

EFFECT OF LAND USE CHOICES ON TRANSPORTATION FUEL DEMAND

IN SUPPORT OF THE
2005 INTEGRATED ENERGY POLICY REPORT

STAFF REPORT

MAY 2005
CEC-600-2005-019



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Table of Contents

Introduction	1
Current Approach to Transportation Fuel Demand and Land Use Planning	1
Obstacles to Efficient Land Use Planning	2
Trends in Land Use Decision Making	3
Case Study – Sacramento Blueprint Project and the PLACE3S Program.....	4
Blueprint Project Overview	4
Developing the Study.....	5
Blueprint’s Flexible Computer Program, I-PLACE3S	6
Value of the Blueprint Case Study.....	6
Land Use Related Fuel Demand Findings	7
<i>Source of Data</i>	7
<i>Scenario Planning</i>	8
Staff Findings and Options for Planning.....	19
Appendix - Key Authorities in Land Use Planning and Transportation Energy Demand.....	21

Introduction

The need to reduce California's transportation fuel demand is well documented by fuel supply and demand statistics published by the Energy Commission in 2003.ⁱ Demand, increasing by about 13 percent between 2003 and 2008, will outpace supply and fuel storage infrastructure capacity in the near term. To address this issue, the California Energy Commission and the California Air Resources Board (CARB) jointly recommended to the Governor that the state should reduce gasoline and diesel consumption to 15 percent below current levels. Such a reduction, however, would require existing vehicle fuel efficiency to double, which at this time appears unlikely.

Another method for reducing transportation fuel demand is the energy savings from alternative land use choices. For example, improved land use planning can reduce the number and length of automobile trips and improve travel via transit and non-motor mobility options. The net result would be fewer vehicle miles traveled (VMT) in the state and reduced fuel demand.

One promising means for reducing transportation fuel demand is integrating transportation planning into land use planning. The recent Sacramento Blueprint Project using the PLACE3S Program successfully bridged the gap between land use and transportation planning. Now firmly established, this bridge could serve, with relatively minor effort, as a means for transportation fuel demand management to enter into the land use and transportation planning processes in Sacramento and elsewhere.

Following an introduction to current land use planning, funding methods, and obstacles to planning, this paper examines the Sacramento Blueprint Project in detail and presents the magnitude of potential energy savings from different land use choices and other actions. The paper then presents staff findings and policy options to reduce fuel demand at the intersection between local government land use choices and regional transportation planning in California.

Current Approach to Transportation Fuel Demand and Land Use Planning

Several reports on transportation infrastructure, mobility, funding, and air quality management indirectly address elements that affect transportation fuel demand. These reports include:

- *Regional Transportation Plans (RTPs)*. Produced by Metropolitan Planning Organizations (MPOs),ⁱⁱ RTPs meet the long-term (25-year planning horizon) transportation needs of the metropolitan population. The plans outline the development of mass transit, highway, airport, port, railroad, bicycle, and pedestrian facilities.

- *Regional Transportation Improvement Plans (RTIPs)*. Also produced by MPOs, RTIPs lay out short-term projects and funding by priority. RTIPs are given to the State Department of Transportation to constitute a state plan.
- *State Transportation Improvement Plans (STIP)*. STIPs are the aggregate of all of the individual RTIPs, along with projects identified by the state Department of Transportation (Caltrans) in its Inter-Regional Transportation Improvement Program (ITIP). Projects within the STIP nominated by RTIPs receive 75 percent of the STIP funds.ⁱⁱⁱ Caltrans controls only 25 percent of the STIP funds through ITIP projects.
- *State Air Quality Management Plans (AQMP)*. AQMPs are produced by Air Quality Management Districts (AQMD) to project future air quality and address necessary measures to keep air quality within federal and state regulatory levels.

RTPs and RTIPs integrate the transportation plans of all cities and counties within their jurisdictions. Once the RTIPs are funded and set into motion, transportation fuel demand is essentially set for many decades. The only items that can affect transportation energy consumption associated with the actions included in the RTIP are changes in end-use technology or regulatory intervention.

Federal air quality regulations also affect the transportation planning process. When a metropolitan area does not meet National Ambient Air Quality Standards (NAAQS), federal Clean Air Act Amendments (CAAA) require local AQMDs to work with MPOs to develop plans that bring RTIPs and the projected air pollution emissions from those projects into conformity with CAAA.

If conformity is not attained, the CAAA allows the US EPA to impose sanctions or penalties such as blocking federal highway funds and imposing more stringent pollution offsets for certain emitters. The urgent need to reduce vehicle emissions to attain conformity drives the effort to reduce the number and length of vehicle trips, which is in effect the only land-use-linked transportation energy conservation program in place today.

Obstacles to Efficient Land Use Planning

A key impediment to adopting and implementing energy efficient land use options is the current method for funding local services. For financial survival, cities and counties often design land use plans to attract the largest tax bearing developments to help replace property taxes lost as the result of Proposition 13. This process, frequently referred to as the “fiscalization of land use,” is one of the well known causes of urban sprawl, escalating VMT and fuel demand. These land use plans are adopted as city and county general plans. Standard operating procedures of the past show that most MPOs collect the city and county general plans throughout their region and create a transportation plan to fit those plans. Local governments with land use authority need to increase their tax base but have no requirement to consider energy use in their decision-making

processes. MPOs, which have no land use authority but are governed by boards populated with locally elected officials, hold the lion's share of the transportation planning authority and funding and have no requirement to consider energy use.

In addition, transportation fuel demand is not accounted for in the current transportation and land use planning process. Some of the more significant reasons include:

- Transportation fuel savings data and related cost savings data are not being developed and are, therefore, not available for use to help justify the value of better policies for land, transportation, or air quality.
- Energy interests generally have been silent in the land use decision making process and do not promote transportation energy efficiency.
- Cities and counties with land use authority are not required to address energy implications of land use decisions.
- MPOs with transportation planning and funding authority are not required to address energy issues beyond achieving any necessary conformity with the local AQMP.
- There is no entity who routinely accounts for the energy savings from retaining dollars in the regional economy or promoting related employment and environmental benefits.

Trends in Land Use Decision Making

Throughout the United States local and regional governments, citizens, and interest groups are expressing growing interest in more sophisticated, resource-efficient land use planning methods. This trend is perhaps a response to local governments facing more complex and highly integrated land use issues. For example, housing supply and affordability are putting more commuters on the highways at the same time increased gasoline prices are pressuring businesses and commuters to drive less.

In addition, constituents are demanding an inclusive public process in which to make decisions. Broader desire for and awareness of the need for civic and environmental equity is opening doors to more meaningful public participation in a wide range of decisions. The number and variety of issues being addressed as part of each local government action increases both the number of citizens wanting to participate and the number of issues in which they become involved.

Complex and highly integrated land use issues also increase the number of parameters to track and amount of data to gather and process. Including constituents in the planning process requires easily understood data and integrated decision making processes.

As computer tools evolve, integrating transportation fuel analysis and energy conserving policies into the already complex land use planning process is vastly improved. Options to better integrate electricity, natural gas, renewable energy, and transmission knowledge into local processes are also improved.

Working to meet these new demands for public involvement, planners are using increasingly sophisticated computer analysis tools to provide the information, analytical power, and real-time outputs needed for meaningful public involvement. These tools are helpful to people interested in transportation fuel demand management. Currently available modeling can describe differences in fuel demand for different land use scenarios that are developed from a region's own parcel-level land use maps, fully integrated with actual transportation and air quality computer modeling. As regional governments work with their city and county members to assess options to best meet their individual and collective needs, participants can use these models to evaluate each option's effect on transportation fuel demand, as well as related economic, environmental, and social consequences.

In response to concerns about traffic congestion and air pollution, some MPOs have begun to change the standard operating procedures for land use and transportation planning. A few MPOs have made major improvements in intelligently integrating land use planning options into the development of their long term RTPs. These MPOs are effectively helping their member cities and counties to recognize that land use policies directly affect transportation outcomes such as congestion and air pollution, and indirectly affect other outcomes such as housing and economic development.

An example of how projected transportation fuel savings can affect policy outcomes is the 1992 San Diego Regional Energy Element to the Regional Growth Management Strategy. This strategy estimated the economic benefit of fuel savings to the San Diego regional economy of 1.5 billion energy dollars that would be retained over 15 years. During the plan's adoption, the committee chair referred to those savings, commenting that it would be fiscally irresponsible not to adopt the plan. The plan was eventually adopted, and is being implemented by San Diego Association of Governments (SANDAG) member cities and county.

Case Study – Sacramento Blueprint Project and the PLACE³S Program

Blueprint Project Overview

In 2002, the Sacramento Area Council of Governments (SACOG) determined that after the transportation and air quality measures contained in their latest Regional Transportation Plan were implemented, the region would continue to have unacceptable congestion and air quality for the long term. SACOG determined that building additional transportation infrastructure was insufficient to alleviate the problems of too many cars driving too many miles. Something different had to be done.

In pursuit of a better transportation solution, the SACOG board of directors created the Sacramento Blueprint Project (Blueprint) in the summer of 2002 to develop state-of-the-art information and analysis tools. These tools would support local government decision making in local city councils and boards of supervisors, as well as for the regional SACOG board of directors.

Blueprint is a scenario-based decision-making program. It offers a wide range of scenarios at neighborhood, county, and regional levels and allows individual areas to be extracted and analyzed. The project's premise is that increased knowledge leads to improved decision making. Given the right tools, the right information, and the right opportunities, citizens will work cooperatively to resolve problems and build their desired future. Although participation for each of the local governments in Blueprint was voluntary, all cities and counties in the Sacramento region chose to participate. In fact, the program was so successful that many participants began implementing local portions of the results in advance of the final adoption. In addition, several SACOG members are integrating the Blueprint workshop findings into the update of their general plans.

Blueprint also is committed to broad participation, using interactive computer software to help citizen planners submit ideas and understand the effects of their opinions and choices. Ultimately, the region's elected leaders will use the detailed technical data developed during the study to make land use decisions affecting current and future growth. The SACOG Board will also use the data to choose transportation projects that will best serve the region as it changes.

Developing the Study

The project began by developing a detailed long-term Base Case scenario to be used as a starting point from which to compare net change created by the other scenarios. The Base Case provided data and maps depicting the region in 2050, assuming that present parameters such as regional growth patterns, transportation system, and air quality were not significantly changed.

At the first regional forum where the 2050 Base Case results were publicly presented, participants were dismayed by the magnitude of the Base Case predictions for air pollution, traffic congestion, VMT, and new land to accommodate housing sprawl. Citizen input via electronic clickers documented strong support to find a different course for the region.

Over the next few months, a series of 37 neighborhood and county level workshops were held to both educate the public and collect public input to best address future population and job growth coming to the Sacramento region. The output of these workshops was used to construct a set of regional scenarios that were then the subject of the second regional forum. Conclusions from this second forum were then used to assemble a Regionally Preferred scenario that was analyzed by locally elected city and

county officials. As a result, SACOG today has a strongly supported and well understood long-term land use scenario to support development and adoption of an enlightened regional transportation plan.

Blueprint's Flexible Computer Program, I-PLACE³S

The Energy Commission has for over a decade supported projects to develop the PLACE³S land use planning method. This year, the Commission's Public Interest Energy Research (PIER) program will add an electricity/natural gas energy module to integrate planning information relevant to electricity, natural gas, and renewable technologies. In 2002, the Energy Commission developed a high speed web-based version of PLACE³S, called I-PLACE³S (Internet-Planning for Community Energy, Economic and Environmental Sustainability).

Because I-PLACE³S is easily customized, the program can be modified to more effectively assess transportation fuel demand and present the findings in neighborhood, county, and regional workshops. Providing fuel demand data alongside housing, land, environmental and economic data would be a meaningful way to educate citizens about the relative benefits and trade-off possibilities. Over time, citizens and professional planners can make better informed land use choices that conserve transportation energy fuel.

SACOG adopted I-PLACE³S to support the data, analysis, and public involvement needs of Blueprint, and added several new features to the programming. One of these features allows the model to reveal subtle benefits of smaller "smart growth" policies, such as pedestrian and transit amenities, that communities may wish to include in their scenarios. Many times, these subtle benefits are lost in the margin of error of in less accurate land use models. Without the appropriate level of accuracy, models may show little or no gain in resource conservation or cost savings from smart growth land use options.

With its web-based functioning, I-PLACE³S is able to manipulate vast amounts of data, enabling the software to perform more and finer calculations than are possible on any desktop run system. Because of the speed of the large off-site processor, results are provided almost instantaneously and can therefore be used in public workshops where citizens want to see the results of land use choices under investigation.

Value of the Blueprint Case Study

Blueprint serves as a useful case study for several reasons:

- Bridging communication and planning gaps between land use and transportation authorities is essential to reducing land-use-generated transportation fuel demand. Blueprint is an award-winning example of such a bridge. More thorough understanding of the process and modeling used in Sacramento should be valuable in achieving state energy goals.

- Blueprint is functional for a six-county region but can also assist other counties and cities, or any geographic subset of an area such as a utility planning area. Therefore, if the Energy Commission is interested in research opportunities, it may be able to use the existing Blueprint database to test the effectiveness of fuel demand management options deployed regionally or locally. Some potential benefits are visible only when applied to a fully integrated regional system and may be masked if the study area is too small. Having a flexible multi-county region in which to work contributes to potential analysis capacity.
- SACOG, via Blueprint, has fully adopted and expanded the I-PLACE^{3S} method. This method is able to conduct the complex analyses necessary to discern how land use options affect transportation fuel demand. Initial discussions with modeling staff continue to result in positive interest in partnerships to expand I-PLACE^{3S}' capacity.
- Blueprint supports interactive workshops where citizens can quantify and evaluate difficult growth issues in a collaborative working group. This education and consensus-building approach is needed to develop broad appreciation of the value of including transportation fuel demand as a parameter into established transportation and land use planning. It also could be a useful academic or educational tool for the state and could provide interagency value to the Energy Commission, the CARB, and the California Department of Transportation (Caltrans).
- Blueprint is local to Sacramento, so tracking progress and investigating further is geographically convenient. In addition, dozens of locally elected officials, professional planners, developers, utility staff, and environmentalist understand and support the Blueprint process and I-PLACE^{3S} tool, and would be valuable resources for guiding the development of any new energy management tools.

Land Use Related Fuel Demand Findings

Source of Data

SACOG, the Sacramento MPO, is responsible for preparing the RTP and RTIP. Like all MPOs, SACOG models the transportation system to assess the types and locations of transportation projects that will best meet the needs of the region for the next 25 years. This modeling includes quantifying the expected air emissions from each transportation option assessed. For Blueprint, SACOG used Emission FACtor (EMFAC), a computer model capable of forecasting emissions through the year 2040. A summary of EMFAC is available at www.arb.ca.gov/msei/on-road/briefs/emfac7.pdf.

SACOG used the most recent version of EMFAC to calculate the emission rates of various pollutants and the primary greenhouse gas, carbon dioxide (CO₂), for vehicles

operating in a user-defined area in California. EMFAC also reports VMT, gasoline consumption, and diesel consumption.

EMFAC data produced by SACOG as part of the Blueprint Project are presented below. Data is presented by county showing percent change from Base Case scenario to Preferred scenario. The results quantify the relationship between fuel demand and land use options over time, using real parcel-level land use data integrated with real transportation data and modeling. It is important to note that the EMFAC reports data for one average summer weekday, not as an annual total. Because EMFAC is an air quality model and is designed to assess weekday commute travel based on findings of very detailed household travel surveys, arriving at an annual number is more complicated than simple multiplication.

Scenario Planning

Blueprint produced a number of scenarios of what the Sacramento region might be like in 2050.^{iv} Each scenario is built on a common understanding of the region's long-term market forces and growth trends. The population and job growth projections from now are held constant among all the scenarios, adding about 1.5 million people and about 750,000 jobs by 2050.

The **Base Case** scenario was developed to function as the benchmark to show how the region in 2050 will accommodate population and job growth under existing policies. Established trends, such as housing densities and housing styles, were projected into the future to determine where growth would be on the six-county map.

The Base Case scenario required 661 square miles of new land to be developed to accommodate growth, most of which would occur in outlying areas where land is cheaper, and homes and lots can be large. The Base Case scenario resulted in about 14 percent more carbon dioxide and particulates than the Preferred scenario. VMT per household per day increased by nearly 13 percent, to 47.2 from 2005 VMT.

The **Preferred** scenario is the result of input from neighborhood, county, and regional workshops, where more than 5,000 participants worked with maps and data. This scenario was adopted by the SACOG Board in December 2004. It is strongly supported by a diverse group of business, environmental, and citizen advocacy groups and has won many awards for technical innovation, planning, and public education and participation. It can be considered realistic, supported, and achievable. It should not be confused with certain smart growth scenarios created by planners to test hypothetical situations.

The Preferred scenario required 46 percent less new land to be developed (304 square miles) than the Base Case. Much of the new housing and jobs were located in already developed areas, either on vacant parcels or on less desirable existing properties. The Preferred scenario reduced carbon dioxide and particulate emissions by about 14 percent over the Base Case scenario. VMT actually drop below the 2005 per household

number (41.7 miles per day) to 34.9 miles per day, even with the additional population growth.

These two scenarios contrast the VMT and fuel demand effect of alternative land uses. Figure 1 and 2 present maps depicting these scenarios. Table 1 provides data compiled using I-PLACE³S and the Blueprint Project for the two Scenarios. While fuel demand data does not appear on this table and is not generally publicly reported by SACOG, if modeling improvements are made allowing fuel data to be presented along with the other 26 parameters on Table 1, citizens could see more clearly how land use affects fuel demand.

Table 2 provides information from SACOG regarding the VMT, gasoline and diesel data for both the Base Case and Preferred scenarios for the year 2040, the farthest year projected by EMFAC at this time. The VMT and fuel differences between the Preferred and the Base Case scenarios result from directing housing and jobs back into existing urban areas. The Preferred scenario employed aggressive infill and redevelopment within areas already developed. By increasing the density of both housing and jobs, transit options become more viable, trips are fewer and shorter, and walking and biking become more feasible, contributing to the reduced VMT.

An overview of the relative difference in the county VMT data of Table 2 shows that Sacramento County, by far the most populous, reduces VMT by the lowest percentage, while the outlying counties, El Dorado, Yuba, and Sutter, report the largest reductions.

Some large assumptions make it possible to offer an order of magnitude estimate of the fuel savings resulting from the Preferred scenario, but a more accurate estimate of the annual costs and benefits is impossible with the available data. Applying the 2025 fuel price forecast made by the Energy Commission in its Ultra High Price scenario, \$2.45 per gallon gasoline, to the fuel saved in the 2050 Preferred scenario results in fuel cost savings of about \$685,000 per summer weekday compared to the Base Case. Because the amount of driving on an average summer day is greater than an average annual day, a conservative estimate for the average annual daily savings could be \$500,000. Thus, the amount saved annually is about \$180 million or about 75 million gallons of fuel.

Dollars not spent on gasoline tend to be retained in the regional economy, producing multiplier effects that generate jobs and income. Alternatively, dollars spent on gasoline tend to leave the regional economy quickly, producing few multiplier benefits. Local governments who understand this will be the most anxious to keep energy dollars local.

There is a need to improve how I-PLACE³S and EMFAC arrive at fuel savings to produce a more viable annual savings number. The model also needs to account for weekend travel. Because Caltrans has recently completed a Statewide Travel Demand Model that does include weekend travel, an opportunity may exist to modify Caltrans' existing statewide travel demand model, the CARB's EMFAC algorithms, and the Energy Commission's I-PLACE³S programming to produce a very useful set of data for

understanding fuel demand resulting from a wide range of land use choices and subjected to the political rigor of public debate and consensus.

Figure 1 – Blueprint Project Base Case Scenario - 2050
Source: Sacramento Area Council of Governments

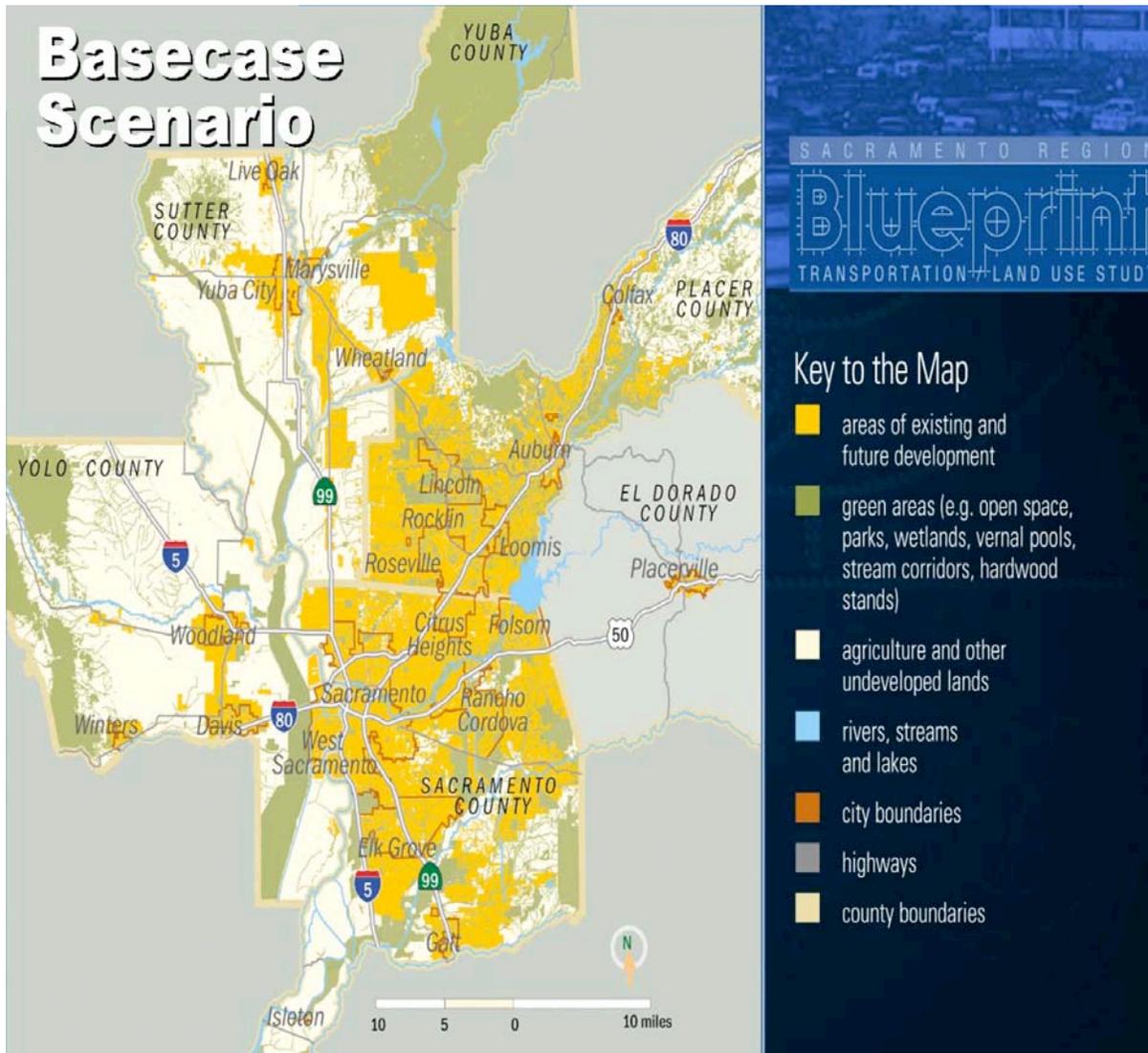


Figure 2 – Blueprint Project Preferred Scenario - 2050
Source: Sacramento Area Council of Governments

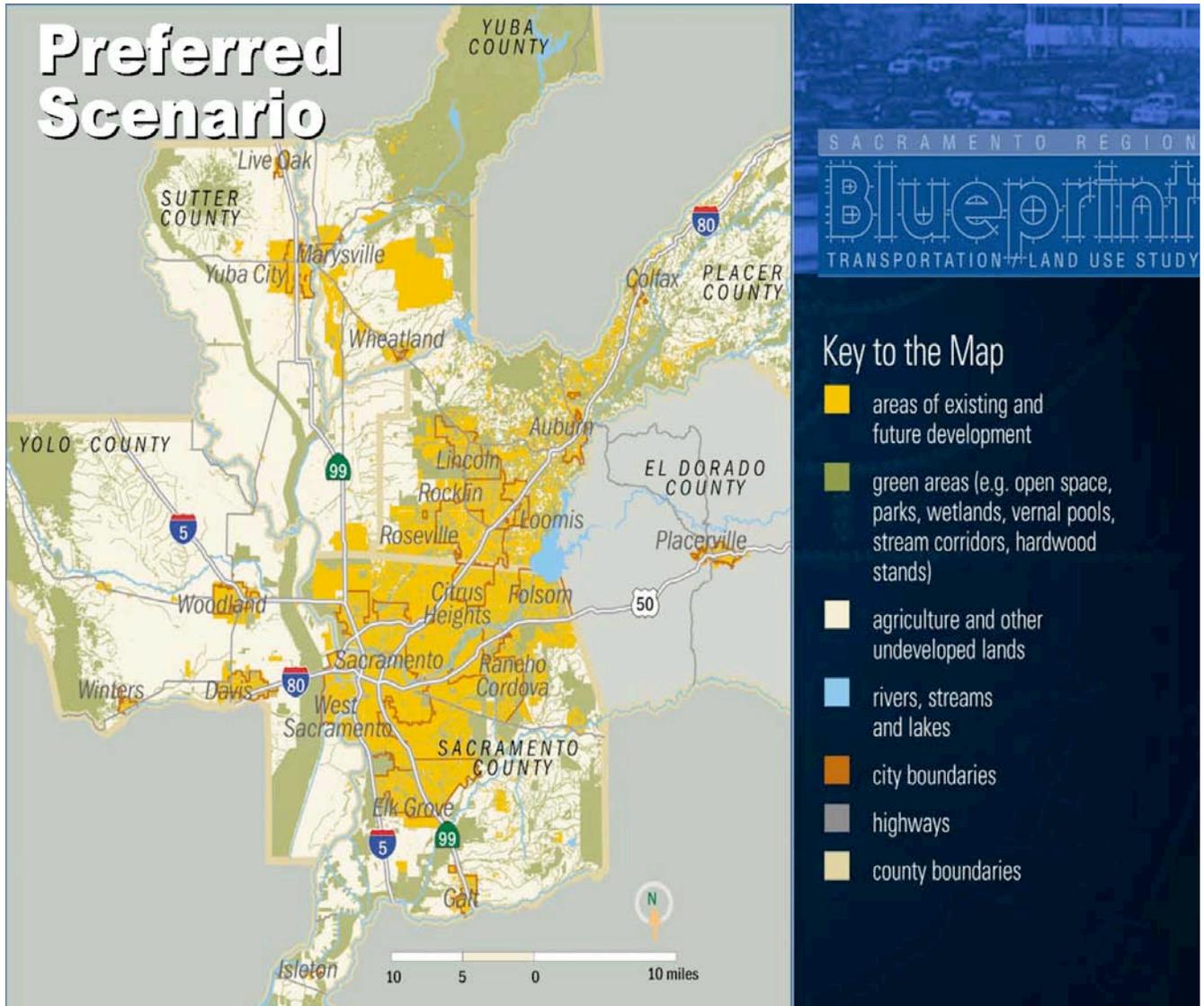


Table 1
Key Statistics Comparing Base Case Scenario 2050 and Regional Preferred Scenario 2050

	BASE CASE	DRAFT PREFERRED BLUEPRINT SCENARIO
Planning Themes	Future development same as recent past (fairly low density). Outward growth pattern, jobs-housing imbalances in sub-areas	More housing choice, growth through re-investment and jobs-housing balance in sub-areas
Population by county in 2050		
El Dorado	285,000	187,000
Placer	584,000	642,000
Sacramento	2,155,000	2,326,000
Sutter	193,000	172,000
Yolo	399,000	357,000
Yuba	201,000	133,000
Region	3,817,000	3,817,000
Percent of region's new growth (jobs + houses) through 2050		
El Dorado	7%	3%
Placer	21%	22%
Sacramento	48%	56%
Sutter	5%	5%
Yolo	13%	10%
Yuba	6%	4%
Housing type: growth through 2050		
Rural Residential (5% existing)	4%	1%
Single Family Large Lot (63% existing)	76%	30%
Single Family Small Lot (3% existing)	2%	28%

Table 1
Key Statistics Comparing Base Case Scenario 2050 and Regional Preferred Scenario 2050

	BASE CASE	DRAFT PREFERRED BLUEPRINT SCENARIO
Planning Themes	Future development same as recent past (fairly low density). Outward growth pattern, jobs-housing imbalances in sub-areas	More housing choice, growth through re-investment and jobs-housing balance in sub-areas
Attached (29% existing)	18%	41%
All housing types in 2050		
Rural Residential (5% existing)	5%	3%
Single Family Large Lot (63% existing)	68%	45%
Single Family Small Lot (3% existing)	2%	17%
Attached (29% existing)	25%	35%
Percent growth through re-investment (i.e. new construction on lots with buildings today)	0% jobs 0% housing	10% jobs 13% housing
Percent growth within 1/4 mile of 15 minutes (or more frequent) transit services (train, bus)	5% jobs 2% housing	41% jobs 38% housing
Percent of people living in an area with a good balance of jobs and houses	26%	53%
Percent of people living in an area with good or excellent pedestrian features	34%	69%

Table 1
Key Statistics Comparing Base Case Scenario 2050 and Regional Preferred Scenario 2050

	BASE CASE	DRAFT PREFERRED BLUEPRINT SCENARIO
Planning Themes	Future development same as recent past (fairly low density). Outward growth pattern, jobs-housing imbalances in sub-areas	More housing choice, growth through re-investment and jobs-housing balance in sub-areas
Percent growth through infill (vs. greenfield)	50% jobs 27% housing	56% jobs 41% housing
Jobs per household for growth (1.2 = regional average)		
Placer County	1.6	1.5
Sacramento County - south of American River	0.7	1.1
Sacramento County - north of American River	1.3	1.1
Sacramento County - Sac City downtown/east Sac.	38.8	1.4
Sutter County	0.7	1.5
Yolo County	1.4	1.3
Yuba County	0.8	1.4
Jobs per household for total (1.2 = regional average)		
Placer County	1.5	1.4
Sacramento County - south of American River	0.9	1.2
Sacramento County - north of American	1.6	1.1

Table 1
Key Statistics Comparing Base Case Scenario 2050 and Regional Preferred Scenario 2050

	BASE CASE	DRAFT PREFERRED BLUEPRINT SCENARIO
Planning Themes	Future development same as recent past (fairly low density). Outward growth pattern, jobs-housing imbalances in sub-areas	More housing choice, growth through re-investment and jobs-housing balance in sub-areas
River		
Sacramento County - Sac. City downtown/east Sac.	4.1	2.5
Sutter County	0.8	1.3
Yolo County	1.4	1.5
Yuba County	0.8	1.3
Additional square miles of urban land through 2050	661	304
Prime, unique, and statewide sign. ag. Lands converted to urban uses through 2050 (in sq. miles)	166	102
Acres of park land provided within new urbanized acres (standard of 10 acres per 1000 people)	17,000	17,000
Potential exterior water consumption per household (compared to Base Case)	100%	67%

Table 1
Key Statistics Comparing Base Case Scenario 2050 and Regional Preferred Scenario 2050

	BASE CASE	DRAFT PREFERRED BLUEPRINT SCENARIO
Planning Themes	Future development same as recent past (fairly low density). Outward growth pattern, jobs-housing imbalances in sub-areas	More housing choice, growth through re-investment and jobs-housing balance in sub-areas
Type of trips		
Auto (existing - 92%)	93.7%	83.9%
Transit (existing - 1.1%)	0.8%	3.3%
Bike and Pedestrian (existing - 6.9%)	5.5%	12.9%
Transit share of work trips (3.3% existing)	2.3%	7.8%
Total transit trips (93,000 in 2000)	147,000	629,000
Vehicle miles traveled per day household (41.9 existing)	47.2	34.9
Vehicle miles traveled per day per HH as % of Base Case	100%	74%
Vehicle minutes of travel per household per day	81	61
Percent of travel time in heavy congestion (23% existing)	27%	20%

**Table 1
Key Statistics Comparing Base Case Scenario 2050 and Regional Preferred Scenario 2050**

	BASE CASE	DRAFT PREFERRED BLUEPRINT SCENARIO
Planning Themes	Future development same as recent past (fairly low density). Outward growth pattern, jobs-housing imbalances in sub-areas	More housing choice, growth through re-investment and jobs-housing balance in sub-areas
Increase in miles of transit service at least every 15 minutes (compared to Base Case)	0%	526%
Transportation capital costs (total all projects through 2050)	\$14.7 billion	\$12.9 billion
Transportation annual operating costs (passenger fares + costs in the year 2050 (existing: \$165 million))	\$412 million	\$532 million
Vehicle emissions per capita compared to Base Case (carbon dioxide and particulates)	100%	85%

Source: SACOG, Blueprint Program, 2005

**Table 2
Land Use Effect on VMT and Fuel Demand – Sacramento Region 2040**

Land Use Effect on VMT and Fuel Demand - Sacramento Region 2040

COUNTY	BASELINE 2040				SMART GROWTH 2040				PERCENT CHANGE FROM BASELINE TO SMART GROWTH			
	HH (000)	VMT (000 mi)	Gas (000 gal)	Diesel (000 gal)	HH (000)	VMT (000 mi)	Gas (000 gal)		HH (000)	VMT (000 mi)	Gas (000 gal)	Diesel (000 gal)
El Dorado	109	6167	316.22	26.21	73	4548	232.87	19.32	-33.03	-26.25	-26.36	-26.29
Placer	231	16773	850.49	43.18	246	15476	788.41	39.89	6.49	-7.73	-7.30	-7.62
Sacramento	840	51258	2489.31	404.61	927	50848	2477.53	402.01	10.36	-0.80	-0.47	-0.64
Sutter	75	4183	208.32	16.02	66	3342	167.28	12.83	-12.00	-20.11	-19.70	-19.91
Yolo	158	10773	516.88	90.68	140	9776	469.62	82.34	-11.39	-9.25	-9.14	-9.20
Yuba	81	3470	171.77	33.29	52	2794	138.08	26.78	-35.80	-19.48	-19.61	-19.56
REGION TOTAL	1494	92624	4552.99	613.99	1504	86784	4273.79	583.17				

Source: SACOG, EMFAC 2002 V2.2, September 23, 2002 WIS Enabled

HH - Household

VMT - Vehicle Miles Traveled

Staff Findings and Options for Planning

The following findings have potential bearing on integrated transportation fuel demand and land use planning:

- Regional projects are conducted by MPOs integrate the plans of all of the cities and counties within their jurisdictions. Therefore, by working with MPOs to address fuel demand reduction within their RTPs, and to prioritize fuel efficient projects in their RTIPs, the state could help fuel demand to become a standard consideration in transportation planning within regional, city and county governments.
- To do this, the state must help MPOs understand the value of fuel demand as a planning function because the process to determine state funding of transportation infrastructure begins with the MPOs and their RTPs. These plans are designed to meet the long-term transportation needs of metropolitan populations. Once these plans are funded and set in motion, regional transportation energy usage is fixed for many decades, and transportation energy consumption can only be affected by changes in end-use technology or regulatory intervention. Because MPOs receive 75 percent of state and federal funds allocated for transportation infrastructure, the MPO transportation process is the logical place to manage future transportation fuel demand through land use choices.
- Environmental impact reports (EIRs) for regional transportation plans can be used to elevate transportation energy as a planning criterion. Nearly all regions of California address the issues of congestion and air quality in their RTP and associated EIR through a range of programs, including those aimed at expanding transit options, managing traffic and congestion, and mitigating emission rates from vehicles. Although these issues and actions are closely related to transportation energy consumption, no specific state or federal requirements exist to measure or address transportation energy issues within regional transportation planning processes or the accompanying EIR. A recently passed law requiring MPOs to establish performance measures could provide an opportunity to include energy considerations as a performance measure. However, additional state or federal legislation^v may be required to ensure such an outcome.

Conclusions

When local governments and MPOs work closely together, the resulting land use and transportation plans can be coherent, efficient, and optimistic for the future. Although using model results showing the relationship between housing, employment density, and VMT has been difficult, recent developments in computer-assisted planning methods have proven useful in initiating change. Working independently or in concert with their regional governments, local governments ultimately control land use and, therefore, the density of homes and employment. For better or worse, the growth

pattern of our communities and the resulting embedded transportation energy demand produced by this pattern is determined by MPOs.

An opportunity exists today to assess the feasibility and benefits of adding transportation fuel demand to the ongoing Blueprint Project, which is an integrated planning approach. Although work needs to be done to make EMFAC data more useful, such as including longer-term fuel price forecasts, the tool and the process are largely in place, functional, and producing excellent results. If the EMFAC data were modified, it would be possible to have fuel demand and cost numbers appear before the public alongside many other key decision making data. If proven successful in Sacramento, the state could support the transfer of the method to MPOs throughout California, many of whom have also asked for support to initiate an I-PLACE³S program based on the Blueprint application.

Appendix

Key Authorities in Land Use Planning and Transportation Energy Demand

Agency	Land Use & Transportation Responsibilities
Local city and county governments	Produce General Plans that specifically include a transportation or circulation element affecting the performance of transportation at the local level. General Plans can, but are not required to be coordinated with regional goals and policies. Local governments implement land use and transportation planning, street infrastructure development and improvement, and provide community-based transportation services such as sidewalks, bicycle paths, and paratransit services.
Metropolitan Planning Agency (MPO) ¹	Serves as the regional transportation planning agency under state law and as the federal metropolitan (transportation) planning organization (MPO). Prepares Regional Transportation Plans (RTPs) to meet long-term transportation needs and Regional Transportation Improvement Plans (RTIPs) that layout short-term projects and funding in priority order. RTIPs are incorporated into the State Transportation Improvement Plan (STIP). MPOs receive 75% of the state RTIP allocation.
Air Quality Management District (AQMD) and California Air Resources Board (CARB)	If a metropolitan area does not meet National Ambient Air Quality Standards (NAAQS), the Clean Air Act Amendments (CAAA) requires the local air quality management district (AQMD) to develop a regional contribution to the State Implementation Plan (SIP) that brings the prioritized transportation projects and projected air pollution emissions from those projects into conformity with CAAA. The SIP compiles all regionally prepared forecasts of future travel volumes, anticipated emissions levels of criteria pollutants, and descriptions of control strategies or measures for NAAQS non-attainment areas. CAAA prohibits the use of federal transportation funds for transportation projects that worsen air quality. If an AQMD fails to submit or implement an acceptable SIP, the federal Environmental Protection Agency has the power to impose sanctions or penalties such as blocking federal highway funds and imposing more stringent pollution offsets for certain emitters.
California Department of Transportation (Caltrans)	Receives 25 percent of the state RTIP allocation; however, has no requirement to consider transportation energy explicitly in its funding decisions.

Endnotes

ⁱ California Energy Commission, California Transportation Fuel, Technologies, and Infrastructure Assessment, December 17, 2003. (Pub No. 100-03-013F).

ⁱⁱ Metropolitan Planning Organizations are often also the Council of Governments. MPO is a federal designation related to responsibility for preparing the RTP and RTIP and receiving and allocating transportation funding. Councils of Government are joint powers agencies established to analyze the relationship between policies in one subject area and its impact upon other regional issues. SACOG, SANDAG and SCAG, for example, are all both the COG and the MPO. ABAG and MTC are separately the COG and the MPO, respectively, serving the Bay Area.

ⁱⁱⁱ The STIP is funded with both federal (seventy percent) and state (thirty percent) dollars. Although the amount varies each year, about \$1.5 - \$2.0 billion total is allocated annually for the projects prioritized in the STIP.

^{iv} Projections developed with Stephan Levy, Center for the Continuing Study of the California Economy, Palo Alto, CA.

^v Caltrans, *Transportation Energy Efficiency and Conservation Report*, 2003, Chapter 8, p. 6.