Green Location: The Critical Role of Land Use in Climate Change and Energy Consumption

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ABSTRACT

This paper focuses on the impact of both *regional* scale land development patterns and *community* scale urban design on climate change and energy and resource consumption. It begins with a discussion of the large scale regional impacts of land patterns on greenhouse gas emissions and energy use, referring to the latest studies, legislative issues such as California's landmark passage of AB32, and case studies of regional-scale projects completed by the author and others.

The paper then moves on to describe the specific climate change and energy impacts of more fine grained neighborhood and community-scale design. It reviews some of the latest research and data then explores the consequences of alternative master plans being developed for the 9,000 acre Southeast Growth Area (SEGA) in Fresno, California. In crafting a master plan for adoption by the City of Fresno, the project aims to demonstrate the specific climate, energy, infrastructure, cost, and quality of life consequences of alternative future land uses, transportation systems, energy and water distribution systems, and approaches to open space and agricultural preservation. It is intended that the ultimate master plan, along with specific guidelines and regulations, will set a new standard for future growth in the Fresno and the Central Valley, the fastest growing area of California. With extensive technical analysis and modeling of impacts, the project will be one of the first to explore, in detail, the critical connection between the shape of future growth and compliance with state, local, and ultimately federal air quality, GHG, and energy standards.

Land Use Emerges as a Critical Issue in the Climate Change Debate

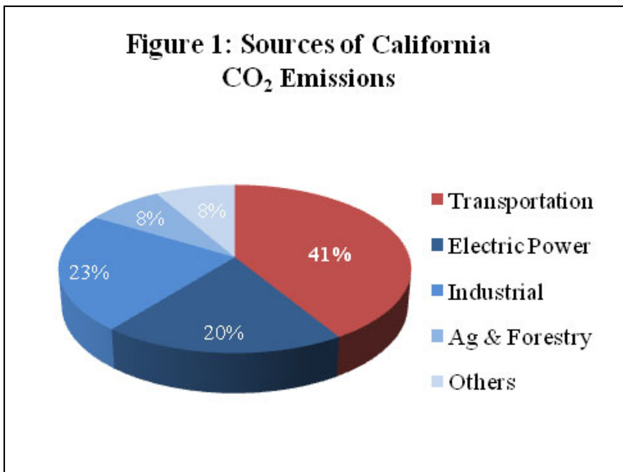
The past decade has seen increasing national and international focus on the challenge of global climate change. Indeed, climate change and its impacts have emerged from a limited discussion among scientists and environmentalists to one that dominates the daily headlines, political debates, posturing among nations, and even the marketing of everyday products from cars to locally grown fruits and vegetables. Almost overnight, we have seen international treaties and debates, the emergence of financial systems dedicated to the trading of greenhouse gas credits (soon to be the largest financial market in the world), and venture capital pouring into renewable energy. All of these efforts, plus thousands of others underway and yet to be imagined, are essential components in the fight to stave off the ill effects global warming. But as governments across the globe take a hard look at how they are going to meet aggressive greenhouse gas (GHG) reduction targets, *the physical design of our regions, cities, and neighborhoods is coming to the fore as one of the critical fronts of the climate change challenge*.

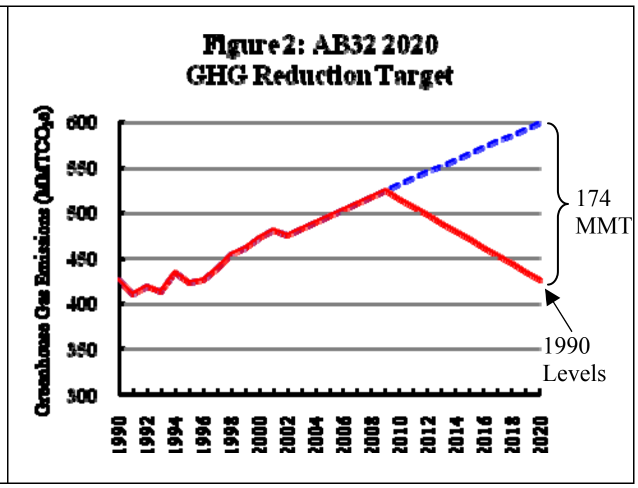
The land use debate strikes at the core of how we live. It is inextricably related to the choices we make about where to live, work, and send our children to school – and how we get from place to place every day. The debate poses a powerful challenge to a development and urban design paradigm that has seen cities across the US and abroad sprawl outwards along new highways, strip commercial developments, and auto-reliant suburban communities. For years, urban planners, politicians, and advocacy groups have highlighted the environmental issues and fiscal inefficiencies of this land pattern. But it is climate change that today is focusing the most intense pressure on the issue and challenging 50+ years of American urban sprawl and the communities it has spawned across the globe.

When politicians announce new regulations and targets to reduce greenhouse gases, land use is rarely highlighted as one of the key challenges. Rather, they focus on the need to reduce our 'carbon footprint' by switching to hybrid vehicles, increasing gas mileage, switching to renewable energy sources like solar panels and hydrogen, and choosing energy efficient appliances. Increasingly, however, with the backing of convincing data and a political will to combat sprawl buoyed by the climate change debate, states and localities across the United States are grappling with how to address the climate and energy impacts of land use patterns.

California's AB32 and Land Use Policy

California assumed a leading role in combating climate change with the passage of the landmark Assembly Bill 32 (AB32) in 2006. The bill sets aggressive targets for GHG reduction, to 1990 levels by 2020, and 80 percent below 1990 levels by 2050. And while Governor Schwarzenegger and legislators highlighted technological innovation when the bill was ceremoniously signed into law, a closer look at the nuts and bolts of the reduction measures highlights land use – the design of our regions, towns, and transportation systems – as an essential component of meeting these aggressive targets.





Source: California Energy Commission, 2006

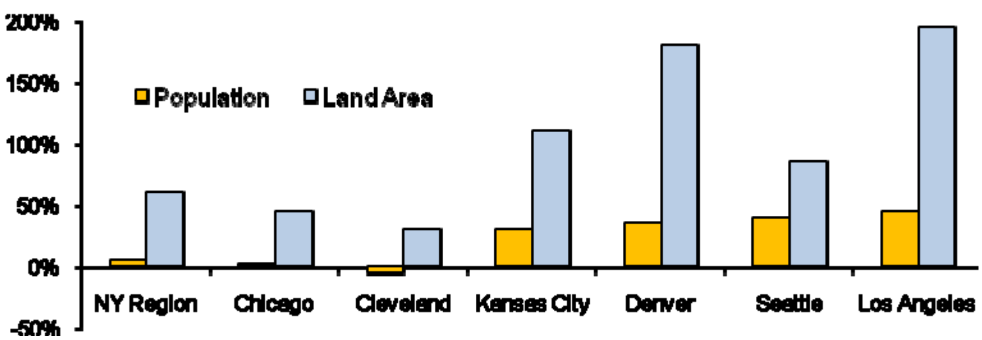
In order to meet its targets (174 million metric ton (MMT) reduction by 2020 and an additional 259 MMT by 2050) AB32 seeks to significantly reduce California's GHG emissions in every source category, from industrial, to power generation, to transportation. The transportation sector currently accounts for more than 40 percent of GHG emissions in California, and the building sector adds nearly as much when the various categories of building energy use and emissions are combined. Both the transportation and building sectors include significant emissions related to land use patterns and community design. AB32 attempts to quantify this impact; it estimates that "Smart Land Use" policy will be required to meet upwards of 18 MMT of the 174 MMT reduction in GHGs needed to meet 2020 targets. And while this inclusion of land use-based mitigations is very significant, it should be noted that there are a number of other elements within AB32's reduction categories, from energy production to infrastructure design, that are not explicitly identified as part of 'smart land use,' but are very much related to urban design and transport system/land use relationships.

Land Use Relationship to Transportation Energy and GHG Reduction

Transportation sector emissions pose one of the most critical and challenging issues to GHG emissions reductions. There are three primary components to transportation-related GHG emissions. The first two, *vehicle efficiency* and *fuel GHG content*, are based on vehicle and fuel technology. They are currently regulated by federal fleet efficiency and fuel standards, which are becoming more aggressive with mounting political and legal challenges from environmental groups and states, and technical innovation in alternative/clean fuel technologies and automobile technologies.

By contrast, the third leg of this 3-legged stool, *vehicle miles traveled* (VMT), bears a direct relationship to land use patterns. It represents the number of miles driven by cars and trucks – a number, fueled by growth in the land area of our metropolitan regions, which has far outpaced population growth. The rapidly-developing Denver region, for example, expanded in land area by 180 percent between 1970 and 1990 while its population grew only 35 percent. In the Los Angeles region, population grew by 45 percent over the same period, while urbanized land area grew an astounding 195 percent.

Figure 3. Population Versus Land Area Growth: 1970 – 1990

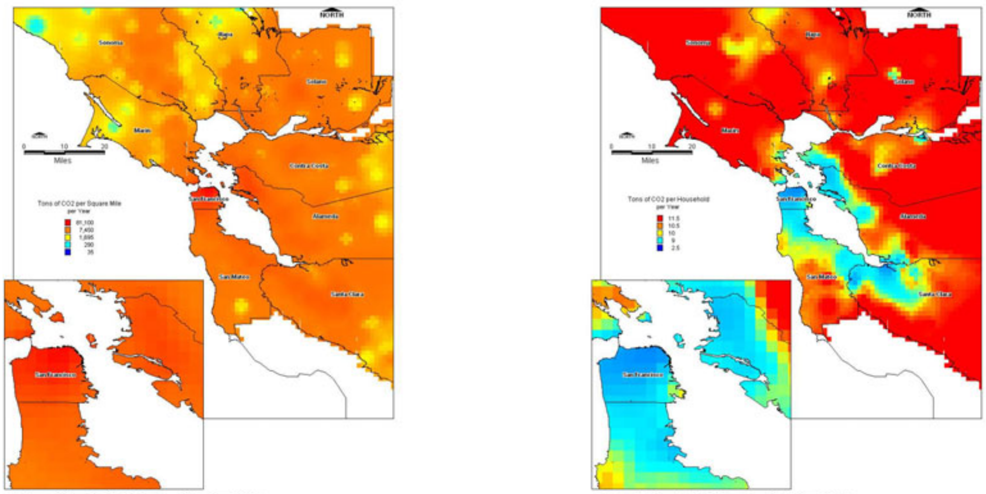


Source: Smart Growth America, 2000

The California Department of Transportation estimates that with 90 percent population growth between 1980 and 2020, the number of vehicles on the road will increase by 120 percent and VMT will nearly double (California Department of Transportation). This rapid rise in VMT has had dire consequences for air quality and GHG emissions in American cities, *despite* gains in cleaner fuels and vehicle technology. Since 1990, $C0_2$ emissions from gasoline and diesel fuel have risen at the same rate as the increase in VMT (EIA, 2006). And in 2007, nearly 159 million Americans lived in counties with unhealthy air quality (US EPA. 2007), leading to record levels of asthma and other respiratory diseases across our urban areas.

Indeed, VMT has been increasing so fast – a trend projected to continue under a status quo policy environment – that it threatens to undermine projected gains in vehicle efficiency and fuel GHG content. A 2007 study by the Urban Land Institute and Smart Growth America pointed out that if trends continue, VMT increases could prevent California and other states from meeting GHG reduction goals (Ewing et al, 2007). A 2007 California Energy Commission (CEC) report supports this claim, stating that "it is apparent that reduced VMT growth will be required to meet GHG reduction goals…it is imperative that land use planning and infrastructure investments place a high priority on reducing VMT growth." (CEC, 2007).

More and more studies are demonstrating that CO_2 emissions by auto-dependent households in suburban parts of our regions are vastly higher than those of households in the more urban cores, where travel distances are shorter and residents are more likely to use alternatives to the automobile, such as walking, transit, or bicycling for work, school, and every day trips.



CO_2 Per Square Mile — CO_2 Per Household

Figure 4. This illustration of CO_2 emissions in the San Francisco Bay area highlights higher CO_2 emissions from suburban households living in more auto-dependent suburban portions of the region. Higher emissions are expressed in darker reds, with the lowest emissions in the darkest blue colors. (Center for Neighborhood Technology, 2006)

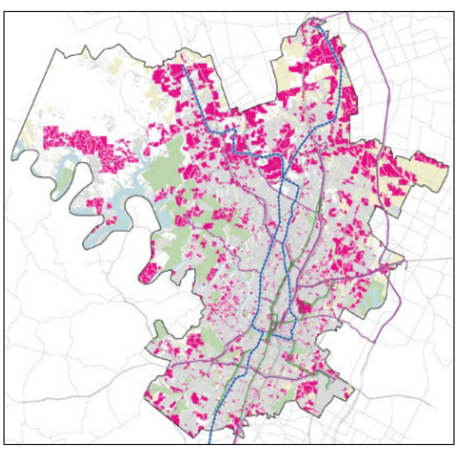
Region and Community: A Multi-Scaled Approach to Land Use Planning for Reduced Energy Consumption and GHG Emissions

Addressing land use impacts on energy consumption and GHG emissions requires an approach to planning and policy at both the *regional* and *community* scales. There is a clear connection between how our regions grow and the consumption of energy for transportation. Reducing this energy requirement and resulting GHG emissions can be achieved with improved *regional planning* that coordinates major infrastructure investments with more efficient land patterns that reduce VMT. We must also take a close look at more sustainable *community designs*. How we design and build the cities and neighborhoods that make up our regions significantly impacts auto-reliance, energy consumption, and GHG emissions. Both of these elements – regional planning and sustainable community design – are essential elements in the effort to reduce our impacts on global climate change. California's efforts to meet AB32 targets will need to directly address regional and community design issues.

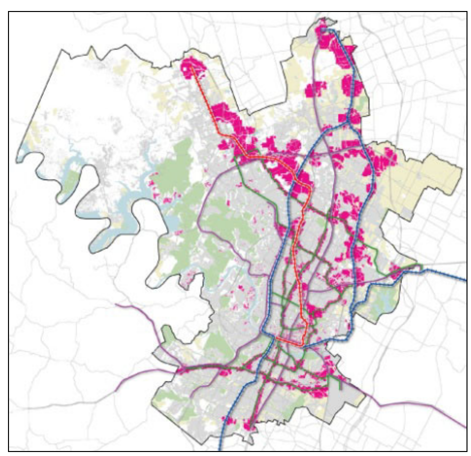
Measuring the Impacts of Better Regional Planning

A number of key regional planning efforts have demonstrated the significant reduction in automobile fuel consumption and GHG emissions of more compact regional forms. In accommodating future growth, there is a clear connection between reduction in vehicles miles traveled and more efficient land patterns that focus a certain proportion of population and jobs around local and regional transit service in mixed use, walkable communities. By placing more people within walking distance of the destinations they need to get to every day – home, school, work, grocery stores, dry cleaners, parks – reliance on the automobile for all trips is significantly reduced and regional VMT can be deeply impacted. Moreover, by investing in high quality transit service to and from major employment and housing concentrations, VMT associated with home-to-work and other trips can also be significantly reduced, with a similar reduction in GHG emissions and other harmful pollutants that impact public health.

Two regional planning efforts highlight the impacts of regional growth patterns on energy consumption, GHG emissions, and other key factors. *Choices for Central Texas*, in the 5-county Austin metropolitan region, examined the role of transit infrastructure in organizing future growth in Central Texas (Calthorpe Associates, 2004). The project explored the potential for accommodating a portion of population and job growth within convenient access of infrastructure included in the regional transit agency's newly adopted transit plan. It examined the consequences of such coordination in comparison to development patterns shaped primarily by existing and planned roads. A Base Case, which depicted growth based on current plans, was compared to a Vision scenario, where growth opportunities around transit were maximized. The Base Case development pattern occupies nearly 65,000 acres of currently vacant land, while the Vision consumes less than 29,000 acres – a 56 percent reduction. This reduction is accomplished by seeking out reinvestment opportunities and closely linking future growth to potential transit investments within the region's core. This concentration of development has significant benefits in the reduction of development on sensitive environmental lands including aquifer areas, habitat lands, and agriculture and ranch lands.



Base Case



Vision Scenario

Figure 5. Choices for Central Texas Scenarios. In the Austin area, scenarios were developed to compare a transit-oriented future, where jobs and households are located within close proximity to transit service (Vision scenario), to a more automobile-oriented future growth pattern that is served, but not shaped, by future transit investments

Southern California Compass, a major regional planning effort for the Los Angeles region, explored how to accommodate 6 million more people and 3 million more jobs over 30 years in the 17 million-strong, 6-county region (Calthorpe Associates, 2003). The plan that emerged, 'The 2-Percent Solution,' demonstrates how a large proportion of the region's expected growth can be accommodated on only 2 percent of the land, maintaining stable neighborhoods, protecting valuable environmental resources, reducing growth in VMT and GHG emissions, and improving air quality. Like in Central Texas, the Compass project demonstrated that close coordination of development with carefully planned transit investments was the most effective means of reducing impacts on an overburdened roadway system, and was the only way for the region to conform to federal air quality requirements and California's AB32 GHG reduction targets.

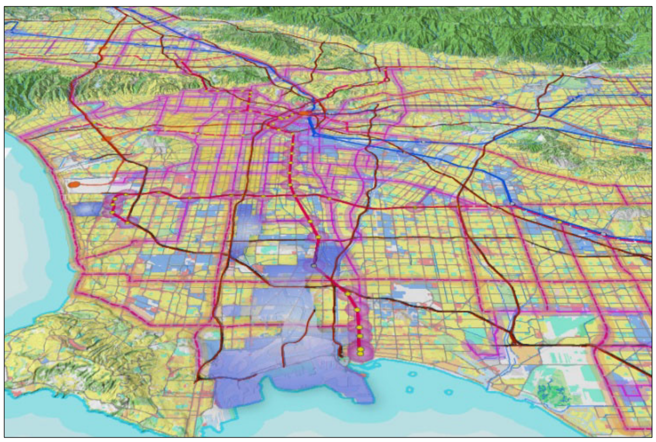


Figure 6. The 2-Percent Solution. The Southern California Compass plan accommodates a large proportion of regional growth around significant investments in local and regional transit infrastructure. The result is a more compact land pattern, the protection of existing stable neighborhoods, and significant reductions in VMT and GHG emissions.

Regional VMT and GHG impacts. Both the Southern California and Central Texas projects demonstrate the significant energy and GHG reduction benefits of more compact transit-oriented regional growth. In the Central Texas project, a comparison of the automobile and transit use projected in the Base Case and Vision scenarios serves to illustrate the impact of different land use patterns on the region's transportation network. Modeling results indicate that the form of future growth projected in the Vision scenario would result in dramatically higher rates of transit ridership and reduced automobile use, when compared to the Base Case.

Table 1. Choices for Central Texas Scenario Impacts (Reductions in Vision Scenario as compared to Base Case)	
Acres Consumed for New Growth	-36,000 (56 $miles^2$)
Vehicle Miles Traveled (Annual VMT)	-700,000,000
Fuel Consumption (Annual Gallons)	-40,000,000
GHG Emissions* (Annual CO_2)	-0.35 MMT
Air Pollution (Annual Tons of CO, NO_x, SO_x, PM, VOC)	-4,000 Tons
Household Transportation Costs (2007 Dollars, Annual)	-$2,000
Regional Infrastructure Cost (Total, 2007 Dollars)	-$3.5 Billion
Per Household Infrastructure Cost (Total, 2007 Dollars)	-$10,900

** Based on EPA (http://www.epa.gov/oms/consumer/f00013.htm) Car and Light Truck emissions statistics; assumes VMT is 60% Passenger Car and 40% Light Truck*

Increased transit use, as well as closer proximity of housing to jobs and daily needs, leads to a significant reduction in automobile travel and congestion in the Vision plan. Modeling results indicate 2.5 million fewer vehicle miles traveled per day, a reduction of more than 700 million miles per year. This VMT reduction generates 4,000 fewer tons of pollution from mobile sources each year, reduces CO_2 by approximately 0.35 MMT, and fuel consumption by approximately 40 million gallons per year. Further, auto travel and congestion reductions in the Vision scenario would provide upwards of $2,000 per household in annual savings from reduced fuel and time costs. And to round out the benefits, the savings from not having to extend infrastructure to a more sprawling growth pattern adds up to more than $3.5 Billion, or nearly $11,000 per Central Texas household.

Analysis of the Southern California Compass plan illustrates similar transportation system and emissions benefits. When compared to a status quo future, the regional vision plan leads to increased transit use, major reductions in VMT and GHG emissions, and reductions in harmful air pollution. Indeed, it demonstrates that a more compact land pattern, closely coordinated with transit investments, is the only way the Los Angeles region will meet Federal and State pollution and GHG reduction requirements.

Table 2. Southern California Compass Scenario Impacts (Reductions in Vision Scenario as compared to Base Case)

Transit Use (Daily Ridership)	+ 22%
Vehicle Miles Traveled (Annual VMT)	-2.5 Billion
Travel Delay (Hours/Day)	-180,000
GHG Emissions* (Annual CO_2)	-1.3 MMT
Air Pollution (Annual Tons of CO, NO_x, SO_x, PM, VOC)	-6,200 Tons

Based on EPA (http://www.epa.gov/oms/consumer/f00013.htm) Car and Light Truck emissions statistics; assumes VMT is 60% Passenger Car and 40% Light Truck

Regional energy and resource consumption impacts. The energy consumption and GHG reductions associated with regional location are related to building-scale emissions as well as transportation behavior impacts. Data from the U.S. Energy Information Administration (EIA) show that higher density areas in the core of metropolitan areas consume far less energy per household than their suburban and rural counterparts. Suburban households consume 21 percent more energy on average, and spend 27 percent more on energy than households in City locations. (U.S. EIA, 2001).

Table 3. Energy Use by Location in Region

	City		Town		Suburbs		Rural	
	BTU (millions)	Dollars (2001)	BTU (millions)	Dollars (2001)	BTU (millions)	Dollars (2001)	BTU (millions)	Dollars (2001)
Per Household	84.7	$1,347	98.4	$1,516	102.7	$1,704	94.5	$1,628
Change from City	-	-	+17%	+13%	+21%	+27%	+12%	+21%

Source: U.S. Energy Information Administration, 2001 Residential Energy Consumption Survey

This reduction is directly related to the mix of housing types in these areas – larger homes on larger lots in far flung reaches of a region consume more energy and produce more GHG emissions. In addition, they consume far more valuable land, water, and other resources to accommodate new growth. The cumulative regional impact of a more diverse, higher density housing program is thus significant. Regional plans that emphasize accommodating growth in more efficient locations for development, from reinvestment in core areas to higher density development around new transit infrastructure, are an essential element in reaching energy use and GHG reduction targets. The benefits of regional efficiency are further bolstered by efficient and sustainable neighborhood and community designs that reduce energy and emissions from buildings, infrastructure, and transportation.

The Role of Community Design in Reducing GHG Emissions and Energy Consumption

While compact regional land patterns play a significant and crucial role in reducing GHG emissions and mobile source pollution, it is just as crucial to consider the consequences of community design in addressing energy and resource consumption, as well as emissions from transportation and building sources. The design of the neighborhoods and communities that make up a region, and their relationship to regional and local transportation networks, is closely correlated to travel and building-related energy consumption and GHG emissions. This section will discuss how community design factors lead to reductions in both transportation and building-level emissions.

An index of travel impacts. A 2001 study of different neighborhoods in Portland, Oregon quantifies the transportation system impacts of varying densities and land use configurations (Lawton, 2001). An 'Urban Index' scored a neighborhood on its combination of three key factors that impact travel behavior: land use density (of housing and jobs), mix of uses, and road network connectivity. The most 'complete' neighborhoods – those with the greatest street connectivity, highest densities, and highest mix of uses – were given high composite ratings of up to ten, and those with the least density, highest separation of land uses, and least connected street network, scored as low as one. The highest scores quantified those factors that contribute to walkability and the ability to meet most daily needs with little or no automobile use, while lower scores represent more auto-oriented neighborhoods typical of American suburban locations.

Travel behavior across the index of urban environments is very telling, and clearly suggests the importance of neighborhood and community design to meeting transportation related energy and emissions targets. Across the entire index, from 1 to10, people make about the same number of trips per day, at 3.8 trips. They also spend close to the amount of time traveling per day – an average of about 63 minutes per person.

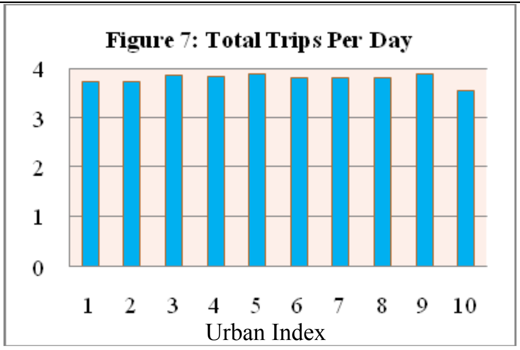


Figure 7: Total Trips Per Day

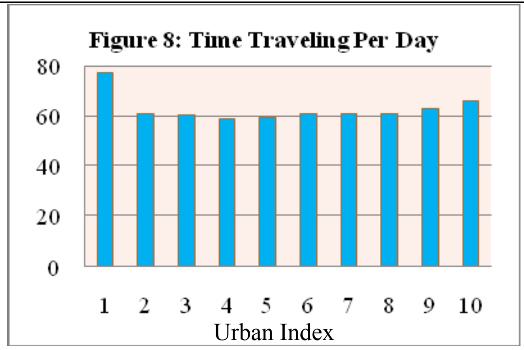


Figure 8: Time Traveling Per Day

Source: Keith Lawton, 2001

However, the similarity ends when one looks at how those trips are made, and the VMT impact of those trips. While those in the most auto-oriented neighborhoods (urban index=1) made nearly 96 percent of trips by car and less than 4 percent on foot, those in the neighborhoods that scored a 10 made more than 30 percent of trips by foot, 11 percent by transit, and under 59 percent by car. The resulting VMT variation is significant, ranging from almost 20 miles per adult per day for urban index 1, to 12.6 in neighborhoods that scored 5, down to about 6 miles for those in urban index 10. The cumulative regional impact of this variation in travel behavior is extensive and points to why both regional and community transportation and design factors must be considered.

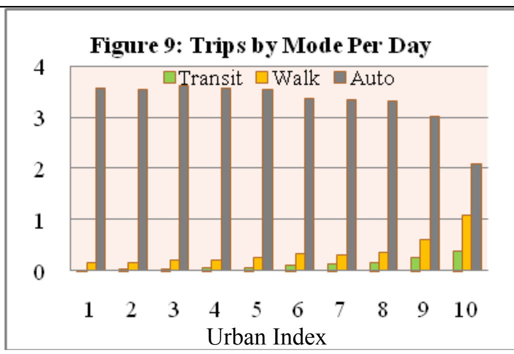


Figure 9: Trips by Mode Per Day

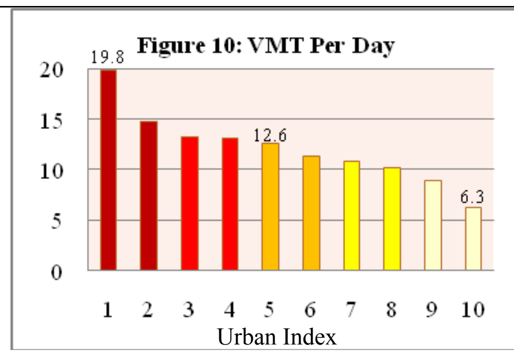


Figure 10: VMT Per Day

Source: Keith Lawton, 2001

Community design and building energy use. Expanding the urban index story beyond VMT reduction to building-scale energy consumption and GHG emissions further emphasizes the importance of sustainable and efficient neighborhood and community design in meeting climate change and energy targets. The design and housing program of typical suburban development over the past decades has emphasized size, private open space, and uniformity at the expense of energy efficiency, resource conservation, and infrastructure efficiency.

At the same time, the one-size fits all housing profile of the American suburban landscape has become increasingly out of touch with demand and the changing demographic profile of the American population. For this first time, single-person households outnumber married-couple households. People in their mid-twenties and the aging baby boomers represent the fastest growing portions of our population (Haughey, 2005). With this changing population come changing real estate preferences. Yet, despite these shifts, housing products have spent the last decade or so chasing an American Dream that no longer fits the average American – and certainly not the average American of the coming decades.

A shift towards more compact development that includes a wider diversity of higher density housing products meets this unmet and burgeoning demand and fosters more energy efficient and resource conserving communities. Data from the Energy Information Administration highlights how over-reliance on larger single family products leads to higher energy consumption per household and much higher household energy costs. Homeowners and renters in townhome and multifamily housing products consume far less energy and thus spend less of their household income on energy. Energy cost savings for multifamily households in 2-4 unit buildings was nearly $340 per year in 2001, and households in higher density housing products saved more than $920 per year, when compared to single family households. This cost savings, along with household transportation cost reductions, is an important component of overall housing affordability – total household energy cost will no doubt become even more of a factor if energy prices continue to escalate as projected (the cost per barrel of oil was at a record high of $112 as of this writing).

Table 4. Energy Use and Expenditure by Unit Type

	Single Family		Apartments in Buildings With			
	Detached		2-4 Units		5+ Units	
Physical Units/Household	Use	Dollars	Use	Dollars	Use	Dollars
Electricity (kWh)	11,965	$1,041	7,176	$704	6,204	$605
Natural Gas (1000 cf)	80	$785	70	$754	28	$300

Source: U.S. Energy Information Administration, 2001 Residential Energy Consumption Survey

This energy savings benefit is further expressed in a study of the impacts of urban sprawl on residential energy consumption completed in 2006. Detailed analysis documented an average 13 percent reduction in per household energy use in areas of more compact development, where a higher proportion of housing is on smaller lots (attached and detached single family) and in multifamily products (Rong, 2006). We will see how these pieces all fit together as we examine alternative master plans for the Southeast Growth Area in Fresno, California.

Designing a More Sustainable Future – Fresno's Southeast Growth Area

California's Central Valley is one of the fastest growing regions of the United States. It also faces some of the toughest challenges related to air quality, energy and water supply, loss of agriculture lands, housing demand, VMT escalation, and GHG emissions. Fresno, one of the largest and fastest growing cites in the Valley (nearly 300,000 additional households are expected in the metro area by 2050), has seen disinvestment in its downtown, spiraling VMT growth, increasing strain on its transportation system, and significant water supply, energy, and public health challenges related to rapid growth and suburbanization over the past decades. Fresno is in 'severe' non-compliance with federal air quality standards (asthma rates are some of the highest in the nation), and will soon be faced with state (AB32) and perhaps federal GHG reduction targets and regulations. A shift in land patterns and a bold move towards more sustainable community designs will be essential if Fresno is to comply with these regulations and meet its own goals for improved environmental, fiscal, and community sustainability.

Empowered by a greater understanding of the negative environmental impacts, fiscal inefficiencies, and community health issues of the last decades of growth, the City of Fresno is carving out a new, more sustainable future in the design of its next growth area, known as the Southeast Growth Area, or SEGA. Plans for the SEGA, under development as of this writing, will serve as a model for how to better accommodate future population growth to meet VMT and GHG reduction targets and reduce energy consumption. It will also show how a more compact land form, organized around transit, walkability, and community health can protect valuable agricultural lands, spur broad-based economic development, and make better use of limited resources and infrastructure dollars.

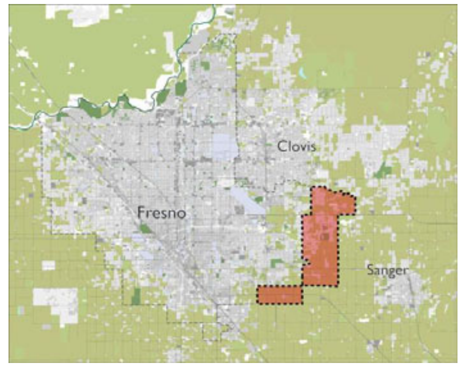


Figure 11. Fresno's Southeast Growth Area, shown in red, lies at the edge of verdant farmland and a rapidly expanding urban area.

Planning and designs for this growth area will demonstrate how regional location and community design can result in a truly sustainable development pattern – one that meets aggressive and interrelated goals of environmental, community, and fiscal sustainability. The concept of sustainability is not a mere buzz word or vague policy goal in the SEGA planning process. Alternative plans and designs are being put to the test and analyzed to ensure they meet goals and targets, and to bring a truly informed discussion about Fresno and the region's future to citizens and decision makers.

Figure 12. The planning process for SEGA aims to meet aggressive goals for community, fiscal, and environmental sustainability. Attainment of these goals is measured by advanced technical modeling of metrics such as VMT, GHG emissions from buildings and mobile sources, water and energy demand, and total and household infrastructure cost.

For greenhouse gas impacts, alternative designs will be compared for both their building and transportation-related emissions. Detailed modeling of housing programs, energy demand reduction measures, and on-site generation capacity will provide a comprehensive view of energy consumption and related GHG emissions. Similarly, enhanced transportation systems modeling will clearly express the consequences of alternative plans for VMT, air pollution, CO_2 and GHG emissions, and travel mode choice (auto, walk, bike, transit). Modeling will also incorporate water demand and supply issues, and the cost to supply infrastructure to alternative land use patterns and urban designs.

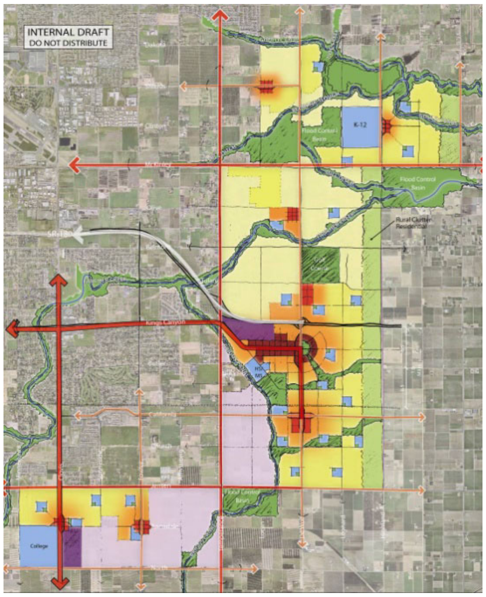


Figure 13. This preliminary draft of one of the SEGA design alternatives expresses a hierarchy of mixed use centers, organized along transit and roadway infrastructure, which form the urban structure of the plan. Open spaces integrate essential bicycle and pedestrian linkages, serve as key recreation areas, perform important storm water retention and detention functions, and integrate a hierarchy of community agricultural uses into the urban environment.

The end-result of the SEGA planning process (a draft specific plan expected in summer 2008) will be a model for sustainable development in Fresno and the Central Valley, *and* the specific design and development regulations to make it happen. The final plan will include targets and regulations related to urban design, street design and connectivity, energy and water demand reduction, infrastructure provision and phasing, and community agriculture. The adopted specific plan will serve as a comprehensive blueprint to guide Fresno in meeting its sustainability challenges, and will clearly link the physical plan for the 9,000 acre site to the policies required to get there. With a plan clearly linked to an extensive array of measured outcomes, it will provide important context to the ongoing debate on how to effectively integrate GHG reduction and energy and resource conservation into the environmental review process of the California Environmental Quality Act (CEQA). It will also provide project-based evidence to bolster discussions about how cities and regions across California can meet the GHG reduction targets of AB32, and will lay out an exemplary implementation framework for other cities and regions across the Central Valley and California.

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