Technical Methodology to Estimate Greenhouse Gas Emissions for the 2022-2046 RTP/SCS for the Tulare County Association of Governments

Introduction

This document describes the general approach to estimating greenhouse gas emissions which the Tulare County Association of Governments (TCAG) 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 TCAG's current work program and TCAG 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 TCAG staff refines its understanding.

In line with the other regions located within the San Joaquin Valley Air Basin, TCAG has a target date for adoption of the 2022 RTP/SCS Update of August 2022. Regional travel demand model updates had been completed, and scenario development and testing began, by July 2021. The public process for scenario development began in late September 2021.

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

TCAG Region GHG Emissions Reductions per Capita Targets

2020	**2035**
-13%	-16%

TCAG 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 (TCAG's third round SCS). Analysis years

for the SCS are shown in Table 1. TCAG staff worked to incorporate those recommendations and will consult with CARB staff as draft results are released. For example, regarding trend analysis, TCAG recently completed minor updates to the regional travel demand model. Testing based on early versions of growth scenarios showed a downward trend in per capita GHG production between the plan base year (2021) and target year 2035 for scenarios based on updating of established land use and transportation investment strategies such as the Tulare County Regional Blueprint sufficient to approach the target of -16%. The TCAG Board is scheduled to adopt a more aggressive scenario than the previous RTP/SCS rounds, the Cross Valley Corridor Blueprint Plus, in order to achieve the -16% target as successive downward population projections have made achieving the target more difficult.

Table 1. Analysis Years Considered in TCAG's 2022 RTP/SCS

Year	Purpose
2005	Base Year for SB 375 GHG Emission Reduction Target Setting
2015	MIP2 Model Validation Year
2020	SB 375 GHG Emission Reduction Target (HPMS adjusted)
2021	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 somewhat by the recent Covid-19 pandemic with respect to telecommute option as a realistic source of VMT reduction. The density goals envisioned by the region's 3 biggest city's 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. The four largest member agencies (of the nine making up TCAG) all adopted comprehensive general plan updates between 2007 and 2014. These plans are still in the process of implementation and incremental adjustment. The region also contains the Tule River Indian Reservation, a sovereign area. In general, its larger development direction represents a continuation of projects and issues generated over the last ten years. Most of the new studies and data that have become available over the last four years result from state funding for equity and sustainability planning such as TCAG's Health Impact Assessment and Environmental Justice study, an update to TCAG's Regional Active Transportation Plan, and numerous local agency complete streets studies.

Population and Employment Growth Forecasts

A vital input to the SCS development process is an updated forecast of population, housing, and jobs. TCAG developed a new forecast for this RTP/SCS based on the most comprehensive and up-to-date regional forecasts and projections available. The growth forecast for this RTP/SCS incorporates

substantial data available from the 2010 census and new projections published by the California Department of Finance, Demographic Research Office (DOF) in 2020. The forecasts for housing and jobs were based upon historic trends with the ratio of population and housing at 3.12 and the ratio of jobs to housing at 1.21 in 2046. The housing forecast is based upon DOF/HCD RHNA projections with consistency between the RHNA and SCS intact (Appendix B). In addition, EDD and Caltrans employment forecasts were used to determine employment growth per sector.

The growth forecast, based on the DOF projection, is much more restrained than in the previous RTP. Indeed, the DOF is projecting 150,000 less population growth than its own projection from 2014 which represents over 30% of the existing population in the county. Low population growth will allow our biggest cites to remain small country towns that will have to rely on active transportation, electric vehicle, and telecommute investments, and TransPort TNC to move toward a clean transportation system. Prior visions of a bustling City of Visalia metropolis with high density and high frequency transit may prove to be elusive within the time frame of the 2022 RTP/SCS. However, the Cross Valley Corridor Blueprint Plus Scenario does provide for higher urban density than the current 2018 RTP/SCS enhanced by a regional Bus Rapid Transit (BRT) service. The new growth forecast is summarized below (Table 2) including a comparison of recent DOF projections as **Figure 1**.

Table 2. Regional Growth Forecast

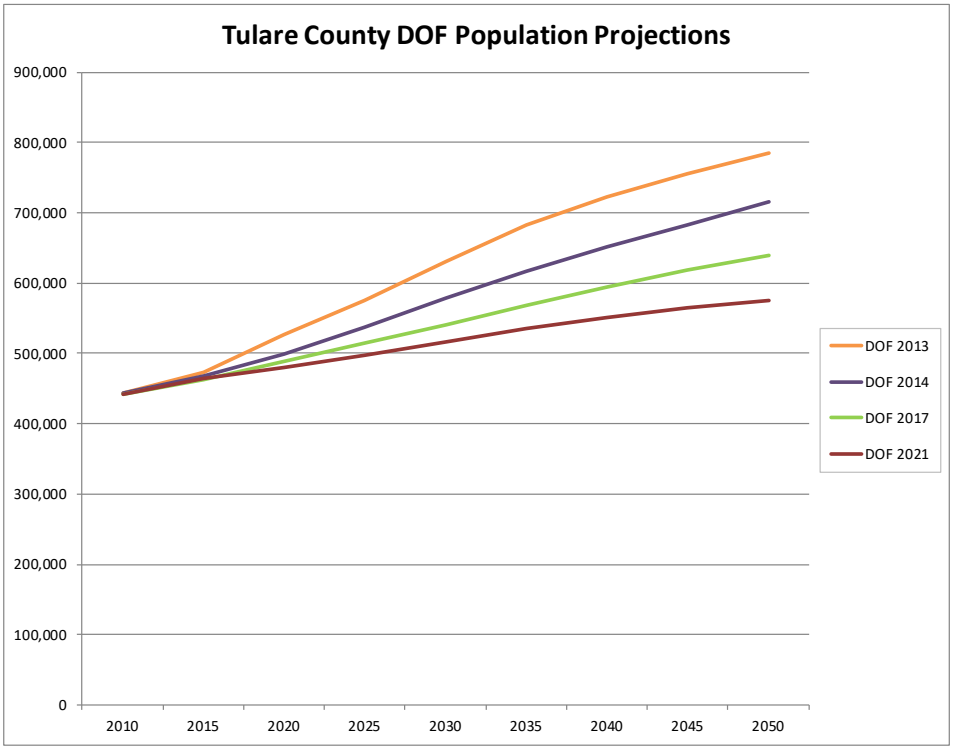
	Population	Households	PPH	Employment	JPH
2021	481,649	142,919	3.34	187,137	1.31
2035	535,463	167,513	3.16	206,681	1.23
2046	567,383	180,652	3.12	218,846	1.21

Figure 1. Comparisons of Recent DOF Projections

DOF State and County Population Projections P-1

Total Population Projections for California and Counties: 2010 to 2060 in 5-year Increments

	Estimates	Projections									
	2010	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**2055**	**2060**
California	37,366,938	39,007,121	39,782,419	40,808,001	41,860,549	42,718,403	43,353,414	43,785,947	44,049,015	44,176,739	44,228,057
Tulare	442,517	463,671	480,788	496,657	516,810	535,463	551,563	565,075	575,525	584,163	591,539
Projections Prepared by Demographic Research Unit, California Department of Finance, March 2021 - TCAG 2022 RTP/SCS											
	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Tulare	442,551	463,291	488,293	514,101	541,140	568,186	594,348	617,916	639,477	659,482	679,167
Projections Prepared by Demographic Research Unit, California Department of Finance, February 2017 - TCAG 2018 RTP/SCS											
	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Tulare	443,487	467,170	498,559	537,015	578,858	616,547	650,819	683,533	715,722	747,912	779,772
Projections Prepared by Demographic Research Unit, California Department of Finance, December 2014											
	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Tulare	442,179	479,763	520,542	564,787	612,792	664,878	721,391				
TCAG 2014 RTP/SCS											
	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Tulare	443,066	473,785	526,718	575,294	630,303	682,022	722,838	755,809	784,334	811,412	836,850
Projections Prepared by Demographic Research Unit, California Department of Finance, January 2013											



Draft 2022 RTP/SCS Scenario Descriptions

Trend

The Trend Scenario shows a projected development pattern that is generally consistent with the development pattern seen in 2014. It depicts future growth continuing without reference to any of the Regional Blueprint principles or strategies, like more compact development. This scenario provides a contrast and basis for comparison between the Blueprint-based scenarios.

Blueprint (Old Plan)

The Blueprint scenario is based on the application of the development principles adopted as part of the 2009 Tulare County Regional Blueprint. Primary among these principles is an objective of a 25% higher overall density of new development compared to the Trend Scenario. The scenario also represents an increased and complementary investment in transit and active transportation.

Cross-Valley Corridor Blueprint Plus

The Cross-Valley Corridor Blueprint Plus Scenario has an objective of overall density of new development 5% higher than Blueprint. These densities are applied to a future transit-oriented development pattern anticipating increased importance of the Cross-Valley Corridor (CVC, 75 miles spanning three counties and linking the metro areas of Hanford/Lemoore - Visalia MSA - Porterville) and maximizing transit, bike, and pedestrian links to provide access from all parts of the county to urban centers along the corridor. The scenario incorporates even greater alternative mode investments that benefit the region's disadvantaged communities such as express passenger service/bus rapid transit (BRT) on State Routes 63, 65 and 198, Avenue 280, and other regional routes serving the CVC The Cross Valley Corridor Plan was one of three major background studies supporting the 2018 RTP/SCS, including also the Long-Range Transit Plan and the Regional Active Transportation Plan.

Quantification Approaches

Table 3. TCAG 2022 RTP/SCS Strategy Quantification Approaches

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

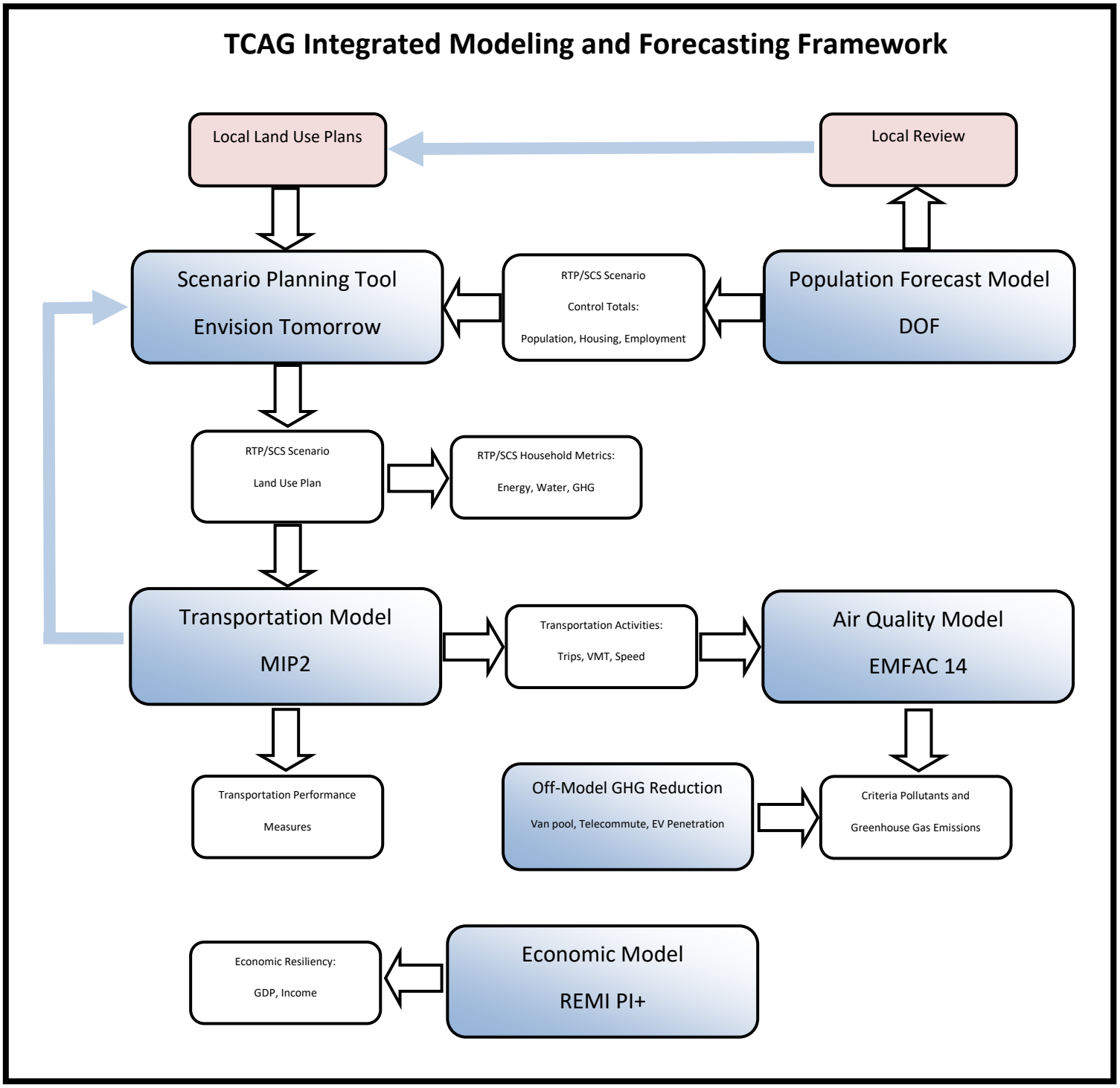
Land Use/Travel Demand Modeling

TCAG develops and applies state-of-the-art models, integrated into a comprehensive modeling and forecasting framework to develop growth projections, travel forecasts, and emissions estimates to support the Region's various planning programs. TCAG uses the same basic methodology as the big 4 MPOs in the state albeit at scale commensurate with the budget and resources of a small MPO. TCAG will use the MIP2 travel demand model with updated sociodemographic detail and transportation network including minor corrections and edits. **Figure 2** below is the TCAG Modeling Framework.

This integrated modeling and forecasting system serves as a conduit between local jurisdictions and key TCAG models by:

- Delivering locally vetted data and plans to key TCAG models for the analysis of plan performances to ensure that regional plans are consistent with local data and policy inputs; and
- Providing directional and order-of-magnitude impacts of local land use and policy decisions that will assist in the development of regional plans and associated scenario analysis.

Figure 2. TCAG Modeling and Forecasting Framework



Models and Tools

The TCAG utilized the following tools, similar to the big 4 MPOs, to estimate GHG emissions for the 2022 RTP/SCS, each of which are described in more detail below:

1. **Forecasting Model** - 2020 DOF Population Forecast 2010-2060
2. **Scenario Planning Tool** - Envision Tomorrow Scenario Planning/Land Use Model
3. **Transportation Model** - CUBE MIP 2 Travel Demand Model
4. **Air Quality Model** - EMFAC 2014 Emissions Factor Model
5. **Economic Model** - REMI PI+ Model

List of Variables and Assumptions for Use in Proposed RTP/SCS

Table 4. List of Exogenous Variables for use in proposed RTP/SCS

Category of Variable (as applicable)	Variable Specification in Model	Example Assumption in 2035
Demographics	Population, Households & Employment	Population: 535,463 Households: 167,513 Employment: 206,681
Auto Operating Cost	Fuel and non-fuel related costs	cents/mile: 0.22
Vehicle Fleet Efficiency	EMFAC 14 model	Average fuel economy: 21.7
Household Income	Census Tract distribution	Median income: $48,817
Household Demographics	Household size, workers, age	HH Size: 3.16 Workers: 1.23
MPO Travel Demand Model Version		Updated MIP 2 Trip-based Model

Per Capita GHG Emissions from Prior RTP/SCS

TCAG tested the previous RTP/SCS Blueprint Scenario using the updated exogenous variables for the 2022 RTP/SCS for plan over plan comparison. TCAG used this approach for the 2018 RTP/SCS (Old Plan Scenario) and included the results in the data table submitted to CARB for RTP/SCS evaluation.

Induced Demand from RTP/SCS Projects

TCAG utilized Fehr & Peer's – 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 & Peer's method compare 2021 Base, No Growth, No Project, and SCS Scenario to determine VMT increase attributed to growth

(population and employment) vs VMT increase attributed to transportation projects. Test results showed that the MIP2 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 TCAG's Integrated Modeling & Forecasting Framework. TCAG 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. The UC Davis UPlan: Urban Growth Model was used to develop the original Tulare County Blueprint and the 2014 RTP/SCS from which the 2018 and 2022 RTP/SCS's land use profile were also developed. UPlan uses accessibility to freeway interchanges and transit stations as an attractor for future growth. 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 especially with respect to CVC transit oriented development near station locations.

VMT testing showed that the MIP2 model is capable of capturing induced demand greater than that estimated by the NCST Calculator method in the case of the Trend Scenario which is similar to the sprawling development pattern the metro areas studied by the induced demand pioneers in academia. The VMT testing also showed that the preferred CVC Blueprint Plus scenario has an efficient use of land and that transportation projects improved accessibility to the existing system. The projects on SR 99 are the only freeway widenings included in the RTP/SCS and are considered goods movement/safety projects and span miles of rural agricultural lands not utilized for urban commutes.

The 2022 RTP/SCS CVC Blueprint Plus Scenario 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 TCAG 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 Strategies

Off-model strategies for the 2022 RTP/SCS were evaluated and quantification methods developed in conjunction with modeling/air quality consultants. TCAG 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, electric vehicle charging programs, telecommute, TSM-ITS, and TransPort TCN micro-transit.

Off-model calculations were done in accordance with CARB recommended methodologies and in consultation with CARB Staff. TCAG utilized the SJ Valley Off-Model Strategy Analysis Tool developed by Trinity Consultants for use in 2022 RTP/SCS development (Appendix C). It is anticipated that Off-model calculations will result in about 3.1% GHG reduction per capita by the year 2035 resulting in a combined total of -16.2% GHG reduction per capita for the 2022 RTP/SCS.

Van Pool -- TCAG is a founding member of CalVans and a financial partner. Tulare County has a history of high CalVans subscription rate, with several local agencies that provide subsidies for riders.

Rule 9410 -- The SJVAPCD rule that requires large employers to provide commute options for employees.

EV Charging Program -- TCAG Electric Implementation Study

Telecommute -- Streetlight Data shows a continued reduction in VMT during the commute period in 2022 indicative of long-term telecommute pattern in the region post Covid-19.

TSM-ITS -- Caltrans Ramp Metering Plan for SR 99 and SR 198. Signal synchronization on major arterials.

TransPort TCN -- Micro-transit embedded within the Uber App utilizing ADA compliant EV vans open in July 2022.

Other Data Collection Efforts

TCAG also utilized the REMI PI+ economic model to stress test the 2018 RTP/SCS for several external factors which were fed back into the 2022 RTP/SCS policy commitments to ensure resiliency.

Table 5. List of Exogenous Variables for Resiliency Analysis

Economic Model Exogenous Variables	
Environmental 1. Water Availability **Political** 2. US Carbon Tax **Economic** 3. US Productivity	**Land Use** 4. Housing Preference 5. Telecommute Share **Transportation** 6. Electric Vehicle Market Share 7. Auto OP Cost 8. Federal Transportation Funding

TCAG has also developed an activity-based travel demand model (ABM) that is currently in the calibration/validation phase. The TCAG ABM is on schedule to be utilized for the next RTP/SCS cycle in 2026. The ABM includes new active transportation networks which should allow for better estimation and sensitivity for alternative modes of travel. The ABM also includes updated methods for estimating interregional travel using big data for origination and destination validation.

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. *(TCAG acknowledges and appreciates this note.)*

Appendix A – Induced Demand Analysis

Induced Vehicle Travel

The balance between traveler convenience and increased auto dependency is at the core of many legislative initiatives in California. MPOs expected to manage congestion while also reducing VMT. As such, induced vehicle travel effects are an essential consideration in forecasting VMT especially when future conditions included through expansion of roadway capacity. To evaluate the model sensitivity to induced vehicle travel, both short-term and long-term effects of increased roadway capacity listed below were evaluated by comparing different combinations of roadway network and socioeconomics.

Short-term responses

1. New vehicle trips that would otherwise would not be made
2. Longer vehicle trips to more distant destinations
3. Shifts from other modes to driving
4. Shifts from one driving route to another

Longer-term responses

5. Changes in land use development patterns (these are often more dispersed, low density patterns that are auto dependent)
6. Changes in overall growth

The scenarios are listed in **Table 1**: Induced Vehicle Travel Elasticity Scenarios with a detailed calculation sheet included in **Appendix A**.

Table 1: Induced Vehicle Travel Elasticity Scenarios

Model Scenario/ Components	Scenario 1 2021 Base	Scenario 2 No Growth	Scenario 3 No Project	Scenario 4 CVC Blueprint Plus
Model Framework	2022 RTP/SCS MIP2	2022 RTP/SCS MIP2	2022 RTP/SCS MIP2	2022 RTP/SCS MIP2
Network	2021 RTP Base	2035 RTP/SCS	2021 RTP Base /TIP	2035 RTP/SCS
Socioeconomic	2021 RTP Base	2021 RTP Base	2035 RTP/SCS	2035 RTP/SCS
Total VMT	10,617,248	10,725,432	11,863,879	11,696,238
Total Lane-Miles	4,167	4,340	4,191	4,340
VMT Per Lane-Mile	2,548	2,471	2,831	2,695

Source: TCAG, 2022 RTP/SCS.

Short-Term Induced Vehicle Travel

Short-term induced travel is caused by the immediate change in speeds and travel when a new roadway capacity expansion project is open to traffic (i.e. a Build compared to a No Build scenario). To reflect the short-term induced vehicle travel, the base year roadway network and the future year RTP/SCS roadway network were both implemented in the model with all other factors being the same (i.e. land use, demographics, and regional travel), and the resulting VMT and elasticity of VMT to lane miles were calculated. Since the change is short-term, mandatory travel from home such as work and school

related trips were held constant with the presumption that changing home, work, or school location would not occur as an immediate response to new roadway capacity. Discretionary trips such as shopping were allowed to change.

The research shows a short-term elasticity of 0.1 to 0.60.[1] As shown in **Table 2**, the VMT change is in the correct direction and on the median of the magnitude relative to the elasticity in the literature. This is consistent with the expected response due to the low levels of congestion in Tulare County. Hence, the model output demonstrates an appropriate sensitivity to short-term induced travel.

Table 2: Short-Term Induced Vehicle Travel Elasticity Check

	Unconstrained 2021 Base	Constrained No Growth	Change
Lane Miles	4,167	4,340	4.15%
Total VMT	10,617,248	10,725,432	1.02%
Model VMT Change	108,183		
Literature VMT Change [1]	44,079 to 264,476		

Note:
1. The change in VMT is based on CARB research for short-term elasticity ranging from 0.1 to 0.6.

Source: TCAG, 2022 RTP/SCS.

Long-Term Induced Vehicle Travel

Long-term induced vehicle travel effects consider the influence on land use and growth patterns over time.. Travel models are typically used to compare a Build and No Build condition and combine the influence of land use, demographics, socioeconomic conditions, and travel. To isolate the long-term VMT changes due to increased roadway capacity, two model runs were used in comparison to the Base Year as shown in **Table 3**.

Table 2: Long-Term Induced Vehicle Travel Elasticity Check

	Scenario 1 2021 Base	Scenario 3 No project	Scenario 4 CVC Blueprint Plus
Model Framework	2022 RTP/SCS MIP2	2022 RTP/SCS MIP2	2022 RTP/SCS MIP2
Network	2021 RTP Base	2021 RTP Base /TIP	2035 RTP/SCS
Socioeconomic	2021 RTP Base	2035 RTP/SCS	2035 RTP/SCS
Lane Miles	10,617,248	11,863,879	11,696,238
Total VMT	4,167	4,191	4,340
Model VMT Change			1,078,990

[1] https://ww2.arb.ca.gov/sites/default/files/2020-06/Impact_of_Highway_Capacity_and_Induced_Travel_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf

Model VMT Change due to Population and Employment		1,246,631	
Model VMT Change due to Roadway Capacity			-167,641
Literature VMT Change [1]	330,595		

Note:

1. https://ww2.arb.ca.gov/sites/default/files/2020-06/Impact_of_Highway_Capacity_and_Induced_Travel_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf. The specific elasticity value used from this research policy brief is 0.75 from NCST VMT Calculator for State Highways.

Source: TCAG, 2022 RTP/SCS.

Scenario 4 reflects the combination of land use and transportation network capacity increases anticipated by 2035 under the RTP/SCS. This resulted in an increase in VMT compared to the base year of 1,078,990. To isolate the change due to land use alone, Scenario 3 was run using the RTP/SCS land use and 2035 interregional travel with the 2021 base year roadway network. This resulted in an increase in VMT of 1,246,631 compared to the base year. Subtracting the isolated land use change in VMT from the total VMT change for the RTP/SCS model run, the change due to long-term induced travel from network changes alone is estimated to be -167,641. This is not correct direction of change, and the estimated VMT from the isolated test is lower than the value when applying the research elasticity. This is not indicative of a model that does not capture the Induced Demand effect, rather the opposite that the 2022 RTP/SCS CVC Blueprint Plus Scenario has a highly efficient land use pattern and its transportation projects significantly improve accessibility within the current system in accordance with RTP/SCS Policy Goals. Indeed as the VMT testing shown above, the MIP2 model is capable of capturing short-term Induced Demand within the acceptable range of the literature. The model is also quite capable of capturing significant Induced Demand similar to the long-range elasticities used by the NCST VMT Calculator in the case of the Trend Scenario which more closely resembles the sprawling conditions and major freeway expansions of the major metro areas studied in the literature albeit scaled to Tulare County dynamics. **Table 4** is a comparison of the long-range Induced Demand captured by the MIP2 Model and the elasticity of the NCST VMT Calculator for Trend and CVC Blueprint Plus Scenarios. Worksheets for both scenarios are also included as part of Appendix A.

If the VMT based on the elasticity from literature were applied rather than the model, the estimated VMT would be 1,577,225, a value 498,236 higher than what the model produced for the change in the RTP/SCS model run.

Table 4: Long-Term Induced Vehicle Travel Scenario Comparison

	Scenario 1 2021 Base	Scenario 4a Trend	Scenario 4b CVC Blueprint Plus
Model Framework	2022 RTP/SCS MIP2	2022 RTP/SCS MIP2	2022 RTP/SCS MIP2
Network	2021 RTP Base	2035 RTP/SCS	2035 RTP/SCS
Socioeconomic	2021 RTP Base	2035 RTP/SCS	2035 RTP/SCS
Lane Miles	10,617,248	12,235,962	11,696,238
Total VMT	4,167	4,337	4,340
Model VMT Change		1,618,713	1,078,990
Model VMT Change due to Population and Employment		1,246,631	1,246,631
Model VMT Change due to Roadway Capacity		372,082	-167,641
Literature VMT Change [1]		324,862	330,595

Given the rural nature of Tulare County congestion is limited and is unlikely to influence vehicle travel such that trip making would be suppressed. Without suppression, induced vehicle travel effects will be substantially dampened. In other words, trip generation in the county is not constrained and trip rates tend to represent full demand levels. For the model to produce the much higher VMT change estimated by the research elasticity would require unrealistic trip generation rates and/or longer trip lengths. This may be an example of ecological fallacy in the application of the elasticity where an inappropriate inference is being made for a single analysis unit (i.e. Tulare County) based on a much larger population representing all of the Metropolitan Statistical Areas (MSAs) in the United States from which the elasticity value was derived.

Since the change due to induced travel in the long-term is much higher for the Trend Scenario than the change in the short-term, the model appears to be appropriately sensitive to long term induced travel.

Appendix B – HCD RHNA Methodology Approval

STATE OF CALIFORNIA - BUSINESS, CONSUMER SERVICES AND HOUSING AGENCY GAVIN NEWSOM, *Governor*

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March 25, 2022

Theodore Smalley, Executive Director
Tulare County Association of Governments
210 N. Church Street, Suite B
Visalia, CA 93291

Dear Theodore Smalley:

RE: Review of Draft Regional Housing Need Allocation (RHNA) Methodology

Thank you for submitting the draft Tulare County Association of Government's (TCAG) Sixth Cycle Regional Housing Need Allocation (RHNA) Methodology. Pursuant to Government Code Section 65584.04(i), the California Department of Housing and Community Development (HCD) is required to review draft RHNA methodologies to determine whether a methodology furthers the statutory objectives described in Government Code Section 65584(d).

The draft TCAG RHNA methodology begins with the total regional determination provided by HCD of 33,214 units. The methodology then allocates total RHNA to each jurisdiction based on the growth forecast in the 2022 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). Next, TCAG creates an income parity trendline that establishes the rate of affordable housing growth needed to achieve an equal distribution of affordable units by 2046. The methodology then calculates the distribution of affordable units needed in 2031 – the end of the RHNA cycle – to achieve regional income parity by 2046. TCAG uses the 2031 distribution to determine each jurisdiction's lower income RHNA. This income parity adjustment results in jurisdictions with a lower proportion of existing lower income households receiving a higher share of lower income RHNA.

HCD has completed its review of the methodology and finds that the draft TCAG RHNA Methodology furthers the statutory objectives described in Government Code 65584(d).[1] TCAG's draft methodology directs lower income RHNA units into high resource areas, areas with higher housing costs, and areas with higher disparities between lower income jobs and affordable housing. The draft methodology's income parity adjustment also increases the number of lower income units going to higher income areas as a percentage of their total allocation.

Below is a brief summary of findings related to each statutory objective described within Government Code Section 65584(d):

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[1] While HCD finds this methodology furthers statutory objectives, applying this methodology to another region or cycle may not necessarily further the statutory objectives as housing conditions and circumstances may differ.

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1. Increasing the housing supply and the mix of housing types, tenure, and affordability in all cities and counties within the region in an equitable manner, which shall result in each jurisdiction receiving an allocation of units for low- and very low-income households.

On a per household basis, the methodology allocates more lower income RHNA to jurisdictions with more higher income households. Jurisdictions with higher housing costs – both in terms of home values and rent – also receive more lower income RHNA on a per household basis. Lastly, jurisdictions with higher percentages of owners receive a higher percentage of lower income RHNA relative to their total allocation.

2. Promoting infill development and socioeconomic equity, the protection of environmental and agricultural resources, the encouragement of efficient development patterns, and the achievement of the region's greenhouse gas reductions targets provided by the State Air Resources Board pursuant to Section 65080.

The draft methodology encourages a more efficient development by using the RTP/SCS to determine each jurisdiction's total allocation. Due to the income parity adjustment, jurisdictions with access to more jobs via a 30-minute commute receive more lower income RHNA per household and more total RHNA. Jurisdictions with access to more jobs via a 45-minute transit commute also receive more lower income RHNA per household and more total RHNA. Further, cities with lower annual VMT per household receive larger total RHNA allocations.

3. Promoting an improved intraregional relationship between jobs and housing, including an improved balance between the number of low-wage jobs and the number of housing units affordable to low-wage workers in each jurisdiction.

The draft methodology allocates the most lower income RHNA, relative to household share, to jurisdictions with lower income jobs-housing fit ratios over 2 (two low-wage jobs for every affordable housing unit). Jurisdictions with lower income jobs-housing fit ratios between 1.5 and 2 receive slightly smaller lower income RHNA allocations relative to household share. The jurisdictions with healthy lower income jobs-housing fit ratios between 1.5 and 0.9 receive the smallest lower income RHNA allocations per household.

4. Allocating a lower proportion of housing need to an income category when a jurisdiction already has a disproportionately high share of households in that income category, as compared to the countywide distribution of households in that category from the most recent American Community Survey.

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On average, cities with a larger existing share of lower income households receive smaller allocations of low- and very low-income units as a percentage of the total RHNA. For cities with higher shares of lower income households, the average lower income allocation is 30.9 percent of total RHNA. The average lower income allocation for cities with smaller percentages of lower income households is 52.4 percent.

5. Affirmatively furthering fair housing, which means taking meaningful actions, in addition to combating discrimination, that overcome patterns of segregation and foster inclusive communities free from barriers that restrict access to opportunity based on protected characteristics. Specifically, affirmatively furthering fair housing means taking meaningful actions that, taken together, address significant disparities in housing needs and in access to opportunity, replacing segregated living patterns with truly integrated and balanced living patterns, transforming racially and ethnically concentrated areas of poverty into areas of opportunity, and fostering and maintaining compliance with civil rights and fair housing laws.

Jurisdictions with more access to opportunity receive larger lower income allocations on a per household basis. Further, jurisdictions with higher percentages of low-resource and high-segregation areas receive smaller lower income allocations per household. More specifically, jurisdictions that are more than half low-resource and high-segregation areas receive a share of the lower income RHNA that is, on average, 67 percent of their share of households, compared to 110 percent for higher resourced jurisdictions.

HCD appreciates the active role of TCAG staff in providing data and input throughout the draft TCAG RHNA methodology development and review period. HCD especially thanks Steven Ingoldsby and Derek Winning for their significant efforts and assistance.

HCD looks forward to continuing our partnership with TCAG to help its member jurisdictions meet and exceed the planning and production of the region's housing need. Support opportunities available for the TCAG region this cycle include, but are not limited to:

- Regional Early Action Planning (REAP) 2.0 – $600 million state and federal investment to advance implementation of adopted regional plans. REAP 2.0 funding may be used for planning and implementation that accelerate infill housing development and reduce per capita vehicle miles traveled. https://hcd.ca.gov/grants-funding/active-funding/reap2.shtml.
- Prohousing Designation Program – Ongoing awards distributed over-the-counter to local jurisdictions with compliant Housing Elements and prohousing policies. Those awarded receive additional points or preference when applying to housing and non-housing funding programs including the Affordable Housing & Sustainable Communities (AHSC), Infill Infrastructure Grant (IIG), and Transformative Climate Communities (TCC).

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- HCD also encourages all Tulare County local governments to consider the many other affordable housing and community development resources available to local governments, including the Permanent Local Housing Allocation program. HCD's programs can be found at https://www.hcd.ca.gov/grants-funding/nofas.shtml.

If HCD can provide any additional assistance, or if you, or your staff, have any questions, please contact Annelise Osterberg, Housing Policy Specialist at (916) 776-7540 or annelise.osterberg@hcd.ca.gov.

Sincerely,

Tyrone Buckley
Assistant Deputy Director of Fair Housing

Appendix C – SJ Valley Off-Model Strategy Analysis Tool

Tulare

Tulare Offmodel Strategy GHG Reduction Summary

2022 RTP/SCS Scenario	2005 (baseline)	2020*	2035	
CO2 Emissions	3440	3340	3840	*Enter daily LDV CO2 emissions in tons from SB375 Post-Processing File (scenario run u*
Population	404148	480788	535463	*Enter Total Vehicle Population*

Measure/Strategy		2020 GHG Reduction (tons)	2035 GHG Reduction (tons)	Reference
Transit Improvement		0.00	0.00	*CARB SB375 Guidelines, November 2019*
Bike & Pedestrian		0.00	0.00	*CARB SB375 Guidelines, November 2019*
Bike Share		0.00	0.00	*CARB SB375 Guidelines, November 2019*
Telecommuting		0.00	62.45	*CARB SB375 Guidelines, November 2019*
Rule 9410		0.00	23.25	*SJVAPCD Rule9410; http://www.valleyair.org/Programs/Rule9410TripReduction/eTRIP_main.htm*
Car Sharing		0.00	0.00	*CARB SB375 Guidelines, November 2019*
Parking Management		0.00E+00	0.00E+00	*CARB SB375 Guidelines, November 2019*
Electric Vehicle Incentive		0.00E+00	0.00E+00	*CARB SB375 Guidelines, November 2019*
Electric Vehicle Charging	Method a	0.00	23.83	*CARB SB375 Guidelines, November 2019*
TSM-ITS		0.00	5.00	*CARB SB375 Guidelines, November 2019*
Vanpools/Calvans		0.00	23.13	*CARB SB375 Guidelines or Calvans data*
MicroTransit/TransPort		0.00	1.59	*CARB SB375 Guidelines or Uber/TransPort Data*

Total CO2 Emissions Reduction from Offmodel	0.00	139.25	
Total CO2 Emissions per Weekday	3,340	3,701	
EMFAC Adjustment	-1.8%	-2.6%	*EMFAC Adjustment Methodology, Appendix D of the SCS Program and Evaluation Guidelines*
% Total Reduction in CO2 Emissions Per Capita	-16.6%	-16.2%	

Notes:

1. When the SCS Quantification Methodology is submitted for CARB review, MPOs will need to provide supplemental information on their off-model strategies (e.g. policy-related documentation, funding sources, in
2. If an MPO applies more than one strategy that share the same inputs, MPO staff should ensure those variables are consistent across strategies (e.g. “average regional HW trip lengths” variable in "Bike & Pedes
3. MPOs should include specific data sources in Column G for each strategy with references, as appropriate.
4. If using actual data for 2020 (e.g. HPMS, traffic counts, PeMS, etc), the impacts from offmodel strategies is likley already captured. In this case, offmodel strategy analysis for CY 2020 is not necessary (enter zerc

* Adjusted 2020 GHG - 2020 HPMS VMT