THINKING AHEAD

HIGH-SPEED RAIL IN SOUTHERN CALIFORNIA

PREPARED BY
INSTITUTE OF TRANSPORTATION STUDIES
SARAH L. CATZ, DIRECTOR, CENTER FOR URBAN INFRASTRUCTURE
ADAM CHRISTIAN, CENTER FOR URBAN INFRASTRUCTURE
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UCIrvine
University of California, Irvine

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LIST OF ABBREVIATIONS

AB 32	Assembly Bill 32 (California)
ARC	Anaheim Rapid Connection
ARRA	American Reinvestment and Recovery Act
ARTIC	Anaheim Regional Transportation Intermodal Center
BRT	Bus Rapid Transit
CAHSR	California High-Speed Rail
CARB	California Air Resources Board
CBD	Central Business District
CEQA	California Environmental Quality Act
CHSRA	California High-Speed Rail Authority
CSI	Cambridge Systematics
EIR	Environmental Impact Review
FIRE	Finance, Insurance, and Real Estate
FT 1Y	Full-Time One-Year
GHG	Greenhouse Gases
HOV	High-Occupancy Vehicle
HSR	High-Speed Rail
MPO	Metropolitan Planning Organization
MTA	Metropolitan Transportation Agency
NEV	Neighborhood Electric Vehicles
NPV	Net Present Value
OCTA	Orange County Transportation Agency
RHNA	Regional Housing Needs Assessment
RTP	Regional Transportation Plan
SB 375	Senate Bill 375 (California)
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
TOD	Transit-Oriented Development
TPL	The Trust For Public Land
VMT	Vehicle Miles Traveled

I INTRODUCTION

Highlighting the importance of federal investment in an interstate highway, President Eisenhower declared in his 1955 State of the Union address: "A modern highway system is essential to meet the needs of our growing population, our expanding economy, and our national security." Fifty-five years later, President Obama also announced a transportation plan that would produce jobs and enhance national security. But this 21st Century plan is considerably different from Eisenhower's, in that if successful, it would dramatically reduce our dependence on cars and the nation's demand for oil.

In January 2010, President Obama announced the recipients of an unprecedented $8 billion federal stimulus grant that will jumpstart high-speed rail service on thirteen corridors across the United States. California is to receive the largest share of any state, $2.34 billion, with $2.25 billion allocated to a dedicated high speed rail system (to be matched by state funds from Proposition 1A), and the remainder allocated toward regional transit projects. The likely scenario is that the majority of the funds arriving in California will be spent on construction in Southern California on a high-speed rail line from Los Angeles to Anaheim.

Excited by the potential of this investment for their constituents, many key political leaders are already touting the myriad benefits of a fast, convenient, and efficient intercity rail system, including lower carbon emissions, improved mobility, jobs and economic revitalization, and less dependence on foreign oil, which in turn will strengthen our national security. United States Secretary of Transportation Ray LaHood recently pointed out in a press release that high-speed rail will "not only … create good jobs and reinvigorate our manufacturing base, it's also going to reduce our dependence on fossil fuels and help create livable communities. I have no doubt that building the next generation of rail service in this country will help change our society for the better."

Just as the Interstate Highway System transformed the way Americans live and where they work, high-speed rail has the same transformative potential. In the arena of transportation, it is a disruptive technology, with the power – as LaHood noted – to reshape entire regions and communities in a more sustainable manner. Southern California will be ground zero for this transformation: of the seven corridor segments identified in the California High Speed Rail Authority business plan, Los Angeles to Anaheim is currently the most advanced in the planning and environmental review process, and could see limited service commence as early as 2017.

For a long time, Southern California has been known as a desirable place to live and work. The region has added over 2 million people since 2000. Despite a dramatic economic downturn, it is still projected to add over 6 million additional people over the next 30 years.

All of the Southern California counties have invested in transportation infrastructure during the last twenty years. Orange County, in particular, has seen heavy investment – mostly through the addition of freeway lanes, a toll road network, additional high occupancy vehicle (HOV) lanes, the inauguration of commuter rail service and surface street improvements, much of which was funded by a one-half cent sales tax known as "Measure M".

For the most part, these investments have delivered incremental improvements and capacity enhancements to the existing transportation networks. High-speed rail will, on the other hand, bring to the Southern California region a new and faster mode of interregional travel, with substantial time-saving and cost advantages over both auto and air networks for the vast majority of destinations served by the proposed CAHSR corridor. This study will analyze some of the benefits likely to be reaped from high-speed rail, specifically in Orange County, and what strategies are needed to ensure that cities around the region can take advantage of the investment about to be made in California. It will also examine high-speed rail's impact in relation to recent legislative initiatives that mandate a reduction in statewide greenhouse gas (GHG) emissions (AB 32), and the coordination of regional land use and transportation planning (SB 375) in support of those reduction targets.

AB 32 and SB 375 have recently come under attack by those who perceive a fundamental conflict between economic growth and environmental protection. In particular, some economists predict that regulatory curbs on GHG emissions

could raise energy prices for California consumers and businesses, making the state less competitive and damaging the prospects for a recovery. Proposition 23, currently on the November 2010 statewide ballot in California, would suspend implementation of AB 32 until long-term unemployment in California reaches a pre-recession level of 5.5% for at least four consecutive quarters.[1] Proposition 23, if passed, would also put SB 375 into jeopardy since the two pieces of legislation are highly interdependent.

High-speed rail's delivery of both economic and environmental benefits therefore represents an important convergence of policy objectives, an opportunity to shift the terms of the debate by demonstrating how a transformative large-scale infrastructure project such as high-speed rail would contribute favorably to both desired outcomes: more robust employment growth, specifically in the "green" jobs sector, and a lighter carbon footprint for each of Southern California's projected nearly 21 million residents by 2035. The project's positive economic impact deserves to be more thoroughly analyzed and understood not only by regional planners and policymakers, but the public at large.

More specifically, the goals of this study were to:

- Quantify some of the regional economic benefits likely to be captured by Southern California transit users and adjacent communities, such as reductions in GHG emissions, improved community health (from increased levels of physical activity among regular HSR users as well as residents of new walkable, TOD communities), HSR-induced employment growth, and the increased accessibility of affordable housing;

- Outline the principles of an effective intermodal strategy that would increase ridership on the future CAHSR system, including complimentary investments that could be made in connecting transit systems and alternative mobility concepts;

- Understand the role of high-speed rail in advancing compliance with SB 375's GHG emissions reduction targets;

- Assess the effectiveness and value of regulatory incentives provided under SB 375's Sustainable Communities Strategy for local governments and developers to build high density, mixed-use communities near transit corridors;

- Evaluate the scale of regional opportunities for transit-oriented development around HSR stations in Southern California, based on current zoning and the availability of land suitable for intensified development;

- Identify strategic land use/planning concepts conducive to future CAHSR ridership and station area (re)development;

- Recommend policies that cities and public agencies can undertake to maximize the benefits of high-speed rail at the local and regional level.

II SUMMARY OF FINDINGS

- During its construction phase (2012-2020), the CAHSR project will contribute a regional income benefit of $701m (NPV @ 4%) to Southern California workers who would have otherwise been unemployed. Together with design/engineering work for Phase II of the system, it will provide the equivalent of over 57,000 full-time, one-year jobs (or multi-year employment for approximately 15,200 workers). Construction of the Anaheim Regional Intermodal Transportation Center (ARTIC) will create an additional 3,500 to 5,000 jobs in Orange County based upon estimated project costs of $179m.

- By 2035, high-speed rail will attract over 127,000 permanent jobs to Southern California that would not have otherwise been created, thanks to the region's increased livability and enhanced transportation network. The opportunity to locate these jobs near HSR stations and other transit hubs is valuable and should be encouraged through supportive zoning and additional policy incentives. Compared to other metropolitan areas with HSR corridors, the percentage of Southern California jobs located in or near downtown areas/CBDs is low. The concentration of business and industry around HSR stations would be reciprocally beneficial both to system ridership and the regional economy. The sectors in Southern California most conducive to this type of clustering and agglomeration benefits include health care and financial/real estate services.

- The CAHSR system would be a major catalyst for the continued expansion of Southern California's emerging "green" economy, which from 1995 to 2008 dramatically outpaced the average statewide rate of employment growth, according to a recent study by Next 10, a San Francisco-based think tank. The green economy includes new goods and services related to energy efficiency and production, high-performance building/construction materials, and low-emission vehicles/equipment, among others. 77% of the new permanent jobs in Southern California attributable to HSR would be created in sectors with a high concentration of fast-growing "green" specializations.

- High-speed rail would prevent the emission of nearly half a billion pounds (220,000 metric tons) of CO_2 annually by 2035, based on the number of intraregional auto trips diverted to HSR. An additional three billion pounds of CO2 (1,365,300 metric tons) would be creditable to the SCAG region as a net reduction in CO_2 emissions under SB 375 implementation guidelines currently being drafted by CARB, based on the number of long-distance, interregional HSR trips originating or ending in Southern California. In Orange County alone, the annual net reduction from both intra- and interregional HSR trips in 2035 would total over one billion pounds (463,715 metric tons), or over one-third of the SCAG total, based on estimated ridership to and from the intermodal Anaheim HSR station during Phase I of CAHSR operations.

- HSR commuters who ride at least four times a week would directly benefit from increased levels of physical activity from walking and/or biking for some portion of their trip. Improved health outcomes attributable to HSR, achieved in tandem with the development of walkable, transit-oriented communities, would total between $50 million and $132 million in reduced medical costs over a fifteen-year period (2020-2035, discounted in 2010 dollars at 4%), depending on the ridership scenario.

- The amount of land currently zoned at an appropriate level of density to qualify for SB 375's "transit-priority" incentives—within one-half mile of a major transit stop or corridor—remains too low to make an appreciable difference on future regional development patterns. The cooperation of local governments in modifying zoning and land use codes will be key to implementing the Sustainable Communities Strategy element of SB 375.

- Assuming additional land is rezoned for higher residential densities, the restrictive conditions attached to SB 375's "Sustainable Communities" project designation will increase project costs for the private developer, effectively diluting the value and effectiveness of the regulatory relief from CEQA review provided under the law. Therefore, local governments must step in with additional incentives to make high-density TOD financially viable,

especially for affordable housing projects, either through contributions of city-owned land or publicly-sponsored financing for associated parking or open space amenities.

- The large amounts of new parking required at HSR and existing commuter rail stations in Southern California, estimated at over 14,000 spaces under conventional traffic modeling conducted by the CHSRA, could be partially reduced with low-cost connectivity concepts that would deliver commuters to HSR stations via other modes. Some of the funds that would otherwise go toward the construction of parking facilities, estimated to cost as much as $565 million for Phase I ($40,000 per space), could be diverted to support these alternative mobility networks.

- Parking structures at HSR stations could be designed and constructed as air rights projects, capable of accommodating increased building densities in the future, with housing, retail, and office uses progressively added to the structures as the market demand for transit-oriented development increases in a given market. These types of structures could not only mitigate the potential negative urban design consequences of conventional parking facilities, which tend to crowd out pedestrian-oriented uses, but the sale of air rights could help local governments recoup some or all of the capital costs of construction.

ECONOMIC AND COMMUNITY BENEFITS OF HIGH-SPEED RAIL

In 2007, Cambridge Systematics (CSI) conducted a benefit-cost high speed rail study for the CHSRA that took into account a vast array of value-creating factors directly attributable to a new high-speed rail system in California, including savings to commuters and intercity travelers from competitively-priced train fares, a reduction in vehicle hours travelled and traffic accidents, and operational cost savings to airlines and airports from reduced idling times on runways, thanks to a substantial percentage of trips diverted to high-speed rail.

Less explored were various "downstream" benefits that the CSI study did not explicitly quantify, but would also contribute positively to the Southern California region, including the potential impact on air quality (specifically in terms of GHG emissions), community health, and the types of jobs likely to be created (as opposed to the raw number of jobs).

A. JOBS

i. Short- to Intermediate-Term Economic Effect of CAHSR

On a statewide scale, the HSR system would directly generate 160,000 construction-related jobs (or the equivalent of 600,000 full-time one-year [FT 1Y] jobs) in the period 2012-2020, with more than 320,000 permanent jobs resulting "both directly and indirectly from the system—including jobs in tourism, transportation, services and security." Related jobs in the economy would "continue to grow to more than 450,000 by 2035 and beyond."

According to a recent CHSRA press release, construction-related employment specific to Southern California is estimated in the range of 53,700 FT 1Y jobs for the LA/Anaheim segment and roughly 4,000 for preliminary work/engineering on the Palmdale/LA segment, for a total of 57,700 FT 1Y jobs.[2] (In terms of actual *workers* employed, this total will be lower, as most workers are likely to

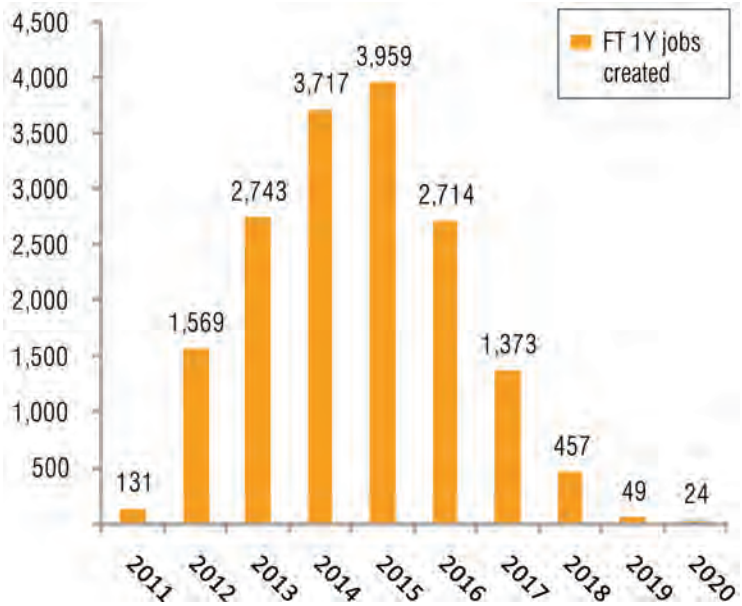

FIGURE 1. ESTIMATED NUMBER OF FT 1Y JOBS CREATED BY CONSTRUCTION OF CAHSR SYSTEM GOING TO OTHERWISE UNEMPLOYED WORKERS IN SOUTHERN CALIFORNIA, BY YEAR

retain their jobs for multiple years over the duration of the project's construction phase.)

Based on various CHSRA sources, each construction-related job will last for an average 3.75 years. Thus the total number of ***workers employed*** during construction of the CAHSR system in Southern California will be closer to 15,400. Unemployment in the construction sector is currently around 10%, meaning that the project will provide full-time, multi-year jobs to 1,540 workers who would otherwise be unemployed, assuming a high level of unemployment persists through 2012 (when construction must commence under ARRA rules).

For its calculations, the CHSRA also employs a generally accepted metric of 20,000 direct/indirect FT 1Y jobs created per $1b of infrastructure spending. Applying this metric to the estimated construction costs for both ARTIC and the LA/Anaheim and Palmdale/LA segments, we can estimate the regional income benefit that would likely go toward otherwise unemployed workers over the duration of the project, assuming a progressive return to normal employment levels between 2011 and 2020. During this nine-year spending horizon, the regional income benefit amounts to $701m (NPV @ 4%), equivalent to over 16,700 FT 1Y jobs for the unemployed. The most jobs created in any one year would peak at just under 4,000 in the year 2015 [see Figure 1; Appendix A].

ii. Long-Term Employment

Of the 320,000 new permanent jobs attributable to the CAHSR system (created between now and 2035), the Southern California region is projected to capture approximately 127,000, or nearly 40% of the statewide total. Overall, the CAHSR system is expected to induce an additional population and employment growth increase of 1.0% and 1.3%, respectively, beyond the growth that would occur in a no-project scenario without HSR. The accelerated rate of growth reflects the region's increased desirability and attractiveness as a place to live and do business thanks to the mobility benefits afforded by better transportation infrastructure.

According to a 2008 study by the Orange County Business Council (OCBC), Orange County is likely to capture 23,000 of those new jobs by 2020, which will in turn generate approximately $103 million in additional tax revenue annually by 2030.[3] The majority of employment growth will be in the finance, insurance and real estate (FIRE) sector with additional gains in business and professional services and tourism.

While the job-related benefits are well-known and extensively cited by CAHSR proponents, less examined is how high-speed rail might both reinforce existing regional economic advantages in Southern California and create new types of synergies. What types of workers will be most likely to use the network for commuting/business purposes, and how might existing economic sectors in Southern California reorganize and concentrate their operations as a result of a high-speed rail network, in order to take advantage of the expanded labor pool that this network makes possible?

Currently, five sectors account for just over half (51%) of systemwide ridership on Metrolink, the existing regional commuter rail system: government (14%), FIRE (finance/insurance/real estate, 11%), human/health services (9%), and construction (7%). HSR is likely to exhibit a similar tendency to attract a higher proportion of jobs in the services, government, and FIRE sectors, ie. those most compatible with locations in higher-density corporate office settings.

iii. CAHSR's Impact on Southern California's "Green" Economy

Of the 127,000 new permanent jobs forecast to be created by the CAHSR system in Southern California, some are likely to be in traditional economic sectors, but many will represent new growth in emerging "green" subsectors across the fields of energy, transportation, real estate, and manufacturing.

A recent report by Next 10, a San Francisco-based think tank, studied the distribution of "green" jobs across the California economy and concluded that the average annualized growth rate for "green" subsectors between 1995 and 2008 was substantially higher than that of the California economy as a whole. Employment in these businesses grew 36% while total jobs in the state expanded by only 13%. The core "green" economy was defined as "products and services that will enable the entire economy to transition to clean energy sources, improve resource efficiencies and reduce pollution."[4]

The Next 10 study further quantified "green" employment growth by subsector and region. In the Los Angeles area, for example, energy generation jobs grew by 35% between 1995 and 2008 (p. 22), while energy efficiency jobs increased by 77% (p. 25). In Orange County, green transportation jobs jumped 1,875%, including the production of alternative fuels, motor vehicles, and equipment.

Extrapolating the insights of this study, it is possible to identify in greater detail the types of occupations that would directly benefit from increased demand for goods and services created by the CAHSR system [Figure 2]. While these types of "green" jobs are slated to become an increasing proportion of future employment growth in California whether or not a high-speed rail system is constructed, the completion of CAHSR project would be a major catalyst for the continued growth and expansion of Southern California's green economy. According to the CHSRA's projection of 2030 employment, 77% of the new permanent jobs in Southern California attributable to HSR would be created in supersectors identified by the Next 10 study as having a high concentration of fast-growing "green" specializations [see Appendix B].

Opponents of California's GHG reduction strategy have recently sponsored a statewide ballot proposition to halt implementation of AB 32, the main enabling

"GREEN" SUBSECTOR	AFFILIATED SUPERSECTOR(S)	POTENTIAL RELATION TO CAHSR SYSTEM
Energy Generation	TCU	solar, wind, and other renewable energy production to power HSR trains
Green Building	Construction/Services	design/construction, advanced materials, real estate development near HSR stations
Transportation	TCU/Manufacturing	clean vehicles/equipment, alternative fuels to support HSR operations
Energy Efficiency	Services	consulting/engineering for new systems installation, retrofits of existing buildings
Financial Services	FIRE	carbon offsets trading, venture capital for related green technologies, green project financing

FIGURE 2. CONCEPTUAL MATRIX OF GREEN ECONOMY + CAHSR SYSTEM

legislation behind this strategy, until average long-term unemployment rates drop to 5.5%, or pre-recession levels. Some economists have bolstered the rationale for a temporary rollback of AB 32 by claiming that regulatory curbs on CO2 emissions will raise energy costs for consumers and businesses, and potentially cause further job losses just as the California economy begins to recover in 2010 and beyond.

The combined analysis of the CHSRA and Next 10 would, on the contrary, appear to indicate the convergence of economic growth and GHG emission reductions in the form of new industries and technologies promoting "green" energy generation and transportation, with HSR likely to accelerate job growth in these subsectors.

B. AIR QUALITY

In California, the failure to meet basic air quality requirements is a factor in an estimated 8,800 premature deaths a year. The main culprits are fine particulate matter, including diesel exhaust particles, ground-level ozone, and nitrogen oxide, which contributes to the formation of smog.

High-speed rail has been cited as part of the solution because it would help moderate increases in vehicle miles travelled (VMT) relative to population growth.

Whereas the cost externalities associated with air pollution from highway travel are already quantified in the CHSRA benefit-cost study, the value of reduced GHG emissions is not included, due to the fact that "analysis methods are still being developed," even as the authors recognize high-speed rail's potential to lower transportation-related GHG emissions, which account for 40% of the statewide total.

Even if CO_2 reductions attributable to HSR cannot be accurately monetized today, the emergence of carbon pricing schemes, including "cap and trade" regulations currently under consideration at both the state and federal level, makes it more likely that there will be an assignable market value to CO_2 emissions in the near future. The State of California may also award discretionary grants to regions that exceed reduction targets, or local jurisdictions that meet specified standards related to SB 375 implementation.

If nothing else, SB 375's aim to reduce GHG emissions will give HSR a direct and valuable role in regional compliance efforts. Depending on the technology ultimately adopted for the California system, HSR would consume as a little as one-fifth the energy of a single-occupant vehicle and one-tenth that of an airplane on a per-passenger seat basis.[5] The CHSRA's intent to use 100% renewable energy to power high-speed trains will virtually eliminate the GHG emissions associated with its passenger operations. Southern California stands to benefit disproportionately from HSR's air quality benefits given the high volume of commuting trips concentrated in the Palmdale-Anaheim corridor segments as forecast by CHSRA ridership estimates.

Regional targets for 2020 and 2035 defined by SB 375 will likely be expressed as a percent per-capita GHG emission reduction from a 2005 base year. With HSR's start of operations planned for 2020 (and potentially as early as 2017 with more limited service), its GHG reduction impact would be most relevant to the 2035 target. At that time, SCAG's regional population is estimated to be nearly 21 million. The 484 million lbs annual reduction in CO_2 emissions attributable to HSR thus translates into a per-capita decrease of 23.1 lbs based on intraregional trips only [see Appendix C].

If local cities do their part in encouraging land-use policies and development patterns supportive of the choice to use HSR for intraregional and longer-distance trips over other modes of transport that are more energy-intensive, they can plausibly count a portion of these savings toward reduction targets under the regulations being developed by the California Air Resources Board (CARB). In terms of apportioning emissions from interregional travel, CARB's preliminary guidelines recommend that "travel associated with an MPO-to-MPO trip generally be split equally between the two MPOs."[6] Therefore, any long-distance trip on the high-speed rail system originating or ending in the SCAG region that is diverted from either the auto or air travel network would represent a creditable net reduction in GHG emissions. Using this more liberal standard, the annual reduction in CO_2 emissions attributable to HSR rises to over three billion pounds, or a combined per-capita decrease of 166.5 lbs in 2035 based on both intra- and interregional trips [see Appendix D].

C. COMMUNITY HEALTH

A number of studies have examined the relationship between community health and the built environment. While the root factors behind weight-related diseases are complex, a broad scientific consensus has emerged pointing to the prevalence of auto travel in American cities—and consequent lack of opportunities for routine daily exercise via walking or biking—as a contributing factor in increased body fat percentages, incidences of obesity, and chronic medical conditions such as diabetes and high blood pressure.

The Center for Disease Control recommends that adults average at least 22 daily minutes in moderate physical activity, such as brisk walking, to stay fit and healthy.[7] Overall, fewer than half of American adults achieve this target, but most public transportation passengers meet this target while walking to and from transit stations. In multivariate analysis, rail users, minorities, people in households earning $<$\$15,000 a year, and people in high-density urban areas are more likely to spend $\geq$30 minutes walking to and from transit daily.[8]

Concurrently, new research by the journal ***Health Affairs*** shows medical spending averages \$1,400 more a year for an obese person than for someone who's a normal weight.[9] The Trust for Public Land (TPL) also estimates that modest amounts of physical activity can reduce annual medical costs by \$250 for people under 60, and by as much as \$500 for people over 60, for those who are not necessarily overweight or obese.[10]

To the extent that high-speed rail will create new opportunities for walkable districts in areas that were not previously served by alternative modes of transit, and provide an enhanced level of multimodal transit access in others, it can help to improve community health throughout Southern California, with the economic benefits accelerating over time as the integration and expansion of high-speed rail into connecting local transit systems encourages more efficient travel patterns and the development of transit-oriented communities. Whether or not these health benefits materialize in the long term is of course dependent upon the nature and quality of the neighborhood design around transit stations.

Based on the CAHSR Ridership & Revenue forecasts jointly prepared by Parsons-Brinkerhoff and CSI, it is possible to estimate the number of high-speed rail passengers who would otherwise be inactive or sedentary but are induced to meet targets for minimum levels of daily recommended physical activity, and thereby quantify the health benefits attributable to HSR. Health benefits are based on two assumptions about shifts in user behavior:

- The number of residents located within a half-mile of high-speed rail stations in Southern California will increase at a rate higher than that of surrounding areas without high-speed rail (contingent, as stated earlier, upon the implementation of policies to incentivize transit-oriented development with a residential component). Some of these new residents will walk directly to and from stations, and generally increase their level of physical activity by using alternative modes of transit for other personal and leisure trips.

- Some of the intraregional commuters who use high-speed rail to access jobs in business districts, even if their trips involve auto travel at the point of origin or egress from the station, will likely incorporate walking and/or biking into their daily routines for some portion of the trip and thereby benefit from increased levels of physical activity.

- Households earning <$15,000/year are also highly likely to be the beneficiaries of public health insurance programs such as Medi-Cal, which means that any reduction in annual medical spending due to increased levels of physical activity and fitness will not only accrue to individual users, but translate into direct cost savings to government programs.

The 2008 Revenue & Ridership Study and updated 2009 Business Plan estimate the number of Southern California intraregional commuters on the high-speed rail system in 2030 under various scenarios:

1. Phase I only (southern terminus at Anaheim), with HSR fares priced at 50%, 77%, or 83% of the average equivalent airfare. These riders undertake short-distance trips wholly within the Los Angeles/Orange Basin.

2. Full System (extension of Orange County segment to Irvine, plus Phase II extension to San Diego via the Inland Empire), with the cost of auto/air travel assumed either to remain stable relative to 2008 costs, or to increase 8% in real costs beyond inflation. In addition to trips within LA/Orange, these estimates count ridership within the San Diego region.

CHSRA's forecast does not provide a fine-grain, detailed breakdown of intraregional travel by trip type, specifically the ratio of business/commuting trips to personal/leisure trips. As previously stated, for statewide ridership on the CAHSR system, the split is projected to be 55:45, but for these shorter trips, the proportion of commuters is likely to be much higher. The best, most reasonable estimate for Southern California comes from Metrolink, the existing regional commuter rail service, since at least some of CAHSR's ridership base would come from Metrolink passengers transferring to faster trains on parallel or similar routes.

Once the number of commuting/business trips is isolated from the total ridership numbers, it becomes necessary to convert the number of ***trips*** back into the number of ***users*** for the calculation of health benefits per user. Personal/leisure trips must be netted out because, although these riders may also accrue health benefits from physical activity undertaken as a result of using HSR for their regional transportation needs, their frequency of use is difficult to establish, and consistent daily exercise is necessary for a user to be reasonably classified as "physically active." For the purposes of this analysis, a "physically active" HSR commuter would take the train at least 4 times per week, or 200 days per year. According to the most recent Metrolink Onboard Survey (2008), those riding the train four or more days a week for commuting purposes increased from 75% in 2006 to 79% in 2008, and it is reasonable to assume that the percentage for high-speed rail will be similar. Around 90% of commuters take

% HSR commuters 4x or more/week	79%	Annual health benefit (60+)	$500
Average annual trips per commuter	400	Annual health benefit (<60)	$250
		% 60 yrs or older	11%

SCENARIO	TOTAL INTRA-REGIONAL TRIPS	COMMUTER TRIPS	CONVERSION TO USERS	<60 YRS	60+ YRS	ANNUAL HEALTH BENEFIT (2035)	SUM OF BENEFITS (2020-2035)
Phase I Only, fares at 50%	10,000,000	7,900,000	19,750	17,578	2,173	$11,475,212	$65,218,045
Phase I Only, fares at 77%	8,300,000	6,557,000	16,393	14,589	1,803	$9,524,426	$54,130,977
Phase I Only, fares at 83%	7,800,000	6,162,000	15,405	13,710	1,695	$8,950,665	$50,870,075
Full System, +8% increase, fares at 50%	20,300,000	16,037,000	40,093	35,682	4,410	$23,294,680	$132,392,631
Full System, +8% increase, fares at 77%	17,200,000	13,588,000	33,970	30,233	3,737	$19,737,364	$112,175,037

FIGURE 3. SUMMARY OF HIGH-SPEED RAIL COMMUNITY HEALTH BENEFITS

the train roundtrip, while the other 10% might regularly use a car, ridesharing arrangement, or alternative mode of travel for the return. Thus, a "physically active" user riding the train at least 200 days per year would make an average of 400 trip ends on the HSR system annually.

Finally, using inflation-adjusted values assigned by the TPL study to regular physical activity for different age groups[11], we can calculate the aggregate health benefits to HSR riders.

Improved health outcomes attributable to HSR in Southern California, achieved in tandem with the development of walkable, transit-oriented communities, would total between $50 million and $132 million over a fifteen-year period (2020-2035, discounted in 2010 dollars at 4%), depending on the ridership scenario [see Figure 3; Appendix E].

The majority of these benefits would accrue directly to the users in the form of reduced out-of-pocket medical expenses, but some direct cost savings to government-sponsored health insurance programs could also be realized. The extent of savings will depend on the pricing scenario ultimately adopted by the CHSRA. Even though households earning below $15,000 represent a disproportionately high percentage of public transit users, the updated CHSRA Business Plan anticipates higher, premium fares than previously publicized, thus reducing the likely percentage of HSR riders earning below the annual income threshold generally necessary to qualify for Medi-Cal and other subsidized programs. Were a lower fare scenario to be adopted, the potential fiscal impact on county and state health budgets would be more substantial.

IV SB 375 AND HIGH-SPEED RAIL: AN OVERVIEW

A. THE SUSTAINABLE COMMUNITY STRATEGY (SCS)

A major component of SB 375 includes the addition of the Sustainable Communities Strategy (SCS) element to the Regional Transportation Plan (RTP). The SCS outlines how regions will meet GHG reduction targets through coordinated land use and transportation planning that supports compact, transit-oriented development.

The adequate provision of housing for all income levels is a major focal point of the SCS, which provides incentives for the development of land close to major transit corridors that is vacant, underutilized, or zoned for a non-residential use. Under SB 375, metropolitan planning organizations (MPOs) are directed to identify all such areas suitable for infill development and increased residential densities without reference to existing zoning ordinances or local land use restrictions. Development projects located in qualifying areas are considered "transit priority" and eligible for exemption from CEQA review or a more limited review process, depending on the fulfillment of other criteria [Figure 4].

Because "transit priority" projects are assumed to achieve a net reduction in GHG emissions compared to a similarly-sized project situated in a transit-inaccessible area, they are exempt from the requirement to address growth-inducing impacts or "cumulative impacts from … trips generated by the project on global warming or the regional transportation network" (Sec. 15 (a)(2)) in the environmental impact report.

For a project to be considered "transit priority" and qualify for streamlined CEQA review, it must not only be located in a Sustainable Communities project area (formally designated as such in the RTP) but meet a set of broader additional criteria.

SB 375 does not override local zoning or land use controls, except in the limited

USE	>50% residential
MINIMUM DENSITY	20 units per acre
MINIMUM FLOOR AREA RATIO (FAR)	0.75 (if >26% non-residential)
MAXIMUM PROJECT AREA	8 acres or 200 units
MAXIMUM BUILDING FOOTPRINT	75,000 sq. ft.
MAXIMUM DISTANCE FROM MAJOR TRANSIT STOP OR CORRIDOR	0.50 mi
BUILDING EFFICIENCY	15% more energy-efficient than code minimum; 25% less water usage than household average
Plus one of the following:	
OPEN SPACE	≥5 acres per 1,000 residents of the project
AFFORDABILITY REQUIREMENTS	20% units for moderate-income, 10% units for low-income, or 5% units for very-low income households OR In-lieu fees sufficient to result in equivalent number of affordable units elsewhere

FIGURE 4. PROJECT REQUIREMENTS FOR SB 375 "TRANSIT PRIORITY" STATUS

case of affordable housing projects denied approval in regions of the state yet to fulfill their allocation for low- or moderate-income units under the Regional Housing Needs Assessment (RHNA). At the same time, the SCS directs each MPO to undertake a formal program and analysis "to identify actions that will be taken to make sites available … with appropriate zoning and development standards" and "demonstrate local efforts to remove governmental constraints that hinder the locality from meeting its share of regional housing needs."

High-speed rail will advance the policy objectives of SB 375 in several ways:

- New and expanded regional transit hubs combining HSR service with increased local connections will expand the geographical reach of "high-quality transit corridors" and hence opportunities for "transit priority" housing projects that reduce regional VMT and GHG emissions.

- Certain performance measures of equity and accessibility assessed in

the RTP (and incorporated into traffic impact modeling under SB 375), including the percentage of the population served by public transit and the percentage of jobs accessible by transit, will likely improve if HSR stations become intensified nodes of development with a full spectrum of residential and employment-based uses.

- Intraregional commuting trips diverted from auto and air to HSR will lead to a net reduction in GHG and help Southern California achieve regional reduction targets set by CARB, the regulatory authority in charge of implementing and monitoring compliance with SB 375.

- Long-distance trips undertaken via HSR originating or ending at any of the stations in the SCAG region (Palmdale, Sylmar, Los Angeles Union Station, Norwalk, and Anaheim) will also be partially creditable as a net reduction in GHG emissions under guidelines currently being developed by CARB. (The total quantity and value of such reductions is further explored under Section III, Air Quality).

B. CHANGES IN TRAFFIC IMPACT MODELING

SB 375 also reforms how state transportation models are generated to better capture the benefits of close-in development, with regional modeling practices subject to review by CARB. MPOs will be encouraged to utilize models that accurately measure the benefits of land use strategies aimed at reducing vehicle trips, such as high-density, mixed-use development with proximity to a transit stop. Under SB 375, traffic impact modeling "should be able to assess the effects of policy choices, such as residential development patterns, expanded transit service and accessibility, the walkability of communities, and the use of economic incentives and disincentives."

Furthermore, it must now take into account:

- The relationship between land use density and household vehicle ownership and VMT
- The Impact of enhanced transit service levels on the above
- Changes in travel and land development likely to result from highway or passenger rail expansion
- Mode splitting that allocates trips between automobile, transit, carpool, and bicycle and pedestrian trips
- Speed and frequency, days, and hours of operation of transit service
- Effect of pricing strategies on vehicle miles traveled and greenhouse gas emissions

V ZONING/LAND USE POLICIES

A. EXPANDED OPPORTUNITIES FOR TRANSIT-ORIENTED DEVELOPMENT (TOD)

SB 375 strikes a delicate balance between local control and statewide mandates in its quest to encourage denser, more compact development patterns around transit in California, consistent with "Smart Growth" principles. By definition, the zoning and land use policies that influence such patterns are subject to the control of individual municipalities along the HSR corridor. Local policymakers and planning officials will ultimately determine the best land uses and regulations conducive to the "right" kind of transit-oriented development (TOD) in their communities. Any strategies for more intensive development will have to be site-specific and responsive to local concerns.

That said, SB 375 will broaden the category of projects eligible for CEQA exemption, thereby increasing opportunities for TOD, if zoning is changed to allow for the minimum residential densities and other requirements specified as qualifying criteria under SB 375. (The previous urban infill exemption provided under CEQA, passed in 2002, was more limited in its application.) If SB 375's incentives work in the manner intended, they will not only make TOD more attractive to the private sector, but intensify pressure on local governments to update general plans and development standards in order to secure the largest possible share of state funding for transportation projects consistent with the SCS.

The cooperation of municipalities in adopting zoning policies supportive of TOD will in turn provide both opportunities for economic growth and reciprocal ridership benefits for the CAHSR system as a whole, augmenting the built-in resident and commuter user base who will find it convenient to incorporate transit into their everyday routines. A number of steps can be taken to capitalize upon the anticipated increase in real estate values and demand for housing/ office space that will be created by HSR:

- Cities and public agencies can identify vacant and underutilized parcels adjacent to station areas.
- Local redevelopment agencies, to the extent that their jurisdictions overlap with station areas, can also take a proactive role in soliciting and coordinating joint public-private development proposals on these parcels.
- Special "overlay" districts around station areas can be implemented to modify zoning regulations related to building heights, allowable densities, parking requirements, and urban design standards.
- Incentive-based zoning can be used to make these development locations more attractive to the private sector. Relief from CEQA review requirements for "transit-priority" projects under SB 375 will further enhance the value of land adjacent to stations.
- Local governments can identify sources of financing (through value-capture or other techniques) for the public spaces and streetscape improvements needed to support the pedestrian/bicycle traffic generated by hub stations, as well as long-term maintenance of the spaces.

Some cities have already initiated a review of zoning ordinances and are planning ahead to accommodate higher levels of density around their transit stations, consistent with the goals of SB 375. In Anaheim, for example, the Anaheim Canyon Metrolink station will be the focal point of a new mixed-use neighborhood, slated to become a complete village of residences, offices, shops and restaurants through supportive zoning practices.

In many localities, however, the amount of land currently zoned at an appropriate level of density to qualify as a Sustainable Communities project remains too limited to make a significant difference in future growth and development patterns on a regional scale.

B. PRINCIPLES OF TOD PLACEMAKING

This section addresses two of the land use components integral to the success of TOD placemaking specifically around HSR stations: employment-based uses and parking.

Traditionally, community planning efforts have focused on the area encompassing a 10-minute walking distance around a given transit hub, based on research showing that the willingness of riders to access transit on foot significantly diminishes beyond one-quarter to one-half mile. SB 375 extends this model by supporting housing projects with a secondary mix of other neighborhood uses, clustered within a ½-mile distance from the station stop. For station areas along commuter and subway/light rail lines, the conventional idea of a "walkable radius" may indeed be appropriate, but it cannot be directly overlaid on HSR locations.

What makes the TOD placemaking principles for HSR stations different? Like airports, HSR stations have a high volume of throughput that makes them more conducive to office/hospitality/tourism uses, as discussed further below. With commuters and business travelers forecast to constitute the majority of CAHSR's ridership base (55% for interregional, 80% or higher for intraregional trips), the proximity of employment-based uses to HSR stations would best serve the needs of its users.

Accordingly, TOD planning efforts undertaken at the local level by cities with HSR stations should encompass a larger radius (1-3 miles) around station areas than the ¼ - ½ mile distance specified by SB 375's "transit-priority" criteria [Figure 5]. According to the OCTA, two-thirds of Orange County's population and jobs are located within a four-mile radius of each of the County's 10 Metrolink stations, highlighting the enormous potential for increased ridership if both future station area development and intermodal connections are executed effectively.[12]

In some respects, by failing to distinguish between local transit and the type of long-distance interregional trips carried by high-speed rail in its definition of "transit priority," SB 375 misses an opportunity to expand opportunities for TOD even further, by applying its regulatory incentives to a much larger geographical area around HSR stations, particularly those with enhanced levels of intermodal transit access.

i. Office/Hospitality Uses

In the interviews conducted for this study, there was a broad consensus among both public- and private-sector participants that cities should focus heavily on employment-based uses as they re-examine their zoning/land use policies in anticipation of HSR.

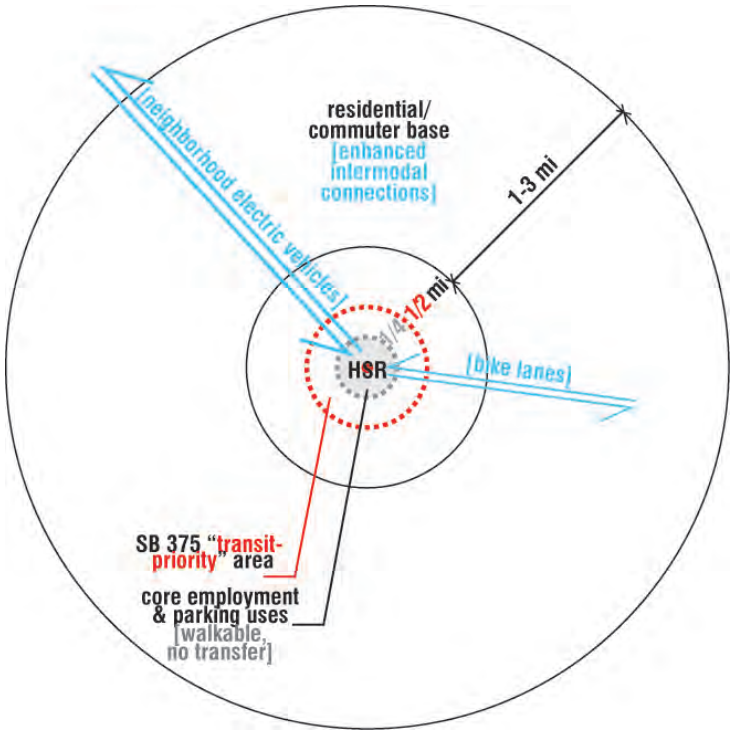

FIGURE 5. LAND USE CONCEPT FOR HIGH-SPEED RAIL STATIONS

The proximity of job centers to HSR stations areas can be one of the strongest reinforcements to transit use. 89% of Metrolink commuters cite work or a business appointment as their primary trip purpose. Over the last twenty years, the addition of employment-based uses to formerly residential "bedroom" communities along Metrolink corridors has stimulated ridership throughout the network.

More generally, the clustering of commerce and industry around HSR stations can lead to valuable agglomeration benefits. Agglomeration refers to the increases in productivity and output that occur as a result of concentrated levels of economic activity in a given area, primarily because businesses have greater, more efficient access to a well-educated workforce, services, and opportunities

for integration and collaboration.

Agglomeration economies often take the form of strong central business districts (CBDs), a key characteristic of successful, well-patronized HSR corridors in other countries. In Japan, the Tokyo-Osaka line services large CBDs with a relatively high share of metropolitan employment, as does the TGV Paris-Lyon line in France. By contrast, Southern California's CBDs are much smaller and less dominant. Downtown Los Angeles contains only 2.5% of total regional employment, compared with 15.6% for Tokyo and 20.1% for Paris. In these cases, HSR has been in operation for years or even decades.

With the proper development and planning incentives, Southern California could similarly bolster and create new concentrations of employment near HSR stations over the long term. Already, conceptual plans for a 25-story office tower located above the Anaheim station demonstrate a strong interest in using the HSR system as a catalyst for future economic growth.

JR Towers, a high-rise complex built atop the Nayoga HSR station in Japan, offers a useful prototype for the proposed CAHSR system [Figure 6]. A combination of retail, offices, a hotel, and parking, it successfully accommodates both workers and tourists in a single, integrated development. This type of multi-use TOD project would significantly reinforce patronage of HSR stations by a broad cross-section of users.

The constellation of destinations made accessible by HSR and connecting systems will be particularly attractive to business and vacation travelers, given the particular geography of Southern California: Union Station is close to major entertainment and tourist venues such as Nokia Live, the Staples Center and Hollywood (via the existing Red Line subway), while Anaheim boasts a Convention Center and Disneyland (via the planned Anaheim Rapid Connection).

ii. Parking

Parking is also likely to emerge as a key land use issue, with transit advocates generally wanting less to discourage driving to/from HSR stations and traffic engineers/developers typically wanting more to accommodate the anticipated demand generated by system ridership and new development projects

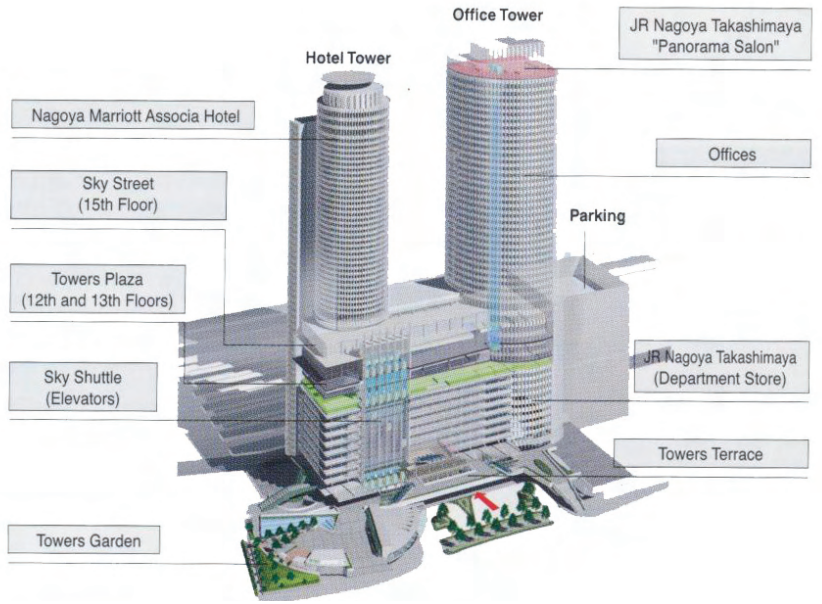

FIGURE 6. JR TOWERS, NAYOGA (JAPAN) HSR STATION

surrounding station areas.

Traffic modeling performed by the CHSRA for the initial statewide EIR/EIS currently calls for vast amounts of new parking at Union Station, Norwalk, and Anaheim to accommodate increased ridership at these stations [see Appendix F]. Recognizing the enormous financial burden and negative urban planning/design impacts that these parking requirements would impose, officials at both Metro and the OCTA have requested that the CHSRA modelers to be more open-minded to other connectivity concepts that might reduce anticipated parking needs.

Regardless of the parking mitigation strategies ultimately implemented, most of the additional parking capacity will most likely still need to be built and provided at the outset of operations. One of the valuable lessons learned by Metrolink is that parking needs were greater than ever anticipated, due to the large catchment areas, especially at outlying and terminus stations. Some riders drive as much as an hour to catch their train in the morning. The CHSRA expects the catchment area for HSR stations to be as much as 100 miles in some cases, with significant parking impacts at commuter rail stations feeding into the HSR corridor.

FIGURE 7. SIXTH STREET GARAGE, DOWNTOWN RIVERSIDE, CALIFORNIA

If adequate parking at HSR stations is a necessity, its cost also constitutes an obstacle to TOD. The provision of an additional 3,600 spaces at Union Station, for example, would equate at minimum to 1.2 million sq. ft. of built area, consuming valuable urban land that could be developed for other, more economically viable purposes.

In the past, when transit agencies have contemplated public-private development ventures on land that an agency owns and is willing to contribute as equity, parking requirements are still prohibitively expensive, because the private developer not only needs to provide parking for the uses that they are adding to the site, but to replace any Metrolink-dedicated surface lot parking that is eliminated as a result of the new development as well. At $20,000-$40,000/ structured space, the parking for most TOD projects cannot be financed by the private developer alone.

Local cities and the CHSRA have yet to negotiate a cost-sharing arrangement for station construction and associated parking facilities. The Authority, while anticipating revenue flows back to local governments from increased land values and economic activity around stations, is still determining how these revenue flows can be used as the basis for issuing debt to finance these costs. The number, location, and pricing of parking spaces, as well as the design of the structures themselves and their integration into station areas, will be critical both to ensuring the accessibility of HSR facilities by passengers and to maximizing value capture from transit-oriented development on which local governments may rely as a source of financing for station maintenance and operations.

Beyond their steep financial cost, parking facilities can also compromise the aesthetics and walkability of station areas, by crowding out more pedestrian-friendly uses. For HSR parking facilities, one innovative option would be to build a structure that could be adaptively reused and converted into other uses in the future, such as groundfloor retail, with residential or offices on the upper levels, as transit's share of the mode split in Southern California gradually increases over time. A similar concept was envisioned in downtown Riverside in the early 1990's– the platform of the city's Sixth Street parking structure was configured to accommodate housing units over parking in case of future demand. Parking was constructed in the first phase to satisfy an immediate need [Figure 7].[13]

Along with their economic and urban placemaking potential, parking structures with decks suitable for air rights projects also present design and operational challenges. One of the primary issues is the need to overbuild the parking so there are spaces for the square footage added by the future development; the longer the interval between the initial construction of the spaces and the development of the TOD project, the higher the carrying cost for the extra spaces. The parking for the air rights project also needs to be physically separated from the public transit parking, which inevitably reduces the efficiencies that can be realized through space management.

The Sixth Street project in Riverside is an interesting design prototype for communities served by HSR stations, especially those without a strong existing intermodal network, because it takes into account the inevitable evolution of land uses and builds programmatic flexibility into the physical structure itself. The incremental addition of revenue-generating uses simultaneously enhances the overall economic vitality of the station areas by increasing the mix and density of uses. Assuming that cities in Southern California share in the construction cost of structured parking at their respective HSR stations, the sale of valuable air rights to future developers could also allow them to recoup part of their original

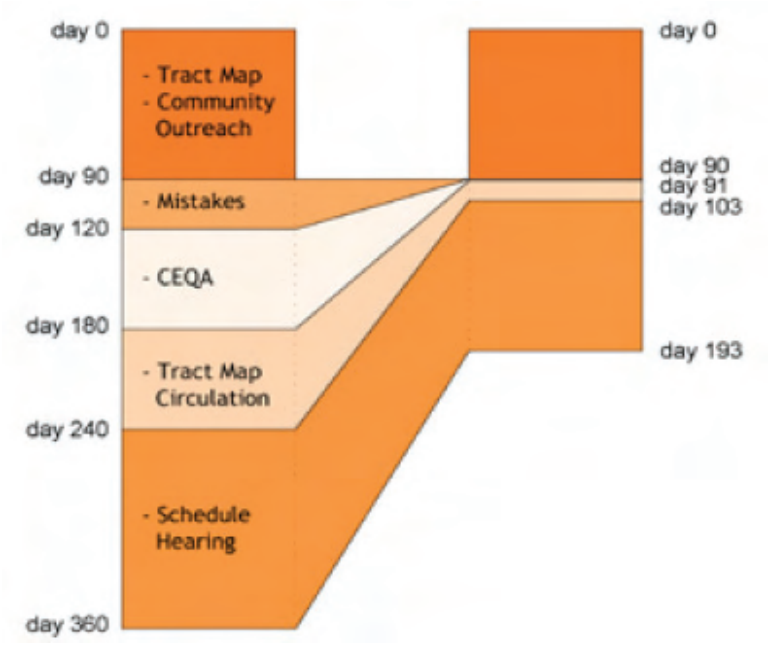

FIGURE 8. POTENTIAL TIME VALUE OF STREAMLINED CEQA REVIEW UNDER SB 375

capital investment.

iii. Affordable Housing

SB 375 imposes new requirements on local governments to consider regional housing needs for all income levels. Local governments must complete rezoning of sites consistent with the housing allocation in the Regional Housing Needs Assessment (RHNA) within three years of the allocation designation, or face limitations on its ability to deny or condition approval of affordable housing projects (defined as containing 49 percent of units for very-low, low-, or moderate-income households).

Low-income households are often those most dependent on transit for their mobility needs, which makes TOD a logical choice for the location of future affordable housing projects. Cities such as Irvine that have yet to fulfill their allocation for affordable housing may find HSR station areas appropriate for high-density residential uses that would be otherwise inconsistent with the predominantly suburban character of its single-family neighborhoods.

The speculative increase in real estate prices expected to occur around station areas in conjunction with the introduction of HSR service in Southern California may at the same time make the inclusion of low-to-moderate income units in TOD or mixed-use projects cost-prohibitive. Furthermore, a survey of recent TOD projects in Southern California suggests that these projects generally command price premiums of 10-15% or more per sq. ft. over comparable non-TOD developments, due to their prime location and higher construction/land costs.[14] Their unit mixes also tend to skew toward studios and one-bedrooms, reflecting their demographic appeal to young single professionals, childless couples, and seniors/retirees. In many cases, these market factors limit the desirability of high-density residential for both low-income groups and larger households with children.

The value of regulatory relief given to "transit-priority" projects under SB 375 is intended to ease some of the financial constraints. According to Southern California-based entitlement and land-use experts, CEQA review under the normal development process can cost up to $500,000 for even a small residential or mixed-use project of 20 units or less. Depending on the scale of the project, the SB 375 CEQA exemption represents on average an upfront savings of $20-30 per sq. ft. for the developer. The greatest value arguably lies in the potential time savings of a streamlined vs. conventional project review [Figure 8]. For a "transit-priority" project, however, this may not be enough to offset increased land costs, plus the development costs associated with the fulfillment of other project requirements (enumerated in Figure 4 above) needed to qualify for this incentive.

The cooperation of local governments in providing additional incentives to private-sector developers beyond those provided under SB 375, such as density bonuses, reduced parking requirements, or "fast track" entitlement, will therefore be essential to encourage a volume of affordable housing production sufficient to meet the requirements of the RHNA.

VI AN EFFECTIVE INTERMODAL STRATEGY FOR HIGH-SPEED RAIL

Recognizing the crucial role that intermodal transit hubs will play in the success of the overall CAHSR system, Proposition 1A, which California voters approved in November 2008 to support and fund a high-speed rail system, specifically allocates $950 million to improving local transit connections to HSR stations.

The California High Speed Rail Authority selected HSR station locations based in part on their potential linkage with local and regional transit, airports, and highways, with the intent that each station become a multi-modal transportation hub with increased levels of ridership and activity.

Now that there is at least $4 billion in combined funding for the project through both Proposition 1A and the American Reinvestment and Recovery Act (ARRA), communities in Southern California affected by the proposed alignment are evaluating the Authority's plans with a higher level of scrutiny. As the CHSRA proceeds through the project-level EIR/EIS phase, planners will have to balance dueling priorities – the pressure to keep costs down, for instance, against the desire to locate high-speed rail stations within existing nodes of development and commercial activity, where the station itself can be more easily accessed and ridership will be higher, but it may be more expensive to acquire land and neighborhood-level resistance to infrastructure projects may be more entrenched.

The need to balance community benefits and impacts is already on display in preliminary discussions between local governments and the CHSRA over the planned location of HSR stations. Planning staffs for the cities of Norwalk and Santa Fe Springs are, for example, currently recommending two station location alternatives with dramatically different implications for intermodal connectivity. The first would establish joint use of the existing Metrolink station, or build a new HSR-dedicated facility in close proximity, while the second would locate the HSR station further afield, without a provision for linking the two facilities. A single transportation center would better facilitate passenger transfers, while a separate location would minimize land-use impacts on surrounding buildings and businesses.

Needless to say, the debate over HSR's benefits and impacts extends beyond immediate station areas. Along the Vernon to Buena Park stretch of the proposed corridor, the cities without a station stop see themselves as suffering all the negative impacts of HSR without enjoying any of the economic benefits of a station. The elaboration of a smart, thoughtful intermodal strategy can help to integrate high-speed rail into the existing fabric of local communities, and create a broader user base in support of the project's economic, health, environmental, and mobility benefits.

If the connecting local systems are efficient, reliable, and easy to use, they also have the potential to save HSR riders the added expenses of a taxi, rental car, private automobile and/or parking, at both trip origin and end. These added expenses make high-speed rail less competitive and reduce overall ridership by essentially negate the pricing advantage that the CAHSR system is intended to offer over both air and auto travel.

A. CONNECTING REGIONAL TRANSIT

Officials at Southern California transit agencies, including Metro, Metrolink, and OCTA, were asked to discuss the regional and local "feeder" systems that would do the most to maximize HSR ridership, as well as the likelihood that such systems could be feasibly built and in operation by 2020, when CAHSR debuts.

Two projects consistently ranked at the top of the "wish list": (1) a Metro Green Line Extension both to LAX Airport and Norwalk Metrolink/HSR facility that would create a seamless plane-to-train link; and (2) the Anaheim Rapid Connection, which would establish a connection between ARTIC and the Anaheim Resort/ Convention Center and dramatically boost rail ridership in Orange County, given the area's 25 million annual visitors.

i. Metro Green Line Extension

Metro's Green Line, roughly paralleling the 105 Freeway between Los Angeles International Airport (LAX) and Norwalk, has long suffered from its reputation as

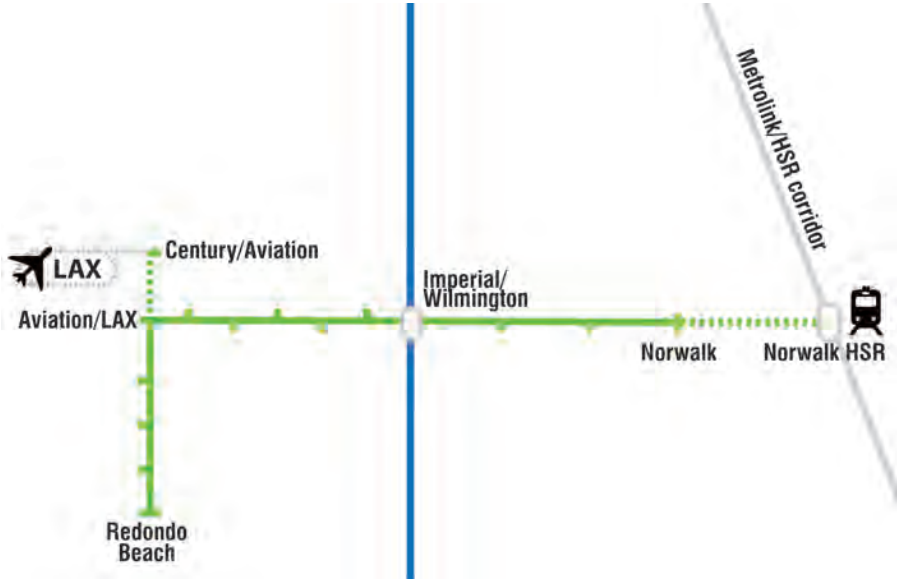

FIGURE 9. PLANE-TO-TRAIN LINK VIA GREEN LINE EXTENSIONS TO LAX + NORWALK HSR STATION

a "train to nowhere," due to the missing rail link between the Aviation station and LAX's airport terminals. But with two key extensions, it could dramatically increase its regional importance as a plane-to-train link, providing an inexpensive and reliable intermodal transfer for some of LAX's 42.5 million annual passengers (2009) and CAHSR's estimated 41.0 million annual passengers (2009 CHSRA Business Plan, for the year 2035).

The first extension would connect LAX directly to Metro's light rail network. One option under consideration is to link LAX to Metro's proposed Crenshaw Line, with a station at Century Boulevard that would transport airport passengers to LAX terminals via a one-mile "people mover."[15] The Crenshaw Line is partially funded and could be completed as soon as 2016-18. To make this plane-to-train link a reality, a second extension of the Green Line would also be necessary. Currently, a three-mile gap separates the current terminus of the Metro Green Line in Norwalk from the Norwalk Metrolink Station [Figure 9].

The challenges, both financial and political, to this second extension are complex, especially within a timeframe that would make it immediately relevant to the debut of a statewide CAHSR system in 2020. To mitigate community impacts, the City of Norwalk would most likely request that a portion of the corridor be built underground, which would increase construction costs. Furthermore, the location of the planned HSR station in Norwalk has yet to be finalized, let alone the feasibility of its integration with a Metro Green Line extension. If more than two transfers are involved between the trip origin at LAX and the trip end at the Norwalk HSR station or vice versa, ridership on a plane-to-train link would be significantly reduced.

These obstacles notwithstanding, many transit officials expressed a renewed interest in building a plane-to-train link via the Green Line, citing the enormous ridership benefits that it would generate for high-speed rail in Southern California. If a HSR station is built at or near the Norwalk Metrolink station, and if the method of Green Line connection could be worked out to the satisfaction of the City of Norwalk, and if such a connection could be incorporated into the Long Range Transportation Plan (LRTP) and funded, an extension of the Green Line from its current terminus to the Norwalk/Santa Fe Springs station could be a smart investment in intermodal connectivity.

ii. Anaheim Rapid Connection

The Anaheim four mile east/west fixed guideway system recently named the Anaheim Rapid Connection (ARC) is another HSR "feeder" project that would serve the Southern California region well. With the planned alignment expected to serve the future Anaheim Regional Transportation Intermodal Center (ARTIC), the Platinum Triangle, Disneyland, and the Anaheim Resort/Convention Center, it would link together entertainment, tourist and sporting venues with major employment centers in Orange County, with massive potential for local ridership and integration with the CAHSR system.

According to the City of Anaheim's website, over the next two years the City of Anaheim will be preparing environmental studies and preliminary engineering and environmental studies, including an Alternatives Analysis Report and a joint Environmental Impact Report/Statement (EIR/EIS) to meet federal and state requirements. The environmental studies will evaluate in detail the impacts and benefits of a fixed-guideway and other project alternatives to identify a locally preferred alternative that will be advanced to the next phase of engineering and implementation.

B. ALTERNATIVE CONNECTIVITY CONCEPTS

Without matching funds from other sources, the limited pool of funds available under Proposition 1A for connecting systems is inadequate to build substantial regional linkages. For the most part, these funds will be allocated to commuter and intercity rail via pre-determined regionally-based formulas. As a result, it may be wise to consider alternative, lower-cost connectivity concepts better suited both to the needs of the HSR passenger and Southern California's dispersed development patterns.

HSR stations are often characterized as "mini-airports" in terms of the volume of users they will attract and the parking they will require. Most of the riders will be taking interregional trips to places like San Francisco, Los Angeles and Anaheim, so transferring between buses and light rail with luggage may not be convenient. In addition, the catchment area for HSR stations – the geographic radius from which the system is project to draw its ridership - will be so large that a fixed guideway system cannot necessarily provide the route flexibility or coverage to be an effective intermodal connections for CAHSR's long-distance commuters.

At least initially, until connecting systems are robust enough to allow seamless intermodal travel to a greater variety of destinations, the majority of HSR passengers are likely to use a vehicle for some portion of their trip. HSR can be integrated with the road network in new, inventive ways that simultaneously help to encourage transit use and reduce regional VMT/GHG emissions.

Alternative connectivity concepts could include:

i. **Express Flyaway buses**. With a capacity of 55 seats, Flyaway buses provide direct bus service to LAX airport from regional transit hubs, including Union Station, Van Nuys, Westwood, and the Irvine Transportation Center. During its first year of operation, the FlyAway from Union Station to LAX transported 250,000 passengers, more than three times the number predicted at the onset of service. By 2008, according to Los Angeles World Airports, the annual passenger count rose to more than 433,000. Furthermore, 69 percent of the riders departing from Union Station used public transportation to begin their FlyAway trip.

ii. **Supershuttle Van/Jitney Concepts**. These programs are shared ride, door to door services that can be expanded to cover areas where transit is not usually operated or not operated efficiently.

iii. **Neighborhood Electric Vehicles** (NEVs). NEVs are four-wheeled vehicles with top speeds of 50 mph and a driving range of up to 100 miles per charge, manufactured primarily for use on local streets with speed limits under 35 mph. In the future, emerging technologies such as NEVs could be part of the solution for the "last mile" between stations and places of employment.

iv. **CityShare/Zipcar programs**. These programs typically operate in dense, urban areas and offer car rental services by the hour, and would work particularly well as alternatives to taxis for frequent users of the HSR service, especially for short, business-related trips. If the program were implemented systemwide and available at all station locations, it would be possible for HSR passengers to use a car at both the trip origin and destination. As incentives, participating cities could offer dedicated, priority spaces at HSR stations and other transit hubs, as well as subsidized or free parking in downtown locations. With daily parking costs anticipated to be as high $32 at San Francisco's Transbay Terminal, the parking benefit could greatly increase the attractiveness and convenience of a CityShare/Zipcar-like program for business travelers.

Instead of being allocated to conventional commuter or intercity rail, Proposition 1A could provide seed funding for incubator businesses that would expand and develop a more robust network of Flyaway bus/Supershuttle type services.

c. New/Expanded Multimodal Hubs

ARTIC, referred to as a joint-development opportunity, proposes to combine a transportation gateway and mixed-use activity center on a 16-acre site co-owned by the Orange County Transportation Authority (OCTA) and the City of Anaheim. According to the official project website, "ARTIC will serve as a hub for Orange County and the region, a landmark where freeways, major arterials, bus routes and Orange County's backbone rail transit system converge. The network of transit choices will continue to grow in the coming years as the number of Metrolink and Amtrak trains serving Anaheim and local and express bus routes increase. ARTIC will accommodate these services as well as plans for future

FIGURE 10. ARTIC AT FULL BUILD-OUT (CONCEPTUAL RENDERING)

high speed trains and Anaheim Rapid Connection." Currently, construction is slated to begin in 2011 and the station to be operational in 2013.

The City of Anaheim is designing ARTIC to minimize the footprint of the actual station and leave eight to ten acres of open space for future private development to be undertaken in partnership with the OCTA. In theory, ground lease revenue could help fund station maintenance and operations. Long-range conceptual plans call for a high-rise tower in close proximity to the station along with additional office and retail space that could substantially reinforce Anaheim's status as a regional employment hub [Figure 10].

HSR AND THE DISCRETIONARY RIDER

VII

The demographic profile of the mass transit rider is likely to change as a result of the introduction of high-speed rail in California. Some of the leisure and business travelers using the new CAHSR system for both inter- and intraregional travel may be induced to use local connecting systems to take them to their end destination, either for reasons of cost, convenience, or time savings. This is an enormous opportunity for cities and regional transit agencies to boost not only their ridership volumes but their share of "discretionary" riders, referring to those who have access to other means of transportation but choose to take public transit, primarily for the cost and, in some circumstances, time savings that it provides.

Historically, one of the overriding priorities of Southern California transportation planners has been to attract a higher share of discretionary riders, given the congestion and air pollution reduction benefits that come from taking cars off the road. Their efforts have been met with some success. When the MTA introduced its first Bus Rapid Transit (BRT) line on the Wilshire Corridor in 2000, a follow-up ridership study found that one-third of the increased ridership was not simply diverted from the local (slower) buses along the same route, but induced to switch from driving to public transit. The Orange Line, a BRT line in the San Fernando Valley, was also found to delay the onset of the morning rush hour on Highway 101 by a statistically significant margin.[16] This study represents perhaps the best predictor of the potential shift in ridership demographics as the result of a faster transit mode, similar to the transformation in intercity travel that will occur when the CAHSR system begins interregional operations in 2020, supplanting the much slower Amtrak routes.

Currently, the MTA estimates that 26% of its riders are "discretionary," Similarly, the OCTA pegs its share of discretionary riders at 27%, with an average household income of $31,800, compared to the Orange County median of $71,601 (2007). The overwhelming majority of riders are transit dependent, either because they

are too young or too old to drive, or cannot afford a car and its associated expenses.

Compared to the profile of the current mass transit user, CAHSR riders will differ in numerous ways. According to the CAHSR's ridership forecast, in terms of trip purpose, 45 percent of interregional HSR travel is presumed to be for business and commuting, and 55 percent for recreation and personal reasons. Overall, this split is more weighted toward business and commuting than the overall 1/3-2/3 mix of interregional travel within the state. Since existing intercity passenger rail in California carries a negligible percentage of business-related trips, virtually all of these new CAHSR riders will be discretionary, and their incomes will tend to be higher on average than existing mass transit users. Indeed, the 2007 CHSRA benefit-cost study values the hourly time savings (ie. reduction in vehicle hours travelled) for interregional riders at $57.72 for business/commuting travelers and $18.33 for leisure/personal travelers.

One of the beneficial impacts of high-speed rail in California will be the cultural "mainstreaming" of mass transit, as local and regional systems become increasingly patronized by a broad cross-section of the population, shedding their unjustified but enduring stigma as the travel mode of last resort for those without a car. While difficult to quantify, this shift in the attitudes of Southern Californians toward mass transit is already taking place, as evidenced by the overwhelming 67.2% majority garnered in the Los Angeles County vote on Measure R in November 2008, which imposes an additional half-cent sales tax, the proceeds of which will raise an additional $34-40 billion for mass transit and highway projects over the next 30 years. High-speed rail offers an important opportunity to cement these recent gains in the public's perception of mass transit's reliability, convenience, and value through prudent investments in connecting local and regional systems.

CONCLUSION VIII

Lower greenhouse gas emissions, cleaner air, healthier communities, faster employment growth in key "green" sectors, urban revitalization and more transit-oriented development...high-speed rail is capable of delivering an impressive package of benefits to Orange County and Southern California.

The aim of this report has been to examine and quantify some of these benefits, with particular attention to positive impacts on local communities and the regional economy. A mega-project of this scale and complexity naturally lends itself to bold pronouncements and futuristic images of aerodynamic trains swiftly gliding across the California landscape at 220+ mph, but in the end, individual users and other local stakeholders will be the most directly affected by its presence and operations. Properly informed about the system's localized benefits, they can also be the most persuasive advocates for successful completion of a high-speed rail corridor not just in Southern California but statewide.

This type of "ground-up" approach is particularly vital to a project that still risks being seen as an abstraction unlikely to materialize, either because it is too expensive, technically too difficult, or otherwise incapable of attracting the necessary ridership to support itself financially. After years of planning, the prospects for this mega-project are in fact brightening, with many pieces of the financing puzzle - including ARRA funding and Proposition 1A - falling into place at a critical juncture in our region's growth and development.

Cities and local communities can further contribute to the recent political momentum being generated around CAHSR by taking proactive steps outlined in this report - whether it be through land use policies or matching investments in regional transportation systems - to take full advantage of high-speed rail's economic and environmental benefits. In doing so, Southern California can position itself competitively for the future - as an attractive destination to live, work, play, and do business.

APPENDICES

A. TOTAL CONSTRUCTION JOBS + REGIONAL INCOME BENEFIT ATTRIBUTABLE TO HSR IN SOUTHERN CALIFORNIA

LA-Anaheim	53,700
Other Segments (LA-San Diego, Palmdale-LA) - *estimated*	4,000
Total Full-Time One-Year Jobs	57,700
Average Job Duration (yrs)	3.75
Total Workers Employed	**15,387**
Of Which Unemployed	*1,539*

Source: CHRSA Press Release

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Construction Costs* (in millions)											
Palmdale-LA			$134	$721	$1,377	$1,820	$1,556	$844	$263	$26	$12
LA-Anaheim			$591	$803	$946	$1,008	$706	$300	$118	$15	$8
ARTIC		$60	$60	$60							
Total		$60	$785	$1,524	$2,323	$2,828	$2,262	$1,144	$381	$41	$20
Unemployment Rate in Construction		11%	10%	9.0%	8%	7.0%	6%	6%	6%	6%	6%
Regional Income Benefit	**$701****	$6.6	$78.5	$137.2	$185.8	$198.0	$135.7	$68.6	$22.9	$2.5	$1.2
Equivalent Number of Full-Time Jobs (for unemployed)		131	1,569	2,743	3,717	3,959	2,714	1,373	457	49	24

Sources: 2009 CHSRA Business Plan, Table 3 (Capital Costs by Segment by Item), ARTIC ppt presentation (1.27.10), available at www.articinfo.com

* includes planning/design, excludes costs of right-of-way acquisition

** net present value in 2010 dollars, discounted at 4%

B. PERMANENT JOBS ATTRIBUTABLE TO HSR IN SOUTHERN CALIFORNIA, BY SECTOR (2030)

Supersector	2030 (NO HSR)	2030 (HSR)	Difference
Farming	165,193	165,710	517
Mining	12,419	12,528	109
Construction	609,079	612,940	3,861
Manufacturing	942,523	946,929	4,406
TCU	580,227	591,215	10,988
Wholesale	633,457	641,556	8,099
Retail Trade	1,801,205	1,816,609	15,404
FIRE	1,156,033	1,164,246	8,213
Services	4,979,096	5,049,808	70,712
Government	1,428,949	1,433,993	5,044
Green Sectors*	8,266,958	8,365,138	98,180
Total	**12,308,181**	**12,435,534**	**127,353**
% Green Sectors			77.1%

Source: Cambridge Systematics, *Economic Growth Effects Analysis for the Bay Area to Central Valley Program*

*sectors identified as having a high concentration of fast-growing "green" job specializations (Next 10 Study, "Many Shades of Green" available at www.nextten.org)

C. CO_2 EMISSION REDUCTIONS ATTRIBUTABLE TO HSR INTRAREGIONAL TRIPS IN SOUTHERN CALIFORNIA, PHASE I SERVICE PLAN (2030)

Daily Passenger Boardings (2030)

		Boarding Station					
Alighting Station		**PMD**	**SYL**	**BUR**	**LAU**	**NSF**	**ANA**
Palmdale	**PMD**	0	135	360	6,473	826	2,499
Sylmar	**SYL**	135	0	91	1,632	208	630
Burbank	**BUR**	360	91	0	1,686	215	651
LA-Union St.	**LAU**	6,473	1,632	1,686	0	730	2,211
Norwalk	**NSF**	826	208	215	730	0	0
Anaheim	**ANA**	2,499	630	651	2,211	0	0

CO_2 Saved Per Passenger Trip (lbs)

	PMD	**SYL**	**BUR**	**LAU**	**NSF**	**ANA**
PMD	0	25.5	35.25	43.5	54.75	65.25
SYL	25.5	0	29.25	18	29.25	39.75
BUR	35.25	29.25	0	8.25	19.5	30
LAU	43.5	18	8.25	0	11.25	21.75
NSF	54.75	29.25	19.5	11.25	0	10.5
ANA	65.25	39.75	30	21.75	10.5	0

Total CO_2 saved by Corridor Segment (lbs)

	PMD	**SYL**	**BUR**	**LAU**	**NSF**	**ANA**
PMD	-	3,443	12,690	281,576	45,224	163,060
SYL	3,443	-	2,662	29,376	6,084	25,043
BUR	12,690	2,662	-	13,910	4,193	19,530
LAU	281,576	29,376	13,910	-	8,213	48,089
NSF	45,224	6,084	4,193	8,213	-	-
ANA	163,060	25,043	19,530	48,089	-	-
Subtotals:	505,991	66,607	52,984	381,163	63,713	255,722

CO2 saved daily	1,326,179	
annually	484,055,153	lbs
	0.0004536	conversion factor
	219,564	metric tons
	23.1	lbs reduction per SCAG resident (2030)

D. CO_2 EMISSION REDUCTIONS CREDITABLE TO SCAG REGION UNDER SB 375, BASED ON HSR INTERREGIONAL TRIPS ORIGINATING OR ENDING AT HSR STATIONS IN SOUTHERN CALIFORNIA, PHASE I SERVICE PLAN (2030)

Daily Passenger Boardings* (2030)

		Boarding Station													
Alighting Station		**SFT**	**SFO**	**RWC**	**SJC**	**GLY**	**MCD**	**FNO**	**BFD**	**PMD**	**SYL**	**BUR**	**LAU**	**NSF**	**ANA**
SF-Transbay	**SFT**									3,421	2,586	614	2,256	1,836	11,643
Millbrae	**SFO**									137	104	25	91	74	467
Redwood City	**RWC**									369	279	66	243	198	1254
San Jose	**SJC**									794	600	142	523	426	2702
Gilroy	**GLY**									615	465	110	405	330	2092
Merced	**MCD**									556	420	100	367	298	1892
Fresno	**FNO**									365	276	65	241	196	1242
Bakersfield	**BFD**									514	389	92	339	276	1750
Palmdale	**PMD**	3,421	137	369	794	615	556	365	514						
Sylmar	**SYL**	2,586	104	279	600	465	420	276	389						
Burbank	**BUR**	614	25	66	142	110	100	65	92						
LA-Union Station	**LAU**	2,256	91	243	523	405	367	241	339						
Norwalk/Santa Fe	**NSF**	1,836	74	198	426	330	298	196	276						
Anaheim	**ANA**	11,643	467	1254	2702	2092	1892	1242	1750						

Distances Between Destinations (mi)

	SFT	**SFO**	**RWC**	**SJC**	**GLY**	**MCD**	**FNO**	**BFD**	**PMD**	**SYL**	**BUR**	**LAU**	**NSF**	**ANA**
SFT									379	411	422	432	445	465
SFO									365	397	408	418	431	451
RWC									360	392	403	413	426	446
SJC									331	363	374	384	397	417
GLY									313	345	356	366	379	399
MCD									254	286	297	307	320	340
FNO									198	227	238	248	261	284
BFD									139	168	179	189	202	225
PMD	379	365	360	331	313	254	198	139						
SYL	411	397	392	363	345	286	227	168						
BUR	422	408	403	374	356	297	238	179						
LAU	432	418	413	384	366	307	248	189						
NSF	445	431	426	397	379	320	261	202						
ANA	465	451	446	417	399	340	284	225						

*Source: CHSRA Los Angeles-Anaheim Technical Memorandum, Appendix F, Table 8

D. CO_2 EMISSION REDUCTIONS CREDITABLE TO SCAG REGION UNDER SB 375, BASED ON HSR INTERREGIONAL TRIPS ORIGINATING OR ENDING AT HSR STATIONS IN SOUTHERN CALIFORNIA, PHASE I SERVICE PLAN (2030) - continued

Daily Passenger Miles Traveled (mi)

	SFT	SFO	RWC	SJC	GLY	MCD	FNO	BFD	PMD	SYL	BUR	LAU	NSF	ANA
SFT									1,296,559	1,062,846	259,108	974,592	817,020	5,413,995
SFO									50,005	41,288	10,200	38,038	31,894	210,617
RWC									132,840	109,368	26,598	100,359	84,348	559,284
SJC									262,814	217,800	53,108	200,832	169,122	1,126,734
GLY									192,495	160,425	39,160	148,230	125,070	834,708
MCD									141,224	120,120	29,700	112,669	95,360	643,280
FNO									72,270	62,652	15,470	59,768	51,156	352,728
BFD									71,446	65,352	16,468	64,071	55,752	393,750
PMD	1,296,559	50,005	132,840	262,814	192,495	141,224	72,270	71,446						
SYL	1,062,846	41,288	109,368	217,800	160,425	120,120	62,652	65,352						
BUR	259,108	10,200	26,598	53,108	39,160	29,700	15,470	16,468						
LAU	974,592	38,038	100,359	200,832	148,230	112,669	59,768	64,071						
NSF	817,020	31,894	84,348	169,122	125,070	95,360	51,156	55,752						
ANA	5,413,995	210,617	559,284	1,126,734	834,708	643,280	352,728	393,750						
Subtotals	9,824,120	382,042	1,012,797	2,030,410	1,500,088	1,142,353	614,044	666,839	2,219,653	1,839,851	449,812	1,698,559	1,429,722	9,535,096
Daily Total	34,345,386													

Total Daily Passenger Miles Diverted From…			Daily lbs CO_2 saved by mode	CO_2 lbs savings/diverted passenger mi*	
Air	5,838,716	17%	3,428,816	0.587	110 seats, 70% capacity
Auto	25,415,586	74%	12,638,032	0.497	1.6 passengers/vehicle
Conventional Rail	2,404,177	7%	426,153	0.177	304 seats, 70% capacity

CO_2 saved daily	16,493,001	lbs
annually	6,019,945,314	
	50%	creditable to SCAG region (under SB 375)
Total Creditable	**3,009,972,657**	lbs CO_2
	.0004536	conversion factor
	1,365,301	metric tons
	143.4	lbs reduction per SCAG resident (2030)

*Source: *High-Speed Rail and Greenhouse Gas Emissions in the U.S.* (January 2006), difference between travel modes assumes adoption of Shinkansen N700 trainsets for CAHSR system

E. CALCULATION OF COMMUNITY HEALTH BENEFITS ATTRIBUTABLE TO HSR, BASED ON INCREASED PHYSICAL ACTIVITY BY REGULAR HSR COMMUTERS IN SOUTHERN CALIFORNIA

							NPV	4%	
							Average Yearly Medical Inflation	7%	
							Annual Medical Cost Escalator (Real Costs)	3%	
	Ridership Ramp-up thru 2035*	**Phase I Only, fares at 50%** (thousands)	**Phase I Only, fares at 77%**	**Phase I Only, fares at 83%**	**Full System, +8% increase, fares at 50%**	**Full System, +8% increase, fares at 77%**		**health benefit (60+)** (thousands)	**health benefit (<60)**
2010	0%	**$65,218**	**$54,131**	**$50,870**	**$132,393**	**$112,175**	**NPV**	0.500	0.250
2011	0%	0	0	0	0	0		0.515	0.258
2012	0%	0	0	0	0	0		0.530	0.265
2013	0%	0	0	0	0	0		0.546	0.273
2014	0%	0	0	0	0	0		0.563	0.281
2015	0%	0	0	0	0	0		0.580	0.290
2016	0%	0	0	0	0	0		0.597	0.299
2017	0%	0	0	0	0	0		0.615	0.307
2018	0%	0	0	0	0	0		0.633	0.317
2019	0%	0	0	0	0	0		0.652	0.326
2020	33%	3,404	2,826	2,655	6,911	5,856		0.672	0.336
2021	50%	4,560	3,785	3,557	9,257	7,843		0.692	0.346
2022	68%	5,812	4,824	4,534	11,799	9,997		0.713	0.356
2023	86%	7,167	5,949	5,590	14,549	12,327		0.734	0.367
2024	88%	7,463	6,194	5,821	15,150	12,837		0.756	0.378
2025	89%	7,787	6,463	6,074	15,808	13,394		0.779	0.389
2026	90%	8,107	6,729	6,323	16,457	13,944		0.802	0.401
2027	92%	8,456	7,019	6,596	17,166	14,545		0.826	0.413
2028	93%	8,801	7,305	6,865	17,867	15,138		0.851	0.426
2029	94%	9,178	7,618	7,159	18,631	15,786		0.877	0.438
2030	96%	9,570	7,943	7,464	19,426	16,460		0.903	0.452
2031	97%	9,916	8,231	7,735	20,130	17,056		0.930	0.465
2032	98%	10,296	8,546	8,031	20,901	17,709		0.958	0.479
2033	98%	10,668	8,855	8,321	21,657	18,350		0.987	0.493
2034	99%	11,076	9,193	8,639	22,484	19,050		1.016	0.508
2035	100%	11,475	9,524	8,951	23,295	19,737		1.047	0.523

*based on CHSRA estimates, 2009 Business Plan (Table E, Initial Phase Revenue & Riders by Year)

F. PROJECTED NUMBER OF PARKING SPACES REQUIRED FOR HSR VS. EXISTING PARKING CAPACITY AT METROLINK STATIONS

STATION	TOTAL PARKING REQUIRED FOR HSR	TOTAL EXISTING	% (UNDER)/ OVER REQUIRED
LA Union Station	3,579	n.a.	
Norwalk	1,156	190	-84%
Fullerton	953	447	-53%
Anaheim	1,926	401	-79%
Santa Ana	342	722	111%
Irvine	864	547	-37%
San Juan Capistrano	987	180	-82%
Oceanside	1,180	625	-47%
Solana Beach	1,262	249	-80%
University Town Center	1,395	n.a.	
San Diego	473	0	-100%
Total	**14,117**	3,361	-76%

Source: CAHSR Program EIR/EIS, LA to San Diego via Orange County, Table 4.3-4

ENDNOTES

1 Margot Roosevelt, "Effort underway to suspend California's global-warming law," *The Los Angeles Times*, February 6, 2010, accessed on February 26, 2010 at http://articles.latimes.com/2010/feb/06/local/la-me-ballot-warming6-2010feb06

2 California High-Speed Rail Authority, "Fact Sheet on the California high-speed train American Recovery and Reinvestment Act Application," October 2009, accessed on March 8, 2010 at http://www.cahighspeedrail.ca.gov/images/chsr/20091001231546_CHSRAARRAFACTSHEETFINAL.pdf.

3 Orange County Business Council, "The Economic Impact of High-Speed Trains For Orange County," October 2008, available at http://www.cahighspeedrail.ca.gov/images/chsr/20081020174618_HSR-OCReport.pdf

4 Next 10, "Many Shades of Green: Diversity and Distribution of California's Green Jobs." December 2009, p. 4, http://www.nextten.org/next10/publications/green_jobs.html

5 The Japanese Shinkansen N-700 series boasts the lowest energy consumption of all systems, with only .327 lbs CO_2 emitted per passenger mile, compared to 3.27 lbs for a Boeing-777 airplane.

6 "Recommendations of the Regional Targets Advisory Committee (RTAC) Pursuant to Senate Bill 375," A Report to the California Air Resources Board, September 29, 2009, p. 26, accessed on March 16, 2010 at http://www.arb.ca.gov/cc/sb375/rtac/report/092909/finalreport.pdf

7 http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html#Aerobic

8 Lilah M. Besser and Andrew L. Dannenberg, "Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations," accessed on December 4, 2009 at http://www.cdc.gov/healthyplaces/articles/besser_dannenberg.pdf

9 CBS News, "Obesity Takes 9% of Health Spending," July 27, 2009, accessed on December 4, 2009 at http://www.cbsnews.com/stories/2009/07/27/health/main5190909.shtml

10 The Trust for Public Land, "How Much Value Does the City of Philadelphia Receive from its Park and Recreation System?" A Report by The Trust for Public Land's Center for City Park Excellence for the Philadelphia Parks Alliance, June 2008, http://www.tpl.org/content_documents/PhilaParkValueReport.pdf (accessed March 16, 2010)

11 The estimated reductions in annual medical spending have been adjusted for increases in real costs likely to have occurred by 2020 and beyond, given that the average annual escalation in medical costs (7%) has historically outpaced inflation.

12 http://www.anaheim.net/images/articles/1364/OCTAGoLocalFactSheet.pdf

13 Ultimately, the residential air rights project planned for the site did not materialize, though due to technical and not market factors. Namely, the deck was engineered and built before the change in California's seismic standards, and would have required retrofitting to meet the new standards with the housing units stacked on top.

14 Emma Tyaransen, Adam Seidman and Adam Christian. "Tracking the Suburbs." *California Builder/Developer,* September 2008, http://www.theconcordgroup.com/pdf/California_builder_TOD_Sept08.pdf (accessed January 19, 2010).

15 Metro Harbor Subdivision Transit Corridor Alternatives Analysis Report – Final, November 2009, Page 3-33, accessed January 13, 2010 at http://www.metro.net/projects_studies/harbor_subdivision/images/AA_study/03-Alternatives.pdf.

16 Caitlin Liu, "Orange Line Eases A.M. Rush On 101," *The Los Angeles Times*, December 30, 2005, accessed on March 17, 2010 at http://articles.latimes.com/2005/dec/30/local/me-orange30