AMTRAK California Express: Proposal for Upgraded Rail Connection along the Western Metro Corridor.

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Introduction

More than 15 million people travel annually between northern and southern California. Of these, six million passengers will fly between Los Angeles and the San Francisco Bay Area, making it one of the most highly trafficked airline routes in the world. At least twice that number drives the route in personal vehicles each year. All this is in spite of rising fuel prices, highway and airport congestion and increasing public awareness of the environment impact of airline and motor vehicle travel. As these imminent crises compel the nation to reevaluate and transform its transportation policy, California and the west coast must lead the way.

The time is now for passenger rail to once again compete head on with the airlines and automobiles, both in California and nationwide. An accelerated speed express route connecting the San Francisco Bay Area and the Los Angeles basin would make significant inroads into the transportation market presently dominated by airlines and passenger vehicles by offering airline competitive travel times, uncompromised performance standards and a premium on-board experience. The route is designed to be financially solvent and self-sustaining and would address critical environmental and policy challenges on a timeline of years, not decades.

Although high-speed ground transportation is widely recognized as the best possible solution to climate change promoting CO_2 emissions, fossil fuel dependency and traffic congestion, true high-speed rail requiring entirely new track infrastructure remains decades away. However, a viable and profitable rail alternative on the California corridor could be up and running within two or three years. A model already exists in the northeast corridor Acela Express.

The Acela model demonstrates that profitable passenger rail in the United States is not only possible, but a vital and desirable option for medium distance business and commuter travel. Capable of achieving speeds between 90 and 150mph on existing track, The Acela offers point-to-point travel times between New York and Boston or Washington surpassing the airlines. The Acela has squarely targeted business travelers with upscale amenities and an unmatched level of comfort. These factors have allowed the Acela to operate well in the black since its inception and capture more than forty percent of market share for business travel in its region.

As project manager for the office of Rail Capital Development and Operations, my team and I launched a comprehensive study to determine how to create a similarly profitable passenger rail service in California. We made an exhaustive analysis of ridership trends, passenger demographics, environmental impacts and current railroad infrastructure, focusing primarily on the Los Angeles - San Francisco corridor. Our goal was to explore the feasibility of the Acela model on the west coast, along with projected costs, revenues, ridership and routing for the project.

Bringing accelerated express rail service to California or any region presents a unique set of challenges and realities. Obviously, with the longer distances it is not possible to surpass airline times between San Francisco and Los Angeles. However a door-to-door transit time of less than five and a half hours, coupled with a premium on-board and pre-boarding experience and the appeal of reducing each traveler's carbon footprint should draw a healthy new and converted ridership to the proposed route. Best of all, the proposed route would utilize tracks and infrastructure already in place, requiring relatively minor retrofitting and upgrades to existing rails along with the new locomotives and cars.

The report that follows will present the case for competitive, profitable passenger rail along California's primary metropolitan corridor and propose changes to Amtrak California's present services to make rail travel a viable alternative to travelers along this route. I will begin with a brief summary of the state of rail travel nationwide and in California, including present ridership statistics, revenues and funding. I will define High-Speed Rail, its various models and challenges, and consider the Acela Express as a workable model for other major business routes. I compare the environmental impacts among modes of travel: greenhouse emissions, energy usage, and fuel consumption. Finally, this report outlines a comprehensive plan for an accelerated speed route connecting Los Angeles to San Francisco, San Jose and Sacramento, along with suggestions for marketing the new service.

AMTRAK in the 21st Century: State of the Rail

Passenger rail is alive and well in the twenty first century. The current year has seen some of the highest ridership totals in the forty-two year history of our organization, the continuation of a steady upward trend over the past decade. (Figure 1) Passenger totals averaged more than 2,500,000 per month (Amtrak FY2012 budget and business plan), an increase of almost 600,000 since 2002. An estimated 31,385,000 people will board an Amtrak train by the end of the year.

Driving this trend is a number of significant factors. Rising fuel cost and an ever-widening recognition of the dramatic environmental impact of air and automobile travel has underscored an immediate need for sustainable alternatives. Increasing congestion on our highways and at our airports accounts for dramatic rises in CO_2 emissions and energy consumption. Dedicated High-Speed Rail is almost universally accepted as the solution to these issues and the future of intercity transit, and is a policy cornerstone of the current administration.

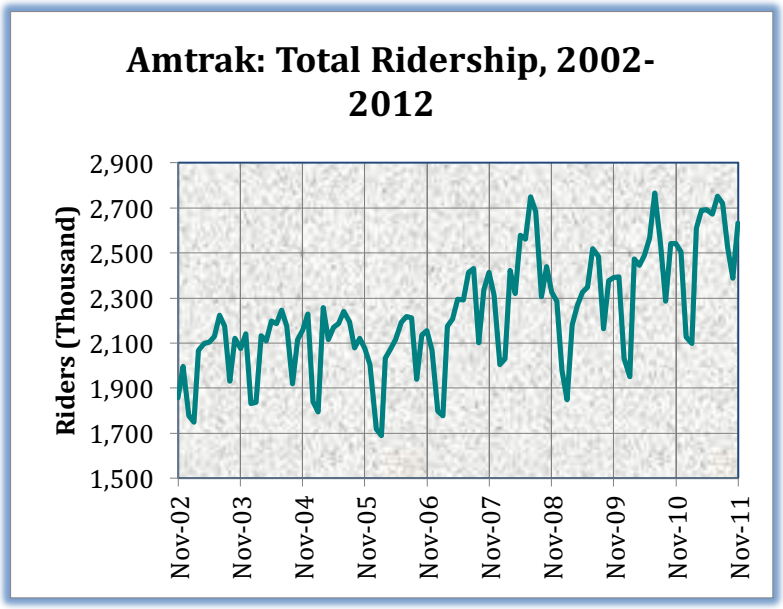

Figure 1 - Amtrak Ridership Trends

The outlook is not, however, entirely rosy. Out of 44 present Amtrak routes, 42 lost money once again this year, amounting to subsidized operating losses totaling an estimated 465 million dollars in fiscal year 2012, or $14.85 per rider. Rail accounts for just 7.7 percent of travel for all purposes and less than 1 percent of all medium to long distance travel in the United States. And funding at the federal and state level continues to be a constant target for cuts and political attacks.

The most recent hearings led by House Transportation Committee Chairman John Mica (R-Fla) are merely the latest in the ongoing attempt to slash our current $1 billion federal subsidy. Rail opponents point to losses, low ridership, decaying infrastructure and mismanagement. Even the Obama Administration, generally an enthusiastic supporter of passenger rail, proposed reorganizing funding for Amtrak in his 2012 budget, removing subsidy allocations from direct congressional control, changes that could weaken the service and leave it vulnerable to future political attacks.

Attacks on the viability of subsidized national passenger rail and calls for privatization omit several significant factors. Critics ignore the record ridership levels and clear pattern of growth, or the fact that Amtrak recoups roughly 85% of its budget in revenues.

Compared with the highway and aviation system, both of which receive considerably more funding than Amtrak, numerous studies tout rail as the most cost effective transit agency per passenger mile (ppm) when environmental impact and other indirect factors are taken into account.

A Transit Solution for California and the Nation

As noted above, the vast majority of Amtrak routes nationwide lose money, with operating costs made up by federal or state subsidies; indeed that is the business model. The standout exception is in the heavily trafficked Northeast Corridor, where both the high speed Acela Express and standard regional service are consistently profitable. Not only do these two lines alone account for more than a third of all passenger rail business, they also represent more than 40% of market share for all travel in the region. It is not hard to see why; with its high population and traffic volume, skyrocketing fuel costs and relatively short distances, the train is well positioned to compete with air and automobile travel between New York, Boston, Philadelphia and Washington, DC.

Table 1: Amtrak Northeast Corridor: Ridership and Profits, 2012

NE CORRIDOR ROUTE	**RIDERSHIP**	**REVENUE** (millions)	**OPERATING EXPENSES** (millions)	**Prof/Loss Per Rider**
Acela Express	3,515,095	$532.00	$332.70	$56.78
Regional	7,693,814	$530.00	$501.00	$3.76
NEC Special	7,400	$1.10	$1.30	-$17.46
NEC SPINE (TOTAL)	**11,216,309**	**$1,063.10**	**$835.00**	**$43.08**
ALL AMTRAK ROUTES	**31,385,337**	**$2,284.6**	**$2,750.4**	**-$14.84**

Profitable, financially stable routes such as the Acela and Northeast Regional service are key to ensuring the future survival of passenger rail in the United States. Demonstrated profitability and vigorous growth in ridership numbers in major transportation markets on the west coast and elsewhere would smooth the path for future High-Speed Rail (HSR) development, helping to overcome political opposition while stoking traveler demand for passenger trains. As the most populous and arguably the most influential region in the nation, California is poised to lead this effort.

The San Francisco-Los Angeles corridor is a prime candidate for High Speed Rail based on both need and demand, as attested to by the eight billion dollars currently allocated by the Obama administration for new HSR development. (I've included an explanation of high-speed rail terms and models in a subsequent section, "Defining-High Speed Ground Transport")

Unfortunately, political opponents and other special interests have made repeated efforts to stall or derail high-speed rail projects in California and other states. Even in a best cast scenario, California's first new HSR segment, connecting Bakersfield and Fresno, won't be completed until 2017, and the first true High Speed trains between San Francisco and Los Angeles will run no earlier than 2026.

By contrast, the Acela accelerated (90-150mph) rail model, which uses primarily existing rail infrastructure, could be successfully implemented in California within the next two to three years. The scope of this report makes the case for the benefits and cost efficiency of such a plan. Naturally, adapting the model to California entails a host of challenges not limited to the distances involved, the present infrastructure and the unique demographics of our region and customer base. The following section will focus on California's rail picture at the end of 2012, including our current routes and offerings.

Amtrak California in 2013

Amtrak ridership in California has grown apace with the rest of the nation. California serves as the western terminus for three cross-country interstate routes, the *California Zephyr, Southwest Chief* and *Sunset Limited*. The *Coast Starlight* runs the length of California as it traverses the coast, connecting the Mexican and Canadian boarder.

The three shorter distance routes serving travelers within the state have also performed well. The *Pacific Surfliner* offers commuter service in southern California between San Diego and San Luis Obispo. The *Capitol Corridor* connects the Bay Area with Sacramento, and the *San Joaquins* serves the Central Valley and will be discussed further below.

Amtrak Routes Currently Servicing California and the West Coast

	Ridership			Ticket Revenue			Route
State Supported Short Distance	FY 12	FY 11	% Change	FY 12	FY 11	% Change	
Pacific Surfliner service	2,640,342	2,786,972	-5.3	$58,595,820	$55,317,127	5.9	SD-LA-Santa Barbara-San Luis Obispo
Capitol Corridor service	1,746,397	1,708,618	2.2	$27,927,540	$25,720,252	8.6	SJ - OAK - Sacramento
San Joaquin service	1,144,616	1,067,441	7.2	$38,661,536	$35,704,109	8.3	OAK/SAC-Fresno-Bakersfiel
National (Long Distance) Network							
Coast Starlight	**454,443**	**426,584**	**6.5**	**$40,826,562**	**$39,997,952**	**2.1**	**LA - OAK -(SEA)**
Sunset Limited	101,217	99,714	1.5	$11,584,844	$11,138,286	4	LA - New Orleans
California Zephyr	376,459	355,324	5.9	$47,605,728	$44,751,539	6.4	SF Bay Area - Chicago
Southwest Chief	355,316	354,912	0.1	$44,183,540	$44,184,060	0	LA - Albuquerque -Chicago

Source: Amtrak

Two Amtrak routes connect Los Angeles with the Bay Area and Sacramento markets, the *Coast Starlight* and the *San Joaquins*. Only the *Starlight* currently offers a direct connection by train, and the length of each trip prevents either from being a realistic alternative for most airline travelers.

The *Coast Starlight* offers one train daily in each direction between Los Angeles and Oakland/Emeryville via Oxnard, Santa Barbara, Salinas and San Jose, continuing north to Sacramento, Portland and Seattle. The LA-Bay Area segment is 473 miles long and the trip takes 12 hours and 45 minutes.

The *San Joaquins* offers four daily trains in each direction between Oakland and Bakersfield and two daily trains between Sacramento and Bakersfield. A connecting Amtrak throughway coach bus takes passengers from Bakersfield to Los Angeles. The entire trip from or to Oakland takes 8 hours, 40 minutes (405 miles), while Sacramento – Los Angeles is 8 hours and 10 minutes.

The single-track line over the Tehachapi Pass southeast of Bakersfield, the famed Tehachapi Loop, provides the only rail connection between the Central Valley and the Los Angeles Basin. Excessive freight traffic currently prevents Amtrak from using this road, necessitating the Throughway Bus connection. A newly constructed section for the HSR line is expected to open around 2022, however use of the existing right of way in the immediate future is contingent upon negotiations with the Union Pacific for its use. With that in mind, this proposal will assume use of the more coastal route currently utilized by the Coast Starlight.

Finally, no Amtrak trains runs directly San Francisco at the present time. San Francisco passengers must take an Amtrak coach from one of several points downtown to Emeryville, or take BART light rail into Oakland to pick up the train. The new downtown transit terminal under construction in San Francisco and scheduled to open in 2017 would be a major component of any proposed new route.

The Case for Competitiveness

Establishing a profitable passenger rail service means competing aggressively for with the airlines, private vehicles and other transit modes for business and leisure travelers. As stated in the introductory section the SF-LA route is among the busiest airline routes in the nation, with more than six million passengers annually. The U.S. Department of Transportation estimates that personal vehicles account for twice that number, and about 3% of all travelers will take an intercity bus.

Trip time, although not the sole factor, is certainly the primary concern for most travelers, especially business travelers. To compete realistically for a viable percentage of that business, travel time *door-to-door* would have to close to a reasonable interval relative to other methods. Without question an eight or ten hour trip, or even a five or six-hour trip is hard to justify next to a one-hour flight when time is the overriding consideration. However when you start to factor in transportation to and from the airports, usually many miles from city centers, security, terminal and tarmac wait times and baggage claim, the difference starts to look a lot less pronounced; approximately three-and-a-half to four hours from beginning to destination.

This is where on-board experience becomes a significant factor in this equation, and it is here that a train can offer travelers a level of service, comfort and convenience unrivaled by the airlines, to say nothing of driving the same distance. A 2011 CNN article reported that the airline industry scored lowest in customer satisfaction among 47 industries, with poor service, rising fares and bag fees cited as the primary reasons for the drop. In addition, congestion at the airports themselves is rapidly approaching critical levels. LAX and SFO two of the most impacted hubs, each surpassing 20,000 hours of annual aircraft delays.

Determining Demand

In studying transportation trends along SF-LA corridor we looked at internal and external studies and surveys of passengers across various modes of transportation. The studies indicated factors such as reasons for travel, age, and income and education level. The United States Department of Transportation: Federal Railroad Administration (FRA), Research and Innovative Technology Administration: Bureau of Transportation Statistics (BTS) and Amtrak's own reporting were all invaluable in providing this relevant data.

To accurately predict increased travel demand and revenues from diverting business from other modes, specifically planes and cars, we utilized a metric based on an FRA Report from 1997 entitled "High-Speed Ground Transportation for America." The model is a series of equations designed to determine what percentage of passengers might be induced to switch to High-Speed Rail, based on factors such as fares, travel times, and frequency of service. We adapted the model to our proposed accelerated speed service and applied it to the current intermodal transportation statistics for SF-LA. (Figure 2), based on four types of trips.

- Local air trips within a corridor (Air O/D)—trips begin and end within the corridor.
- Transfer air trips ("Air Transfer")—the trip within the corridor forms part of a longer air journey.
- Auto
- Conventional Rail

Assumptions on Induced Demand

Donor Mode	Induced HSGT Traffic as a Percentage of Traffic Diverted from Donor Mode
Air O/D	10%
Air Transfer	25% of 10%, or 2.5 percent
Auto	10%
Conventional Rail	At 50% diversion rates and above, a graduated scale of diversion starting at 0% and reaching 10% at the 100% diversion level

Figure 2: Source: Federal Railroad Administration.

The results, as shown in Figure 2, predict that 12.5% of air travelers and 10% of drivers would likely use high speed rail if it were an option, and at least 12-15% would consider and accelerated (90-150 mph) express route.

Environmental Impact: Rail Travel is Green Travel

Travel by rail is the greenest transportation solution available now and the foreseeable future. California's present rail network uses a mix of diesel and electric locomotives, while substantial investment in biodiesel, magnetic levitation and other power alternatives promises to maintain Amtrak's environmental edge in this sector.

The impact of private vehicle usage on climate change, energy consumption and congestion are well documented and widely known, but public awareness is growing as to the true costs of air travel. A 2008 study by the International Union of Railways (UIC) and Community of European Railway Companies (CER) analyzed climate change impacts of transportation modes in the European Union.

The study projected a 25% increase in Greenhouse Gas (GHG) emissions between the years 1990 and 2010. While road transport, including personal automobiles, motorcycles, trucks, buses and emergency response vehicles, accounted for the largest number of CO_2 emissions for the year of the study, some 896 million metric tons, aviation produced a whopping 150 million tons, or 12% of total EU emissions. By contrast, rail accounted for just 1.6 percent, or 20 million metric tons.

The same study measured that a single passenger trip via rail is more than three times as carbon-efficient as the same trip by plane, and four times as much as by car. (Table 2)

BERLIN-FRANKFORT 545KM (339MI)	**CARBON DIOXIDE (CO_2) PER PERSON**
Car	98 Kg
Plane	85 Kg (includes travel to airport)
TRAIN	**26 Kg**

Table 2. Source: UIC-CER, 2008

Amtrak's own environmental studies analyzing intermodal transportation impacts in the United States demonstrated similar results and offered some startling data of its own. Table 3 expresses the amount of energy expended in British Thermal Units, or BTUs, per passenger mile for each mode.

ENERGY USED (BTU) PER PASSENGER MILE (2005)
Rail – 2,709
Airline – 3,264
Road – 3,445

Table 3: Source: Amtrak

The internal report from 2005 offered quantitative statistics that strongly establishes rail's ecological edge over planes and cars. Its findings are firmly supported by dozens of subsequent assessments, such as a 2010 Bureau of Transportation Statistics survey of all transportation modes, showing rail travel accounting for just 1% of energy consumption in the United States. (Figure 3)

From the Amtrak study's concluding statement:

> "Amtrak is 17 percent more energy efficient than either commercial airlines or automobiles. Air travel has an additional disadvantage of radiative forcing, which increases the climate effect of air travel by 2 to 4 times as compared to surface travel.
>
> By diverting traffic from highways and the air to a more efficient alternative, railroads save fuel. Amtrak removes 8 million cars from the road and eliminates the need for 50,000 fully loaded passenger airplanes each year. "

An airplane expends much of its fuel and produces a significant portion of its carbon emissions upon take off and landing. From an environmental standpoint, short, high-traffic routes of 400 miles or less such as San Francisco – Los Angeles are critical. Short, one-hour flights have the greatest environmental impact, and with so many flights per day, a sound transportation alternative has the highest potential to affect significant reductions in greenhouse emissions, energy consumption and congestion.

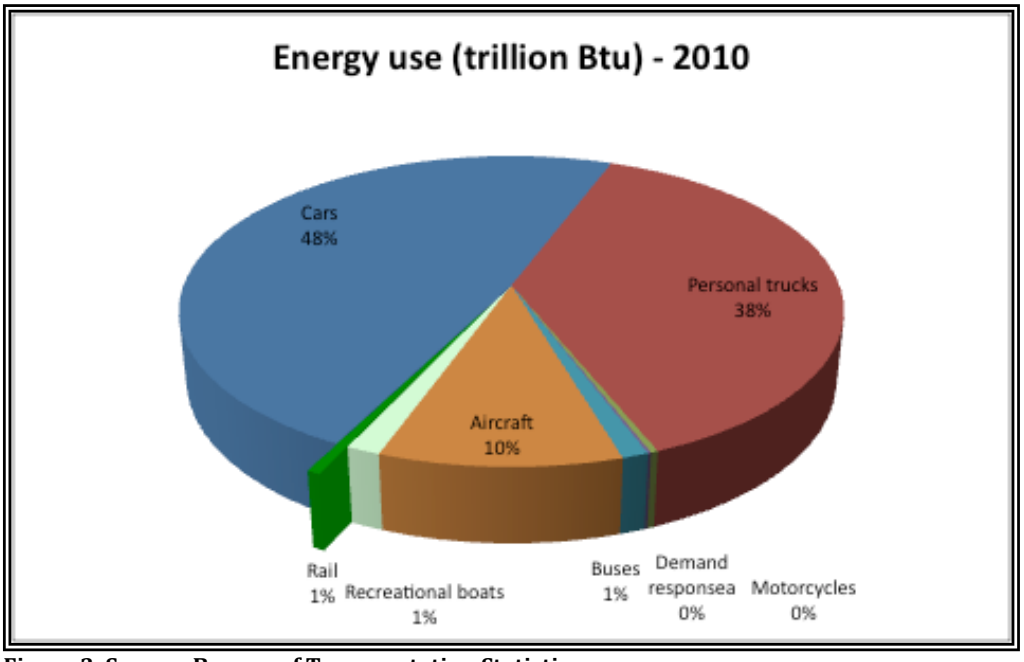

Figure 3. Source: Bureau of Transportation Statistics

Building a Better Train – High Speed at High Speed

Defining High Speed Ground Transport

HIGH SPEED GROUND TRANSPORT (HSGT) is considered any form of self-guided intercity ground transportation that is time competitive with air or automobile travel over a range of 100 – 500 miles.

A MARKET is any two cities or metropolitan areas that are or will be connected by a transit line, e.g.: San Francisco – San Jose, Los Angeles-San Diego.

A Corridor is a natural grouping of markets or metro areas by geographical proximity that can be served by a single transportation service.

When most people refer to High-Speed Rail they think of wheel-on-rail trains capable of traveling up to 200mph or more on new rail infrastructure constructed specifically for that purpose. This model, known as **New High Speed Rail (HSR),** is indeed the long-term plan for California.

Another technology being explored for use in the United States is **Magnetic Levitation (MAGLEV).** Magnetic forces lift, propel and guide the vehicle over a guide rail without the need for wheels. With minimal resistance, such a train could top 300mph, making competition with airlines over long distance routes feasible.

The ACELA EXPRESS:

A proposed **Accelerated Rail** route on the California corridor would be modeled largely on the successful Acela Express route serving the northeast corridor between Boston, New York, Philadelphia, Baltimore and Washington, DC.

Accelerated Rail is defined as traveling at speeds between 90 – 150mph over track infrastructure already in place. Its specially designed trains accomplish this by *tilting,* 4.2˚ to 6.8˚, while moving at 60mph or higher on curved sections of track, reducing centrifugal forces on passengers. Though the Acela does reach speeds up to 150mph over certain segments, it averages around 80 for the length of its journey.

The Acela is currently the only route in America that exceeds the Department of Transportation 125mph threshold for high-speed and is *by far* the most profitable route in the Amtrak network, averaging a profit of $56.00 per rider in 2012.

In this section I will give a brief breakdown of the Acela business model; it's schedule and routing, fares, travel times, consist and premium on and off-board amenities. These features would serve as the template for a potential SF-LA express service.

ON-BOARD SPECIFICATIONS

SEATING
Standard Business Class:
260 seats
First Class Car
44 seats

Seat Width: up to 23"
Maximum Seat Pitch: 42"

COACH FEATURES
AC power - all seats
Free Wi-Fi
Large Overhead Compartments
Expanded baggage area

DINING OPTIONS
Café Car:
Features a variety of restaurant quality cuisine options sourced from external restaurants and chefs.

At Seat Dining:
Available in First Class only
(Menu:
http://www.amtrak.com/ccurl/266/946/Acela-First-Class-Menu-2012.pdf)

ADDITIONAL ONBOARD AMENTIES
Fully equipped conference room and business centers available on most trains.

ACELA ROUTE

Boston - South	MA	ET	0 mi
Boston - Back Bay	MA	ET	1 mi
Route 128	MA	ET	11 mi
Providence	RI	ET	43 mi
New London	CT	ET	105 mi
New Haven	CT	ET	156 mi
Stamford	CT	ET	195 mi
New York - Penn. Station	NY	ET	231 mi
Newark	NJ	ET	241 mi
Metropark	NJ	ET	255 mi
Trenton	NJ	ET	289 mi
Philadelphia - 30th Street	PA	ET	322 mi
Wilmington	DE	ET	347 mi
Baltimore	MD	ET	416 mi
BWI Airport	MD	ET	427 mi
Washington – Union St.	DC	ET	457 mi

OFF-BOARD – WAITING AREA

Club Acela Lounge
Exclusive club lounges are available while waiting at Washington Union Station, New York Penn Station, and Boston Back Bay Station. Similar to airline clubs, these lounges are available only to Acela passengers and club card members and continue the on-board experience with drinks, dining and business services.

TRAVEL TIMES AND FARES (One Way)

New York – Boston
3 hours, 25 minutes / 231 miles
First Class: $187 - $240
Business: $ 107 - $160

New York – Washington
2 hours, 45 minutes / 226 miles
First Class: $261 - $336
Business: $149 - $224

Boston – Washington
6 hours, 40 minutes / 457 miles
First Class: $349 - $405
Business Class: $223 - $279

Amtrak vs. Airline Shuttle*

		Roundtrip Fare	Travel Time	Total Travel Time and Expense
Acela	Cab from DC location to downtown	$14	15 min	**$338 3 hr 15 min**
	Train fare	$310	2 hr 45 min	
	Cab to Mid-town location	$14	15 min	
Airline	Cab from DC to Reagan National	$11	15 min	**$729 2 hr 6 min**
	Non-stop plane fare (Reagan National to LaGuardia)	$678	1 hr 16 min	
	Cab from LaGuardia to Manhattan	$40	35 min	

*Based on same day roundtrip pricing, center of city to center of city.

These fares are effective as of April 17, 2009, for walk-up fares. Cab fares were obtained from AirportShuttle.com metwashairports.com.

Source: AMTRAK: Acela

Adapting the model for California and the west.

With cities further apart and lower population and traffic density along the route, there are obviously changes and adjustments to be made to the basic model. Seat layouts will be based on further customer research, and premiums such as food and social cars will be tweaked to best serve and reflect the market.

The clear difference between regions is the distances involved. For accelerated high-speed rail to viably compete with the airlines, travel time must come in at no more than 1 ½ to 2 hours longer than the relative, *door-to-door* flight times. If a traveler flying between central Los Angeles and San Francisco would require 3 ½ to 4 hours en route, from leaving for the airport to arriving at their ultimate destination, a rail journey must take no longer than 5-6 hours between centrally located terminals.

Routing the California Express

An Accelerated Express service between San Francisco and Los Angeles could take one of two potential routes.

Coastal / El Camino Route: Currently used by the *Coast Starlight* and US Highway 101.

Central Valley / Inland Route: Used by Amtrak *San Joaquins,* Interstate 5 and US 99.

This report previously described the existing *San Joaquins* and *Coast Starlight* routes. Both routes cover roughly the same distance: 405 miles for the present San Joaquins and 473 miles for the Coast Starlight (SF-LA).

Also as previously mentioned, the single-track line over the Tehachapi pass is heavily trafficked by freight and not currently in use Amtrak. The New HSR plan includes a newly constructed dedicated HSR line over the Tehachapi pass, due to open in 2022. Until then, we would either have to renegotiate with Union Pacific to run several trains daily in each direction over the existing track or use the Coastal route. This proposal will proceed based on the latter assumption.

The California Coastal Express - One Potential Route Plan

SEGMENT	LINE / OWNER	MILE	ETA	AVG MPH
San Francisco		0	--	--
San Jose	Caltrain	50	0:50	60
San Luis Obispo	Union Pacific -Coast Subdivision	203	1:45 (2:35)	140
Santa Barbara	UP – Santa Barbara Subdivision	117	1:00 (3:40)	120
Ventura	UP – Santa Barbara / Ventura Subdivision	37	0:20 (4:05)	100
Los Angeles	Metrolink	66	0:55	70
TOTAL ROUTE		**473**	**5:00**	

PROPOSED ROUTE IN DETAIL

San Francisco to San Jose – 50 miles
Track owner: Caltrain
The northern terminus would be a newly constructed station located in central San Francisco. The New Transbay Transit Center, under construction at First and Mission streets and scheduled to open in 2017, would almost certainly serve as this terminus. A retrofitted Caltrain station at 4th and King Streets would serve as a temporary terminal prior to that date.

The initial section will run over the Caltrain owned track and would share the route with Caltrain commuter light rail, likely at a relatively low speed. A target travel time of 40-50 minutes would be ideal for this segment.

San Jose to San Luis Obispo – 203 miles
Track owner: Union Pacific
From San Jose, the route continues on the Union-Pacific Coast Subdivision, passing Salinas on its way to San Luis Obispo. The straight, mostly level road should permit cruising speeds approaching 135 to 140 mph for most of the way. Estimated travel time – 1:45.

San Luis Obispo to Santa Barbara – 117 miles
Track owner: Union Pacific
Joining the Santa Barbara Union Pacific subdivision, the route drops into the Santa Ynez Valley and hugs the pacific coast to Santa Barbara. Target train speeds for this segment will be between 90 – 120mph. Est. travel time – 1 hr.

Santa Barbara to Los Angeles – 103 miles
Track Owner: Union Pacific / Metrolink
The train continues on Union-Pacific track along the Santa Barbara and Ventura Subdivisions, before joining with the Metrolink light rail line in Venutra.
Once again, the express will operate at reduced speeds as it nears Los Angeles' Union Station, approx 60-80 mph. Target travel time – 1:15.

Factoring in station wait times of 10-15 minutes each, the estimated end-to-end travel time for the entire route would be between 5:00 and 5:30. Limited express trains could come in at five hours or less, skipping all stations in between, or including only San Jose and/or Burbank. This is just over an hour longer than the average flight between San Francisco and Los Angeles when you factor in airport transportation, wait and taxi times.

FUTURE EXTENSIONS

San Jose – Oakland – Sacramento – 130 miles
Via Union-Pacific Martinez subdivision, 1:15 ETA

Los Angeles – Anaheim – 31 miles
Via Metrolink Surf line, 30 minutes ETA

Los Angeles – San Diego – 128 miles
1:15 ETA

A Note on proposed High Speed Rail segments
A number of new rights-of-way are already planned for the New HSR route that may be integrated into the proposed California Express network as they become available. These include the **Pacheco Pass** between San Jose and Modesto, the **Madera-Fresno-Bakersfield Segment** scheduled to open in 2017, and the aforementioned **Tehachapi Loop** upgrade.

Capital Investment and Operating Costs

OPERATING and MAINTANENCE EXPENSES

The 1997 HSGT study estimated costs of operating the railroad by average speed, per passenger mile (ppm)

Average Speed (MPH)	Operating Coast (Per passenger mile)
90 mph	$ 0.13 ppm
110 mph	**$** 0.10 ppm
125 mph	$ 0.11 ppm
150 mph	$ 0.095 ppm

Table 4. Source: Federal Railroad Administration, U.S. Department of Transportation.

ROUTE INFRASTRUCTURE

Existing lines and rights of way will need some upgrades and new construction to accommodate higher speed trains. A study will be commissioned to assess the state of the track and determine which curves and clearances might require upgrades. In addition, an environmental impact survey will assess issues like pollution, noise and leakage that might occur along construction sites, and also look into greening along the road.

ENGINES AND ROLLING STOCK

At least twenty new titling engines similar to those on the Acela and other accelerated speed trains would be acquired for the launch, along with new First, Business Café, Dining and Observation cars.

STATIONS

All stations must be centrally located in the downtown cores or business districts of their respective metro area. Amtrak California and Caltrans would pay for upgrades to the Caltrain terminal at Fourth and King Streets, so that it can serve as a temporary San Francisco terminus while the Transbay Center is under construction. Other stations may require some upgrades or expansion as well. The major stations and terminals will feature an exclusive club and waiting area for California Express passengers.

CATERING

The railroad will begin soliciting contracts from premium vendors once route plans have been finalized. These will include renowned restaurants from California and elsewhere, and upscale national chains such as Starbucks, Pete's or Blue Bottle Coffee.

WIRELESS INTERNET and other business related equipment.

Amtrak California would likewise begin taking bids from Internet service providers and other suppliers once the project has been officially approved.

Fares and Revenues

The fare structure would be ultimately determined by demand, demographic analysis, operating coasts and the market rate for other modes of travel in the same region. Fares would be set higher than standard routes but remain extremely competitive with airfares and other transit options.

Number of Trains per Day

Ideally we would launch at least four to six trains daily in both directions, with 1-2 additional trains to/from Sacramento and, eventually, south to Orange County and San Diego. Limited Express direct service between San Francisco and Los Angeles, potentially stopping in San Jose or Burbank as well, would also be available.

Projected Revenues and Ridership

Our methodology and research strongly suggests that an accelerated speed express route as laid out in this proposal would be profitable and self-sustaining in California, generating up to $0.18 in revenue per passenger mile against an average cost of $0.12 per passenger mile to launch and operate the service. The basis for these projections includes not only the metrics for calculating rider demand as described in a prior section, but also on data from the Acela and similar trains around the world, particularly in regions where rail comprises a significant share of the transportation market.

Based on this methodology, our projections for the proposed California Express route are as follows:

- **25% increase in overall rail ridership**
- 10-12% of airline passengers converted to accelerated HSR
- 10-15% passenger vehicle traffic converted to accelerated HSR
- Induced ridership (New passengers who decide to travel based on this service alone): 5-10%
- Current Amtrak riders taking the new service: 25-50%
- **Total Passenger Miles by 2020: 1000-2000 million**
- **Estimated Revenues, 2014-2020: $70 – 130 million**

We recommend that Amtrak and Amtrak California conduct further cost assessments, environmental studies and market research of business and other frequent travelers along the California metro corridor. These studies should include focus groups of intermodal travelers and customer feedback surveys of current Amtrak passengers traveling within California. The surveys would be designed to answer the following questions:

Where do our potential customers travel?
What is their most frequent purpose of travel?
What are the most important factors for taking one mode of travel over another?
What features or services might induce customers to take the train?

These direct user studies will help to paint a clearer picture of the demand for an accelerated speed rail connection in California and help fine-tune this proposal route to best serve its potential customer base.

Marketing Strategy – A True Travel Alternative

The prime goal of any marketing strategy for the proposed California Corridor Express would be to reach the most frequent travelers along the LA-Bay Area – Sacramento route, specifically airline business travelers who require fast, convenient, upscale service and the ability to work and stay connected onboard. They are by no means the entirety of the route's intended riders, however. The new line would also attract vacationing families, environmentally conscious travelers, automobile commuters, new riders seeking a novel experience and older rail fans seeking a nostalgic return to the golden age of rail travel.

What follows is a brief summary of potential marketing approaches.

BUSINESS TRAVELERS:
"Arrive Fast. Arrive Rested. Arrive Prepared."
"Your new office, at 150 mph"
"Check-in at the airport? Or check out the scenery."

DRIVERS:
"Sit in traffic? Or relax in style."

ENVIRONMENTAL
"Go Green. Go Rail."

ON BOARD EXPERIENCE
"Experience the best of California."
"Dining with a view. Redefined."

NOSTALGIA – RAIL HISTORY
"Welcome back to the new golden age of rail."

GENERAL
"Hollywood and Vine, in no time."
"The San Francisco Bay, the easy way."
"Market to Sunset. Your new morning commute."

Conclusion

Amtrak should compete aggressively for market share in the transportation sector. With economic and ecological crisis a daily reality and only expected to deepen, the time is now to promote reliable, fast and environmentally responsible ground based transit. High-Speed Rail will ultimately alleviate the critical problems of traffic congestion, petro-fuel dependency and global warming promoting CO_2 emissions. Despite aggressive support and funding, true High Speed Rail, running on newly constructed infrastructure, remains years or even decades away and faces constant political opposition at every turn. Subsidies for Amtrak itself also remain under attack, with defunding or privatization proposed on a regular basis.

The San Francisco to Los Angeles corridor is a prime market for an accelerated express rail service that could operate on existing tracks and rights of way with minimal upgrades, and begin service within the next two years. These trains could cut rail travel times between northern and southern California from 8 to10 hours to approximately five and a half, closing the gap on origin-to-destination flight times and equaling or surpassing driving times. The proposed service would target business and other regular travelers and feature a premium on and off board experience that pays tribute to the golden age or rail travel while offering 21st century, high tech amenities like Wi-Fi access, fully equipped business centers and fine dining options.

The model for the proposed California Express is largely based on the profitable Acela Express, Amtrak's most profitable route. The Acela successfully competes with air and highway travel along the northeast corridor, and combined with standard northeast regional service, accounts for more than a third of passenger rail revenues and ridership in the United States.

Taking the regional challenges and culture of the west coast into account, a proposed California Coastal Express route would be designed to compete directly with the airline and personal vehicles and serve as a model of a profitable modern rail line. The success of accelerated rail in California would help counter political opposition and public skepticism surrounding rail travel, create new generations of rail enthusiasts, dramatically reduce transportation's carbon footprint and smooth the way for passenger rail's resurgence as the leading mode of transit for America's future.