

VISION CALIFORNIA | RAPID FIRE MODEL

REGIONAL SCENARIOS SUMMARY

This report includes the summarized results of the Vision California *Rapid Fire* modeling processes that were performed on scenarios for the MPO regions of Southern California, the San Francisco Bay Area, the Sacramento Area, and the San Joaquin Valley. Designed to provide critical context for the implementation of the state's Senate Bill 375 (SB 375), the Rapid Fire model was used to measure the impact of varying land use patterns, transportation investments, and policy directions on greenhouse gas emissions, air pollution, water and energy use, land consumption, and infrastructure cost. The results from a range of scenarios in each region have provided critical context for the SB 375 target-setting process for land use-related GHG reductions to 2020 and 2035.

The Rapid Fire Modeling Framework

The *Rapid Fire* model emerged out of the near-term need for a comprehensive modeling tool that could inform state and regional agencies and policy makers in evaluating climate, land use, and infrastructure investment policies. The model calculates results based on empirical data and the latest research on the role of land use and transportation systems on automobile travel; emissions; and land, energy, and water consumption. It provides a single transparent framework within which these assumptions and research can be loaded to test the impacts of varying land use patterns on environmental and fiscal performance. The transparency of the model's framework of input assumptions has made it readily adaptable to different study areas, as well as responsive to data emerging from ongoing technical analyses by state and regional agencies. As such, the Rapid Fire model has filled a timely need for defensible comparative analysis of regional scenarios.

More detailed information about the *Rapid Fire* model and the Vision California project can be found at visioncalifornia.org and at www.calthorpe.com/vision-california.

Regional Scenarios and Assumptions

Scenarios were developed to reflect a range of land use choices in each region, from a business-as-usual future based on past trends to more compact options, including those represented by regional Blueprint plans. The business-as-usual scenario for each region incorporates the results of a back-cast (whereby the model is calibrated with a base year of 1990 and then run forward to predict the performance of the year 2005 as measured by empirical data for that year) to project results for future years. Other scenarios for each region were derived from input data taken from each region's Blueprint process as well as Regional Transportation Plan analysis data, including demographic projections, number of new housing units by type, and projected greenfield land consumption derived from GIS analyses.

Technical assumptions about baseline vehicle fuel economy, building energy and water use, and fuel and building energy emission rates were localized using regional data, where possible. To accord with the MPO analyses, "policy-based" assumptions about future vehicle economy, energy use, and emissions were not varied among scenarios. Future vehicle fuel economy and fuel emissions assumptions were derived from the direct outputs of the California Air Resources Board's Emissions Factors Model (EMFAC), which does not account for improvements that will be realized by the state's Pavley 1 and Low Carbon Fuel Standard regulations.

Regional Results

The regional scenario emissions and co-benefits results are summarized in the following sheets. For each, the impacts of a business-as-usual future are contrasted with a more compact planned future – in most cases, the regions' adopted Blueprint plan.

SAN JOAQUIN VALLEY SCENARIO RESULTS

BUSINESS AS USUAL: Growth pattern based on past trends

VALLEYWIDE HYBRID: Growth pattern informed by the land use and density distribution of the San Joaquin Valley Blueprint 2050 Valleywide Hybrid scenario

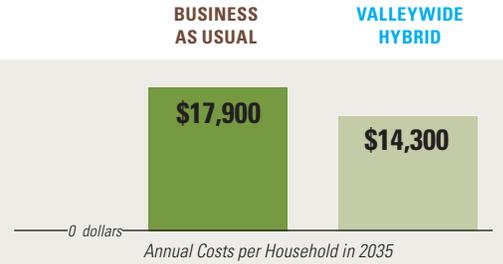
2035 SCENARIO RESULTS

Scenarios analyzed using Calthorpe Associates' Vision California Rapid Fire Model

HOUSEHOLD COSTS

More centrally located homes can dramatically reduce household driving and utility costs. Households in the Valleywide Hybrid scenario spend **\$3,600 less per year** on auto-related costs and utility bills.

Saves over \$3,600 per household on auto costs and utility bills.



INFRASTRUCTURE COSTS

Infrastructure costs rise in line with land consumption, as dispersed development calls for longer extensions of sewers, water pipes, local roadways, and utility lines. Through 2035, the Valleywide Hybrid scenario **saves more than \$20 billion** in capital infrastructure costs, more than \$24,300 per new housing unit.

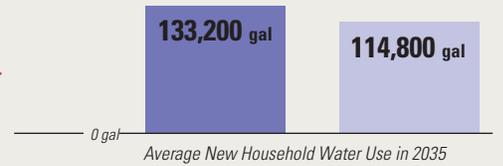
Saves over \$24,300 per new housing unit, or over \$680 million per year.



WATER

More compact development patterns, with more smaller lot single family homes, townhomes, and multifamily housing, save water. By 2035, the average new household in the Valleywide Hybrid scenario **saves over 18,000 gallons per year.**

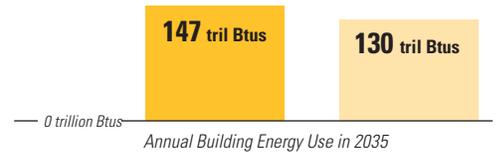
Saves over 680,000 acre-feet of water, enough to supply over 1.2 million households for a year.



BUILDING ENERGY USE

The Valleywide Hybrid scenario **cuts annual energy use by 17 trillion Btus** in our homes and businesses. This leads to lower household utility bills, greater energy security, and lower carbon emissions.

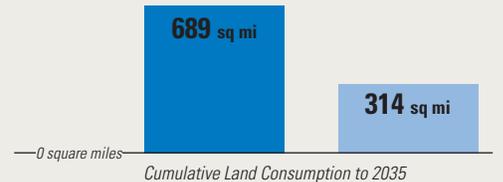
Saves enough energy annually to power over 235,000 homes.



LAND CONSUMPTION

Trend development patterns will expand the San Joaquin Valley's urban footprint by 2035, consuming 689 square miles of farmland, open space, and recreation areas. The Valleywide Hybrid scenario **saves over 375 square miles** of this precious and finite resource.

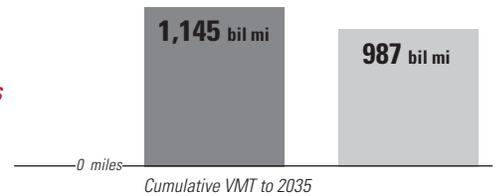
Saves over three times the land area of Fresno.



VEHICLE MILES TRAVELED (VMT)

Automobile emissions account for about 40% of carbon emissions in California. They are also a primary cause of asthma and respiratory illnesses. How much we drive also impacts how much we spend on fuel, insurance, and maintenance. The Valleywide Hybrid scenario, with more walkable, transit-oriented development, reduces VMT by **over 158 billion miles** to 2035.

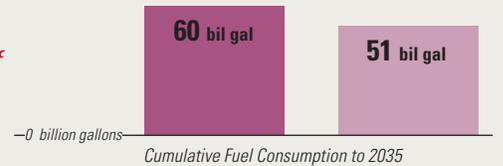
VMT reduction equivalent to taking ALL cars off the San Joaquin Valley's roads for over five years.



FUEL CONSUMPTION

Reduced VMT in the Valleywide Hybrid scenario reduces automobile fuel consumption by **over 8 billion gallons** to 2035. This saves the average household **\$1,600 per year.**

Fuel savings equivalent to over half of annual fuel use in California.



GREENHOUSE GAS EMISSIONS

More compact development patterns, along with more efficient cars and buildings, cleaner fuels, and a cleaner energy portfolio are all essential in reducing GHG emissions. The Valleywide Hybrid scenario prevents the release of **over 6.5 million metric tons** of carbon dioxide equivalent in 2035, or 16% less than a Business as Usual future.

Savings equal to emissions offset by 4,200 square miles of trees in a year.

