 and MDV). In order to ensure a coordinated approach and reduce potential for user errors, EMFAC2014 modeling instructions and EMFAC output post-processing worksheet have been developed for the SJV MPOs in consultation with ARB. The approach uses Transportation Data Templates that convert VMIP2 travel model outputs into EMFAC2014 inputs including VMT and speed distributions specific to the region. Per RTAC recommendation, the VMT modeled for SB 375 purposes does not include through trips. The EMFAC output post-processing worksheet calculates per capita CO_2 reductions from 2005 base year for 2020, 2035, and RTP horizon year 2042 using CO_2 emissions modeled with EMFAC2014 and the latest population projections for the region.

Induced Demand from RTP/SCS Projects

SJCOG utilized Fehr & Peers – SB743 Transportation Project – Induced Travel and VMT Testing Tool (Appendix A) to determine the amount of induced demand (VMT) captured by the travel demand model as compared to the VMT estimated by the NCST VMT Calculator. The Fehr & Peers method compares the following No Project Alternative (Stay the Course/SCS Scenario A), Remake Centers and Corridors (SCS Scenario B), and the , SCS Scenario to determine VMT increase attributed to growth (population and employment) vs VMT increase attributed to transportation projects. Test results showed that the SJCOG travel demand model is capable of capturing short-range induced demand from a change in lane miles. Long-range changes in the development pattern were also captured through SJCOG's modeling framework. SJCOG has used several iterations of feedback between models over successive RTP/SCS's in an effort to improve land use and transportation accessibility and efficiency. For the 2022 RTP/SCS further manual adjustments to the land use pattern were made using Envision Tomorrow to increase densities and compact the development pattern consistent with RTP/SCS goals and objectives.

The 2022 RTP/SCS impressively coordinates land use and transportation projects through the 2046 horizon year. The SCS is intended to identify a land use strategy that supports the objectives of SB 375 to achieve, among other things: increased roadway optimization, increased modes of travel other than single occupancy automobiles, increased access to jobs and amenities, minimized increases in VMT and reduced GHG emissions. Among the strategies to meet these goals is a mix of land uses balanced to minimize VMT and maximize the ability for residents and visitors of the region to conduct everyday activities without the need to travel by car. As a consequence, the associated transportation system performance results discussed in this analysis capture the effects of land use changes on overall travel demand in the region. Although the SJCOG Model does not specifically evaluate induced travel from the perspective of longer trips, changes in mode choice, route changes or newly generated induced trips, at the regional level these effects may be negligible compared to the overall amount of travel. As discussed in the Federal Highway Administration's "HERS-ST Highway Economic Requirements System - State Version: Technical Report - Appendix B: Induced Traffic and Induced Demand" (August 2002), "If the demand is for a single facility, then induced traffic will appear large relative to previous volumes, because most of the change in trips will be from diverted trips. At the regional level, induced traffic would be a smaller share of total traffic growth, because only trips diverted from other regions, plus substitutions between transportation and other goods, make up the induced share." Therefore, additional VMT resulting specifically from induced travel demand would not be substantial, and the induced travel impact at the regional level would be less than significant.

Off-Model Adjustments

Off-model strategies for the 2022 RTP/SCS are being evaluated and quantification methods developed in conjunction with modeling/air quality consultants. SJCOG will work closely with CARB to obtain consensus on quantification assumptions, methods, and resultant estimates. Early 2022 RTP/SCS discussions have included van pool, Rule 9410, and electric vehicle charging programs.

Off-model calculations were done in accordance with CARB recommended methodologies and in consultation with CARB Staff. SJCOG utilized the SJ Valley Off-Model Strategy Analysis Tool developed by Trinity Consultants for use in 2022 RTP/SCS development (Appendix B).

1. Electric Vehicle Charging
2. Vanpool program expansion
3. Rule 9410 Employer Trip Reduction

CARB NOTE ON THE TECHNICAL METHODOLOGY

CARB understands MPOs are Board-driven agencies and RTP/SCS scenarios are developed through a robust public process. Upon submission of the Technical Methodology, CARB will receive the level of detail available at time of submission with more detail forthcoming as the Technical Methodology is developed through the RTP/SCS process. CARB staff will continue to work closely with the MPOs as preferred scenarios and assumptions are developed to ensure GHG emission reduction methodologies are clearly understood. (SJCOG acknowledges and appreciates this note.)