



THE RAIL YARD

TRACK I

California's High-Speed Rail as an Energy Lifeline

By Chris Nelder

California has affirmed its commitment to building the nation's first high-speed rail system, but among the justifications for it, the most important one was scarcely mentioned: energy.

Yes, it will be wonderful to be able to travel from downtown San Francisco to downtown Los Angeles in a little over two and a half hours. That's faster than driving or even flying, once you take into account the travel time to SFO or LAX, arriving there at least an hour before your flight time in order to get through security, sitting on the tarmac waiting for a gate or a runway slot, and all the rest of the actual time commitments not included in the nominal hour-and-a-half flight time.

Under the system's targeted fare structure, the San Francisco – Los Angeles trip would also be about half the price of airfare, or about the same price as buying \$4 gasoline

for a car that gets 20 mpg and driving those 500 miles. But it would be a whole lot safer, more comfortable, and more productive.

The alternatives of building more airport capacity or more freeway lanes would be even more expensive than the system's \$68 billion price tag on a full lifecycle basis, including operational, maintenance, and fuel costs. Last October, I found that merely remaining committed to our existing road-and-car transportation infrastructure costs the U.S., around \$1.6 trillion annually, and that the U.S. High Speed Rail Association's \$600 billion price estimate for a high-speed rail system connecting all our major metropolitan cities is decidedly cheap

And yes, my beleaguered state, with its \$15.7 billion budget deficit and declining tax revenues, could certainly use the 450,000 permanent jobs that the HSR system will bring.



A Better Way to Fly

By the time an estimated 7 million new California residents will be needing affordable regional transportation 20 years from now, the air travel industry will be in shambles. It was built in the expectation that oil would rarely cost more than \$40 a barrel, and it has struggled mightily to survive over the

past four years as we entered the new era of triple-digit oil prices. It is already shrinking on the periphery, with small regional carriers going belly-up. Were it not for hedging their fuel costs on the futures market, nickel-and-diming passengers for baggage and other fees, or as Delta did in April buying a refinery in hopes of eliminating refining margins from their cost structure, most carriers would be sounding their death rattles already. It is very difficult to imagine how they'll survive the next 20 years at anything like their current level of service.

But anything new engenders opposition from those who fear change, and sadly, most Americans have never traveled abroad or experienced first-hand the joy of traveling by high-speed rail, where it is enthusiastically embraced in 11 other countries. I have experienced it on the TGV in France, and I can tell you that it was hands-down the most enjoyable long-distance travel I have ever known: A big reclining leather seat with ample leg room that even the most odiously huge American can fit into. Boarding 10 minutes before departure with no security hassles. Keeping all your luggage with you. Being able to get up and stretch your legs, or walk down to the bar car and grab a beer and a sandwich, or even have a smoke in the smoking car. Watching the countryside zip by. The new California

trains will also sport WiFi and power outlets. It beats the pants off the humiliating experience of modern air travel.

Those who oppose HSR have called it a "boondoggle." A "loss-making whim," and "a monument to bad territorial planning."

Actually, those quotes were not from recent coverage about the California HSR system (although they could have been), but from the Spanish minister of transport and public works in 2009, reflecting on the two decades of opposition that conservatives had mounted against his country's progress in building a high speed rail system. "Shielded behind overly simple, short sighted cost-benefit analysis, critics complained with those arguments against high speed projects over years," he wrote, "until the success of each one of the new corridors proved them wrong and showed that in troubled economic times, the best investments for a society are the ones which improve equality."

Today, Spain's HSR system is on track to be one of the world's most comprehensive, putting 90 percent of the country's population within 31 miles of a station by 2020. Economic development and rider enthusiasm have followed wherever it has been built. The high speed line from Madrid to Barcelona cut air travel in half in the first year of its operation.

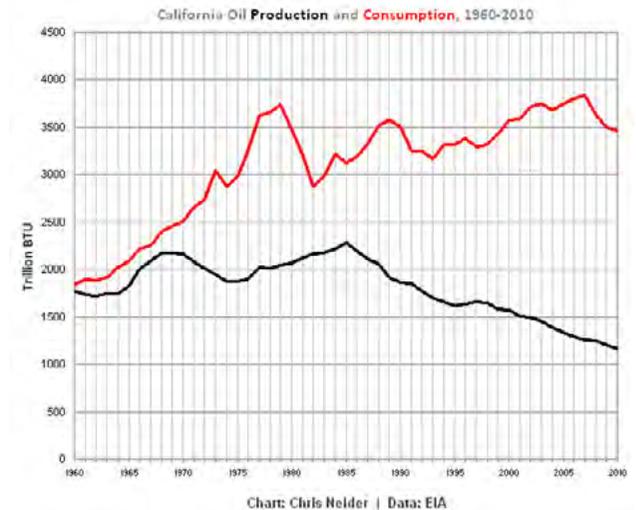
Simply put, rail is cheaper, safer, and better

than flying or driving in every way for trips in the 500-mile range.

But all of these perfectly good and sufficient reasons to build the HSR system pale in comparison to meeting our energy challenge.

The Growing California Energy Deficit

Despite being miles ahead of the rest of the country in its energy efficiency, and charging ahead with its target to produce 33 percent of its retail electricity from renewables by 2020, the Golden State's energy situation is not good. Have a look at its oil balance:



Since its halcyon days of producing almost as much oil as it consumed in 1960, a widening gap has opened between production and

consumption. As of 2010 (the latest state data available), California had a nearly 451 million barrel annual oil deficit. At today's \$86 a barrel, that's a \$39 billion annual cash outflow, just to buy oil.

Now, it's true that the oil producers are private companies participating in a global market, so the state's oil production has a much more complex interaction with the state budget than this simple math suggests. But it's also true that nearly three straight decades of declining oil production have exerted a heavy drag on the state's economy in the form of declining tax revenues and lost jobs, and has contributed greatly to the state's chronic budget problems. Now, the ever-growing amount of energy the state must import has dramatic implications for its fiscal future.

In fact, California's energy production as a whole, from all sources, is now at a 50-year low. In 2007, the state's total energy production dropped below its 1960 level of 2,630 trillion British Thermal Units (BTU), and has continued to decline. Most of the drop owes to oil production, which fell from a peak of 2,285 trillion BTU in 1985 to 1,168 trillion BTU in 2010, and to natural gas, which fell from a peak of 815 trillion BTU in 1968 to 318 trillion BTU in 2010. Non-biofuel renewable energy has only grown from 270 trillion BTU in 1960 to 692 trillion BTU in 2010, less than the post-peak loss of natural gas BTUs alone.

Now California has a new supply gap to fill since the San Onofre nuclear plant was shut down five months ago after a radioactive steam leak. Hard data on the plant's recent

production is hard to come by, but I estimate that the shutdown has removed about 32 billion kilowatts per year, or about 11 percent of the state's total electricity demand. Compensating for the loss of San Onofre with renewables would require a little less than all of the state's hydroelectric supply, or a little more than the state's existing wind, solar, and geothermal production combined.

Rails to the Future

With its energy production declining, California will need to do all it can to use energy more efficiently, and that's where high-speed rail really shines. It requires just one-third the energy per passenger as air travel, and one-fifth the energy per passenger as automobiles.

A 2008 study by Navigant Consulting found that the California HSR could cut state oil demand by 12.7 million barrels per year through displaced air and car travel. That's roughly two percent of the state's 2010 oil consumption of 653 million barrels, or about 74 trillion BTU, more than the 59 trillion BTU the state produced from wind that year.

In other words, the energy savings from building the HSR system is equivalent to more than the state's entire wind generation. California is the nation's third-largest generator of wind power, after Texas and Iowa, and the growth of renewable power is one of the few bright spots in her energy future.

But the HSR system is more than an energy gain for California. It's about more than the jobs, or the 3 million tons of CO2 emissions it would cut annually, or the 146 million hours

a year that residents would stop wasting unproductively in traffic. It could mean the very difference between life and death in a fuel-constrained future.

If my estimate is correct, world oil production will begin its decline around 2015 and fall by roughly seven percent by 2020, the year that the HSR link from San Francisco to Los Angeles is due to begin service. In that event, the fiscal benefits of the system would be dwarfed by the utter necessity of keeping the economy running, even as air travel soars out of the average person's reach and automobile fuel becomes either too expensive or too scarce. And the electrification of existing rail corridors and other improvements that are part of the HSR package will become essential elements in transitioning transportation away from liquid fuels and onto renewable power.

California's high speed rail system may prove to be the critical lifeline that keeps the nation's most populous state afloat against the undertow of oil depletion, and to be the cornerstone of the entire nation's transportation future. By 2028, when the full 800-mile network from Sacramento to San Diego is up and running, its \$68 billion price tag will start to look like a bargain. ■

Chris Nelder is a columnist for SmartPlanet. This column – republished with permission – originally appeared on July 11, 2012 and can be viewed [here](#).