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The XpressWest High-Speed Rail Line from Victorville to Las Vegas: A Taxpayer Risk Analysis

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Executive Summary

XpressWest is a proposed high-speed rail line that would operate from Victorville to Las Vegas. It would seek to attract Southern California drivers from their cars for the final 175 miles of the 230- to 300-mile trip to Las Vegas and to attract passengers who would otherwise travel by air. The project is forecast by project sponsors to cost between \$6.0 and \$6.5 billion and is planned to be a private, for-profit venture.

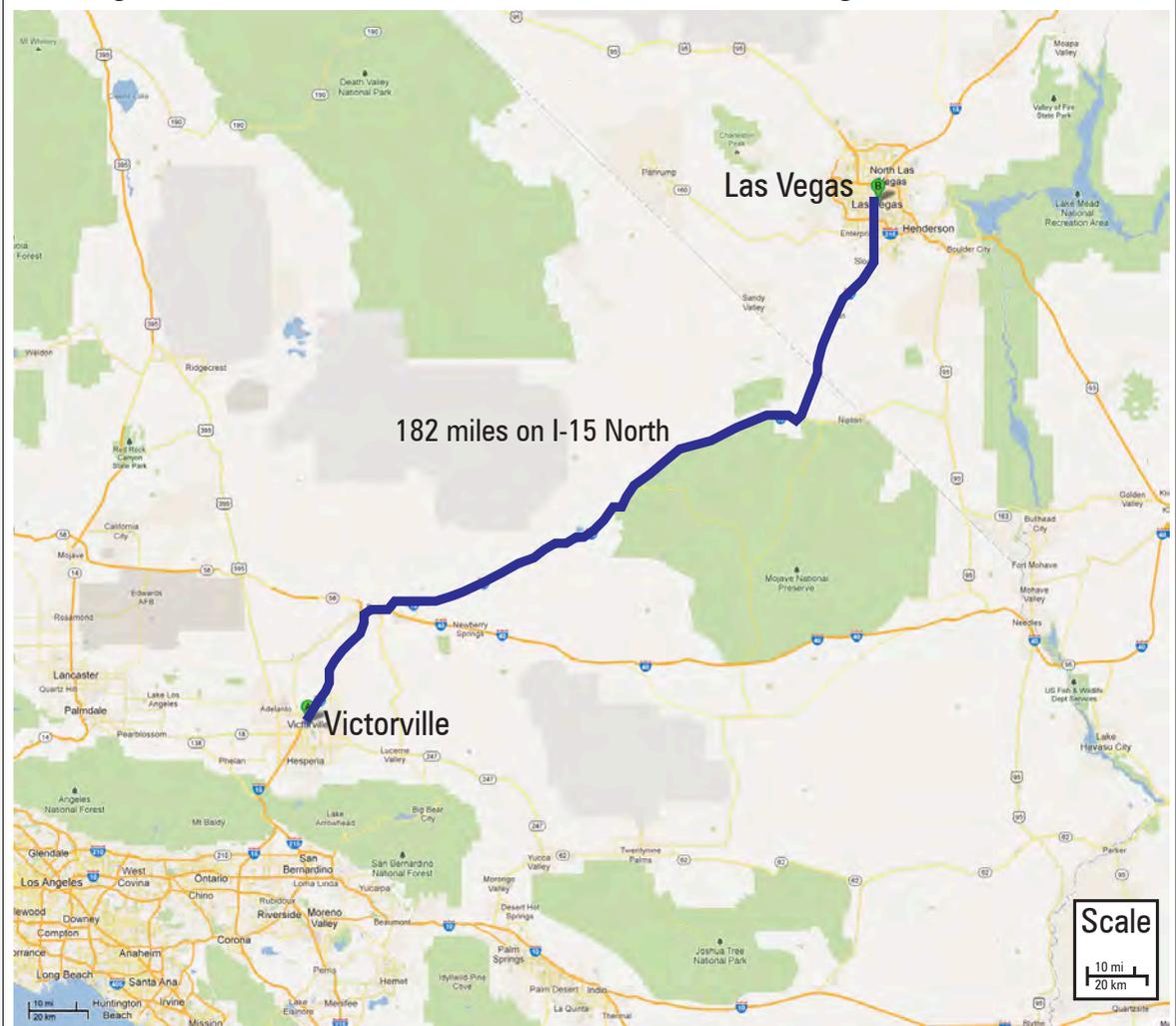
According to Federal Railroad Administration (FRA) information, XpressWest is seeking a long-term, low interest loan from the Federal Railroad Administration's Railroad Rehabilitation and Improvement Financing Program (RRIF) of from \$5.5 billion to \$6.5 billion. This loan is expected to finance between 80% and 100% of the project, with any balance from private investment and commercial financing. Historically, RRIF has been used principally to support existing freight railroads and public projects. The XpressWest loan would represent the first high-speed rail startup project under RRIF. This is not a federal loan guarantee, but rather a direct loan of federal funding. Should the project fail to repay the loan, the entire loss would be sustained by taxpayers.

It is not known whether the federal loan would be subordinated to private or commercial debt. In light of the financial concerns outlined below, unsubordinated federal debt could be a serious barrier to private investment. At the same time, it may not be possible to subordinate the federal interest, given the negative and intense political reaction to subordination of taxpayer interests in the recent Solyndra failure.

International research shows high-speed rail projects have been plagued by optimistic ridership and revenue forecasts, financial losses and capital cost overruns. XpressWest expects to draw significant numbers of riders from throughout the Los Angeles Basin and the Inland Empire. There is no precedent for large numbers of people driving one-third of the way to access a train or air service for the remaining two-thirds of such a short trip (up to 300 miles away). Thus, the very existence of much of the XpressWest market is speculative and the actual ridership could be a mere fraction of the forecast.

Even if the geographic size of the consumer market includes the entire Los Angeles Basin and the Inland Empire that XpressWest assumes, there are substantial additional difficulties. For example, the ridership and revenue forecasts used in the Final Environmental Impact Statement (FEIS) date from 2005. Not only is this documentation now seven years out of date, it is potentially irrelevant due to the economic reversals of the Great Recession.

Figure ES1: 182 Miles from Victorville, California to Las Vegas, Nevada on I-15



Source: Google Earth

The Need for a Taxpayer Risk Assessment

This *Taxpayer Risk Assessment* examines the financial risks to taxpayers of the proposed XpressWest project. There would be no need for a *Taxpayer Risk Analysis* without government (taxpayer) involvement. For example, if a bus company were to establish a new service between Victorville and Las Vegas, there would be no taxpayer financial exposure under normal circumstances. The company would either succeed or fail depending on its ability to cover its costs through various commercial activities. As with private loans, the ability to secure the loan depends on the bank's assessment of its successfully pay off—a natural inhibitor of risky propositions. XpressWest is intended to be self-supporting, with the construction and financing expenses and operating expenses covered by commercial revenues, principally passenger fares. Tellingly, the project sponsors are apparently unable to arrange conventional private sector financing and seek a federal loan with a subsidized interest rate, which would pass the risks on to taxpayers if the forecasted ridership should fail to materialize. Moreover, in the event of financial difficulty, state and local taxpayers could face significant pressure to provide funding to complete the system or to subsidize its operations. Thus, a *Taxpayer Risk Assessment* is necessary.

This *Taxpayer Risk Analysis* reviews ridership, revenue and capital cost forecasts to the extent that they are available. The principal focus is on ridership, since the repayment of the proposed federal loan from taxpayers is entirely dependent upon commercial revenues, principally the fares that will be paid by riders and ancillary revenues, such as advertising.

Since XpressWest is nominally a commercial (private) project, not all relevant information is publicly available, which makes it necessary to rely on broader industry data for some elements. However, even substantial variations in the assumed data that is not directly available for the project would make little difference in the overall financial conclusions of the *Taxpayer Risk Assessment*.

Summary of Risks to Taxpayers

Should the Victorville to Las Vegas train commercial revenues fail to pay operating costs and debt service, the project would not have enough money to repay the federal loan, resulting in a default. Taxpayers would lose up to \$6.5 billion in principal and any unpaid interest, an amount that could climb to more than \$7.5 billion if a full six-year deferment of repayment is granted.

The *Taxpayer Risk Assessment* identifies a number of concerns that could result in taxpayer losses. As Table 1 shows, there are six principal risks to taxpayers from the Victorville to Las Vegas train.

- **A Speculative Consumer Market:** The greatest risk is that the potential consumer market for the train is far smaller, in geographical terms, than is assumed in the project documentation (see Part 3). There is no parallel for large numbers of drivers and airline passengers to travel well outside the urban areas in which they live to connect to a train (or plane) to any destination, much less one so close to Southern California as Las Vegas. As a

result, common sense finds ridership and revenue likely to be a *mere fraction* of forecast. This would likely make repayment of the federal loan impossible. This risk to taxpayers of an exaggerated market is “unknown, but potentially severe.”

- **Materially Changed Circumstances (Not Reflected in the FEIS Forecast):** Even if the consumer market were geographically as large as assumed, growth in the Las Vegas tourist market has been far below forecasts in recent years. As a result, the base ridership figures are implausibly exaggerated and need to be revised downward (see Part 5). The ridership and revenue risk to XpressWest from this factor is high and risks make paying the federal debt impossible, calling for a taxpayer bailout.
- **Ridership and Revenue Forecast Model Concerns:** The international record indicates that rail projects tend to average approximately 39% less in ridership than forecast. Specific factors of the ridership forecast for the Victorville to Las Vegas train indicate that actual ridership is likely to be 39% to 70% less than the FEIS forecast, even after adjustment for the materially changed circumstances. These factors include an optimistic estimate of the base year market, a market growth rate greater than in pre-recession years, an optimistic assumption of attraction from cars and an optimistic bus attraction assumption. Such rosy predictions increase the likelihood that the federal loan would not be repaid.
- **Capital Cost Escalation:** Capital cost escalation for rail projects has been pervasive in similar projects, suggesting that capital cost escalation is likely to occur on the Victorville to Las Vegas train (Part 6), leaving the project impossible to complete and triggering a default on the federal loan. Governments (federal, state and local) would be faced with difficult decisions about whether to complete the project, at elevated costs, with public funding or to fund dismantlement of a partially completed system.
- **Likely Commercial Losses:** Even if there is no capital cost escalation, it is unlikely that the business plan for this project is flexible enough to deal with all the variations discussed above without suffering either higher costs or commercial revenue shortfalls. This inflexibility could lead to a default on the federal loan with the loss paid by taxpayers. Further, political pressure to keep the train operating could lead to a federal Amtrak-style takeover with subsidies, or the train could be operated with state and/or local subsidies. The risk of taxpayer loss from this factor is evaluated at “high.”
- **Higher Cost for Highway Expansion:** Use of the median of I-15 for the Victorville to Las Vegas train could preclude the most cost-effective options to expand highway capacity (see Part 8). This would increase costs to taxpayers and highway users. The risk of higher expansion costs on I-15 is evaluated as “moderate.”

Table 1: Victorville to Las Vegas Train (Summary of Taxpayer Risks)		
Issue		Taxpayer Risk
1	A SPECULATIVE MARKET (See Part 3): The consumer market may not be as large as the Los Angeles Basin and the Inland Empire. This could result in ridership and revenue being a small fraction (3% to 25%) of the expected amount (See Part 3).	Extent of Risk: UNKNOWN, BUT POTENTIALLY SEVERE Because this could lead to a default on the federal loan.
If the consumer market includes all of the Los Angeles Basin and the Inland Empire		
2	MATERIALLY CHANGED CIRCUMSTANCES (See Part 5): The FRA FEIS ridership forecast does not reflect materially changed circumstances. The recession has brought substantial deterioration to the Las Vegas tourist market. The 2005 ridership forecast, used in the 2011 FEIS, does not reflect these changes and the current ridership forecast must therefore be considered highly optimistic. The lower likely ridership and revenue would increase the likelihood that the project could not repay the federal loan.	Could contribute to taxpayer risk, see #5, "Commercial Losses," below
3	RIDERSHIP AND REVENUE MODEL FORECAST CONCERNS (See Part 5): The ridership forecasts include factors that predict unrealistically high ridership and revenue: (1) International research shows there are a number of common errors made that inflate ridership forecasts, errors that are included in the ridership estimates for this project, (2) The base-year market is inflated by using the change in number of hotel rooms in Las Vegas rather than using the change in room occupancy, and (3) The forecast for diversion of riders from charter buses is unrealistically high. Adjusting these factors would reduce ridership and revenue, increasing the likelihood that the project could not repay the federal loan.	Could contribute to taxpayer risk, see #5, "Commercial Losses," below
4	CAPITAL COST ESCALATION (See Part 6). Capital cost escalation could prevent project completion and thereby preclude service. This would make it impossible for the project to repay the federal loan.	Could contribute to taxpayer risk, see #5, "Commercial Losses," below
5	LIKELY COMMERCIAL LOSSES (See Part 7). The losses from #1 to #4, above could be substantial. This could impede repayment of the federal loan, and if the project is completed, there would likely be political pressure to provide subsidies to operate the system. The collateral on the federal loan is likely to provide little reduction in the eventual loss to taxpayers in a default.	Extent of Risk: HIGH Because: (1) This could lead to a default on the federal loan. (2) Political pressure could lead to federal, state and/or local operating subsidies to keep the train operating.
6	RIGHT OF WAY SUBSIDY AND HIGHER HIGHWAY EXPANSION COSTS (See Part 8): Building the rail system in the I-15 median (1) is a grant of public right of way to a private project, a direct subsidy, and (2) takes space that would be used to widen the Interstate, which will have to use more expensive means when it eventually is expanded.	Extent of Risk: MODERATE Increased costs to federal and state taxpayers and highway users when the highway is expanded.

Ridership and Financial Projections

Table 2 provides more detail on ridership and revenue, which will likely fall considerably short of the project forecasts. Likely ridership outcomes range from 39% (in the International Average Error Forecast) to 71% (in the Taxpayer Realistic Risk Forecast, also referred to as the Reason Foundation Forecast) below the project forecast (see 2: Project Forecast Current Data in Table 2

below). Likewise for project expenditures over the 24-year planning horizon, ranging from \$7.3 billion to \$11.1 billion more than the project revenues, assuming a \$6.5 billion federal loan.

A Likely Default?

On the basis of this evaluation, the *Taxpayer Risk Analysis* concludes that the Victorville to Las Vegas train project, as proposed, entails enormous risks for taxpayers. There appears to be little or no prospect for the Victorville to Las Vegas train to generate sufficient fares and commercial revenues to repay a federal loan of between \$5.5 billion and \$6.5 billion. The likely default would represent a loss to taxpayers. Moreover, this could lead to further taxpayer losses, at any or all of the federal, state or local levels, as political pressure is placed upon governments to operate (and perhaps even complete construction of) the system at taxpayer expense.

Federal taxpayer risks from similar financial commitments have become a matter of considerable political debate, especially as a result of the federal loan guarantees to Solyndra, a solar panel company.

Table 2: Summary of Ridership and Profit (Net Revenue) Projections				
	Annual One-Way Ridership: 3rd Year (Millions)	Ridership Compared to (2) Project Forecast: Current Data	Net Profit: 24-Year Projection Period (\$6.5 Billion Federal Loan)	Assessment
Project Forecast				
(1) Exhibit: Project Forecast: 2005 Data	8.9 Million			Rendered invalid by changed circumstances (principally the financial crisis) and secondarily by the passage of time. Shown as exhibit because of its obsolescence.
Revised Forecasts: Developed for this Report				
(2) Project Forecast: Current Data	7.0 Million	0%	-\$3.9 Billion	Adjusts Project Forecast: 2005 Data to account for changed circumstances. Significant ridership forecast factors make this scenario overly optimistic (Part 5)
(3) International Average Error Forecast	4.2 Million	-39%	-\$7.3 Billion	Reduces Project Forecast: Current Data to reflect average ridership bias in international projections.
(4) Taxpayer Realistic Risk Forecast (Reason Foundation Forecast)	2.1 Million	-71%	-\$10.3 Billion	Eliminates upward bias of some of the questionable assumptions in the FEIS Forecast: 2005 Data (and the Project Forecast: Current Data).
Note: It is possible that the principal customer market (in the Los Angeles Basin and the Inland Empire) is too remote from Victorville Station to be attracted in material numbers. Should this occur, ridership would be well below the lowest projection indicated above and financial performance would be considerably worse.				

The Railroad Rehabilitation and Improvement Financing (RRIF) Program

The \$5.5 billion to \$6.5 billion proposed loan would dwarf the size of both *any* previous loan and *all* of the loans combined of the RRIF program. There are serious risks to taxpayers from financing speculative mega-projects like XpressWest through the RRIF program. Congress has provided a more appropriate funding vehicle for large transportation infrastructure: the Transportation Infrastructure Finance & Investment Act (TIFIA). TIFIA can provide needed funding, but with effective protections to taxpayers from undue speculative risks.

Policy Recommendations

Based upon the analysis above, the following policy recommendations are offered:

The RRIF Loan Application Should Be Declined: It is recommended that the Victorville to Las Vegas train RRIF loan application be denied. With much or all of the investment being in the form of a federal loan, taxpayers—rather than private investors—are placed in the role of speculators on a project of doubtful financial viability. The Victorville to Las Vegas train project would be appropriate for consideration under the TIFIA program, which relies principally on commercial financing and minimizes speculative risk on the part of taxpayers. Or, ideally, if the project made economic sense, it would be possible to finance it commercially, without a federal loan or interest subsidy.

RRIF Should Not Finance Highly Speculative Projects: In reauthorizing the federal surface transportation program, Congress should reduce the risks inherent in RRIF as currently structured, drawing lessons from the successful TIFIA credit-support program to reduce speculative risks to taxpayers. Specifically, it is recommended that:

- RRIF should provide subordinate loans, rather than primary loans.
- Projects eligible for RRIF loans must secure an investment-grade rating on their primary debt.
- The maximum amount of an RRIF loan should be no more than 33% of the project's capital cost.

Editor's Note on Recently Proposed Victorville to Palmdale Link

In recent months, there have been proposals to extend XpressWest from Victorville to Palmdale, in order to connect to the proposed California high-speed rail line. No environmental or planning studies have been conducted on this proposed Palmdale extension and thus it cannot be evaluated in this report. It is, however, highly unlikely that a Palmdale link would significantly improve XpressWest's ability to repay the large federal loan it is seeking for the main Victorville to Las Vegas line.

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Part 1

Introduction

XpressWest Enterprises, LLC, a private firm, has proposed construction of an approximately 188-mile high-speed rail line between the Victorville, California area and Las Vegas, Nevada that they call XpressWest. The Southern California station would be located approximately one-quarter of the way between Victorville and Barstow from Victorville, along Interstate 15. The Las Vegas station would be located across Interstate 15 from the Las Vegas Strip.¹ The Victorville station would have up to 18,000 parking places.

The principal purpose of the Victorville to Las Vegas train would be to attract riders who would otherwise travel between Southern California and Las Vegas by air, car or bus.

Current forecasts indicate that the Victorville to Las Vegas rail line would cost \$6.0 to \$6.5 billion to build.² The train would operate at up to 150 miles per hour and complete the Victorville to Las Vegas trip in 100 minutes. Project documents forecast that the train would capture nearly 20% of the automobile travel between the Victorville and Las Vegas as well as approximately 20% of airline and bus traffic. The one-way passenger fare is projected at \$50 (\$100 round trip per person).

The Victorville to Las Vegas train was originally proposed to be privately financed.³ However, the project is applying for a federal loan of from \$5.5 billion to \$6.5 billion⁴ under the Railroad Rehabilitation and Improvement Financing (RRIF) Program (See Box: Railroad Rehabilitation & Improvement Financing Program: Summary & Loan Approval Criteria). In its procurement for financial analysis of the project, the Federal Railroad Administration (FRA) indicates that the loan would represent 80% or more of the project cost. Yet, at \$5.5 billion to \$6.5 billion, the federal loan would appear to represent 85% to 100% of the project cost.

Under RRIF, an applicant can seek up to 100% of project costs and obtain payback periods as long as 35 years, with initial payments deferred for up to six years. Under RRIF, the interest rate would be at the federal government's borrowing rate for similar term debt. As a result, federal taxpayers would subsidize the project with a below-market interest rate over the term of the loan. Further, interest would increase the loan amount from nearly \$7 billion to \$7.5 billion before the first payment is made (after the six-year deferral).

The Victorville to Las Vegas project has applied for the 35-year term and the six-year payment deferral. The Federal Railroad Administration (FRA) has hired Deloitte Financial Advisory Services, LLP of McLean, Virginia to undertake financial assessment services with respect to this potential loan.⁵

Railroad Rehabilitation & Improvement Financing Program: Summary and Loan Approval Criteria

According to the Federal Railroad Information website (<http://www.fra.dot.gov/Pages/177.shtml>):

“The Railroad Rehabilitation & Improvement Financing (RRIF) Program provides direct federal loans and loan guarantees to finance development of railroad infrastructure.

The RRIF program was established by the Transportation Equity Act for the 21st Century (TEA-21) and amended by the Safe Accountable, Flexible and Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU). Under this program the FRA Administrator is authorized to provide direct loans and loan guarantees up to \$35.0 billion. Up to \$7.0 billion is reserved for projects benefiting freight railroads other than Class I carriers.

The funding may be used to:

- Acquire, improve, or rehabilitate intermodal or rail equipment or facilities, including track, components of track, bridges, yards, buildings and shops;
- Refinance outstanding debt incurred for the purposes listed above; and
- Develop or establish new intermodal or railroad facilities

Direct loans can fund up to 100% of a railroad project with repayment periods of up to 35 years and interest rates equal to the cost of borrowing to the government.

Eligible borrowers include railroads, state and local governments, government-sponsored authorities and corporations, joint ventures that include at least one railroad, and limited option freight shippers who intend to construct a new rail connection.”

FRA's Substantive Criteria for Evaluation of RRIF Applications (from <http://www.fra.dot.gov/rpd/freight/1629.shtml>)

“Determinations are made based on the following criteria and standards, as more fully set forth in the statute or the regulations, evaluated individually and considered collectively.

- The statutory eligibility of the applicant and the project (49 CFR 260.3, definition of applicant and 49 CFR 260.5, eligible purposes);
- The creditworthiness of the project, including the present and probable demand for rail services and a reasonable likelihood that the loan will be repaid on a timely basis. (49 CFR part 260, Subpart B-FRA policies and procedures for Evaluating Applications for Financial Assistance)
- The extent to which the project will enhance safety. (49 CFR 260.7(a))
- The significance of the project on a local, regional, or national level in terms of generating economic benefits and improving the railroad transportation system. (49 CFR 260.7(c))
- The improvement to the environment that is expected to result directly or indirectly by the implementation of the project. (49 CFR 260.7(b)) and
- The improvement in service or capacity in the railroad transportation system or the reduction in service- or capacity-related problems that is expected to result directly or indirectly from the implementation of the project (45 U.S.C. 822(c))”

According to the FRA, the final financing package and amount of the federal loan would be determined “once the final cost of the project is determined.”⁶

Part 2

The Context: Unreliable Megaproject Ridership and Cost Forecasts

Major transportation infrastructure projects, including high-speed rail, have been plagued by substantial forecast errors. Generally, the consensus of researchers is that cost forecasts have been unrealistically low, and that ridership forecasts have been unrealistically high.

Often, these projects are fully funded by taxpayers, who are required to pay the additional capital costs as well as unplanned operating subsidies that occur from actual revenue that is less than forecast (because of overly optimistic ridership forecasts).

The leading international research is by European academics Bent Flyvbjerg, Nils Bruzelius and Werner Rothengatter.⁷ In an extensive examination of 258 transportation infrastructure “mega-projects” covering 70 years in North America, Europe and elsewhere,⁸ they have noted significant, recurring and even gross forecast errors.

Flyvbjerg et al. found that capital cost escalation from the time of project approval to completion date averages 45%, with some cases of 100% or more. Moreover, they found that capital cost overruns were pervasive, occurring in 9 out of 10 projects.⁹

Flyvbjerg et al also identified serious errors in projecting ridership and revenue:

...the problem with cost overrun is exacerbated by the fact that often this problem comes hand in hand with lower-than-estimated revenues. The consequence is projects that are risky to the second degree.¹⁰

Flyvbjerg et al found that actual ridership on passenger rail projects averaged 39% below forecast levels.¹¹ In particular, they noted:

There is a massive and highly significant problem with inflated forecasts for rail projects. For two-thirds of the projects, forecasts are overestimated by more than two-thirds.¹²

Flyvbjerg et al found that despite the rampant forecasting errors, there has been virtually no improvement in forecast accuracy in recent years. Further, firms that make inaccurate forecasts incur no sanctions or financial penalties.

Flyvbjerg et al have characterized the inaccurate forecasts as exhibiting “optimism bias” and “strategic misrepresentation.”¹³ In words uncharacteristically sharp for academic work, they refer to this practice to as “lying.”

Improved Forecasting: Because of recurring and expensive forecasting errors, conventional cost and ridership forecasting methods have come under serious professional criticism. This tendency toward optimism about outcomes was identified in research by Daniel Kahneman of Princeton University and Amos Tversky of Stanford University, which led to the award of the 2003 Nobel Prize in Economics.¹⁴ Based upon research by Flyvbjerg and others, the American Planning Association (APA) recommended that planners “should never rely solely on” conventional forecasting methods. The APA recommended that such efforts also separately include comparisons to similar projects (“reference class” forecasting). An APA study on the inaccuracies of road and rail project revenue forecasts was published in the *Journal of the American Planning Association* (JAPA) and noted that:¹⁵

The authors call on planners to take an active role in helping generate more accurate forecasts for public projects, including road and rail projects. They recommend that planners use the “reference class” forecasting method to reduce inaccuracy and bias in forecasts. The method requires taking an “outside view” on the project being forecasted by examining similar projects, creating a distribution of outcomes for the “reference class,” and then positioning the project within that distribution. “Reference class” forecasting typically produces more accurate results because it does not focus on the specifics of a project nor on the potential outcomes that could unduly influence it.

This common sense method of comparing to similar projects is indispensable as a test because of its grounding in “real world” experience.

This analysis is presented in the context of the pervasive and unreliable forecast record of rail projects, principally with respect to optimistic ridership and revenue forecasts and under forecast (“low-balling”) of construction costs.

Part 3

Speculating on a Questionable Consumer Market

The most fundamental risk to the project is that there may be no substantial market for travel one-third of the way from Los Angeles to Las Vegas (Figure 1).¹⁶ The genuine travel market at the California end could be limited to the Victorville-Hesperia-Apple Valley urban area (in the Victor Valley), the location of the Victorville station. The Victorville station would be located between Exits 154 and 161 on Interstate 15, north of Victorville (toward Las Vegas). XpressWest would have better prospects for attracting ridership if trains reached stations in the Los Angeles Basin and the Inland Empire. Completion of the line to these locations would have been far more expensive.

Some have discussed linking an extension from the Victorville Station to Palmdale, where transfers could be made to and from California high-speed rail services to Los Angeles. However, there is considerable uncertainty about the future of the California high-speed rail project.

The assumed larger-than-Victor-Valley market, including the Los Angeles Basin and the Inland Empire, could be too far away to provide a substantial level of ridership (and revenue). There is no precedent for a train or air terminal so far from the principal urban areas intended to be served (the Los Angeles urban area in the Los Angeles Basin and Riverside-San Bernardino urban area in the Inland Empire). It can only be known whether there is a substantial market for such an unusual service configuration after service begins. In other words, the existence of the potential market itself is speculative.

Yet the Final Environmental Impact Statement (FEIS) ridership forecast assumes that riders will be strongly attracted from cars not only from the immediate market of the Victor Valley, but also from the much larger and more remote Los Angeles Basin and Inland Empire. The Victorville train station would be located 40 miles beyond the urban fringe at the southern approach to Cajon Pass near San Bernardino, more than 90 miles from downtown Los Angeles and as far as 110 miles from other parts of the Los Angeles urban area (including Orange County). The ridership forecasts also assume that a substantial number of air travelers would be attracted to the service, despite the fact that airports are considerably closer to Las Vegas than the Victorville train station for the overwhelming majority of Los Angeles Basin and Inland Empire residents.



It would be virtually unprecedented for a high-speed rail end-of-line terminal for a major urban area to be located so far from the core (84 miles from downtown Los Angeles). All of the major high-speed rail lines of Europe and Asia have their terminals in or near the urban core of their terminal markets.¹⁷ The long distance from Victorville to Los Angeles would make the line particularly unattractive for people beginning round-trip journeys in Las Vegas, because of the necessity of renting a car at Victorville to complete the trip.

Driving One -Third of the Way to Las Vegas? It seems unlikely that large numbers of people will drive one-third of the way to Las Vegas and then board a train in Victorville for the balance of the trip. There are no international parallels. People do not voluntarily change modes of travel on an automobile trip unless there are significant time or cost savings, which would not exist in the case of the Victorville to Las Vegas train.¹⁸

The Steer, Davies, Gleave review indicates that “those travelling to Las Vegas by car do so because of *cost and convenience*.”¹⁹ Yet, as shown in Part 5, the train will be considerably more expensive. Further, traffic congestion is generally more severe in the Los Angeles Basin and the Inland Empire than between Victorville and Las Vegas. As a result, for many drivers, the least stressful (and most convenient) part of the drive to Las Vegas would be the less congested Victorville to Las Vegas segment. This could make attracting people from cars to the train more difficult.

A Much Longer Trip to the Plane or the Train? Virtually all of the Los Angeles Basin and the Inland Empire is within 45 minutes drive of an airport that has service to Las Vegas. To travel to Las Vegas on the train would require a drive to Victorville that is in most cases at least twice as long as the trip to the airport. Only a small portion of the Inland Empire is within 45 minutes driving time of the Victorville station. Virtually none of the Los Angeles Basin is within an hour's driving time of Victorville station. As with cars, the principal question is whether there is sufficient demand for former air travelers to drive two-thirds of the way to Las Vegas to ride the train.

As in the case of driving, there is no international parallel of a large market in which people drive *so far outside* the urban fringe to access planes or trains. In fact, virtually all of the world's largest urban areas have airports *within* or close to their urban fringes that provide service to nearby destinations, such as Las Vegas from Southern California. High-speed rail services generally operate from city centers, though some operate closer to, but *not outside* the urban fringe.²⁰

The Steer, Davies, Gleave review indicates that “People travelling by plane did so to obtain a *faster journey* (and also because they found that mode convenient).”²¹ Traveling by car to Victorville will generally not reduce travel time and air travelers are not likely to perceive it as more convenient.

The Potentially Smaller Market: The genuine consumer market for the train would likely be limited to the Victor Valley, which represents less than 3% of the assumed Southern California market. Even if the genuine market includes all of the Inland Empire, the total market would be less than one-quarter as large as is assumed in the FEIS (Table 1).²²

Table 1: Southern California Markets				
	Population	Share of Total Southern California Market	Distance (Miles) to Victorville Station	A Genuine Market?
Victor Valley	420,000	2.7%	0-25	Yes
Inland Empire	3,270,000	20.7%	40-100	Possible, though long distances
Los Angeles Basin	12,110,000	76.6%	65-115	Distance could be too great
Total	15,800,000	100.0%		
Estimated from 2010 Census Data				

Some experiences with remote airports may be relevant. People can be reluctant to drive longer distances to airports, especially if they have a choice.

- In 1975, a new international airport, Maribel, was opened less than 40 miles north of the core of Montréal. The airport operated as the only transatlantic origin and destination in the Montréal metropolitan area from 1975 to 1997. Yet there was consumer resistance to the use of the airport and nearly all domestic and U.S. bound flights continued to operate out of Dorval airport, which is much closer to most residents of the Montréal area. Eventually, Maribel airport was closed to major passenger aircraft operations. Since that time, Maribel airport has served as movie sets and there have been proposals to turn it into an amusement park.

- During the 1970s and early 1980s, the Los Angeles Department of Airports acquired a large amount of property in the Palmdale area of the Antelope Valley to build a new major international airport. While there are limited operations at Palmdale airport, the larger project did not proceed because the Department of Airports, which must finance its capital and operating costs from airline and passenger revenues, was not convinced that the airport would be sufficiently attractive to be successful.

If, as has thus far been the international experience, the genuine market is only the Victor Valley, then approximately 97% less ridership could be expected. If the Inland Empire is demonstrated to be a part of the genuine consumer market, then ridership could be expected to be approximately 75% less than any forecasts based upon the entire Southern California market. That there are no examples of similar projects makes the venture particularly speculative.

The fact that there are no international parallels does not guarantee that the market cannot be as large as the project assumptions. However, the existence of a market of such size and remoteness is purely a matter of speculation. The reality can only be known after the expenditure of at least \$6.5 billion, which is proposed to be provided by taxpayers through a federal loan.

Part 4

Travel Time by Train, Car and Plane

According to project reports, most of the forecast ridership on the Victorville to Las Vegas train would be attracted from automobiles, as drivers seek to avoid traffic congestion and slower travel on the Victorville to Las Vegas section of I-15. Additional riders are forecast to be attracted from airlines and buses.

Travel times are an important component in forecasting ridership on a project such as the Victorville to Las Vegas train. The greater the travel time savings (if any), the more people are likely to switch to the train, instead of driving or flying, all things being equal. At the same time, leisure travelers, who would represent the largest share of Victorville to Las Vegas train passengers, tend to be less responsive to travel time savings than other travelers, especially business travelers.²³

Drivers routinely add a “congestion security cushion” as they travel to board scheduled transportation services, such as planes or trains. This is necessary, because if sufficient time is not allowed, the plane or train can be missed, causing substantial delay, additional expense or even trip cancellation. Serious traffic disruptions can occur in Southern California at virtually any time. Technology, however, is making it possible for people to better plan their trips to avoid congestion. Improved traffic information services could be used by travelers in the future to determine the most advantageous times of a planned travel day to drive to (or from) Las Vegas. This factor could work to increase or decrease eventual ridership on the train.

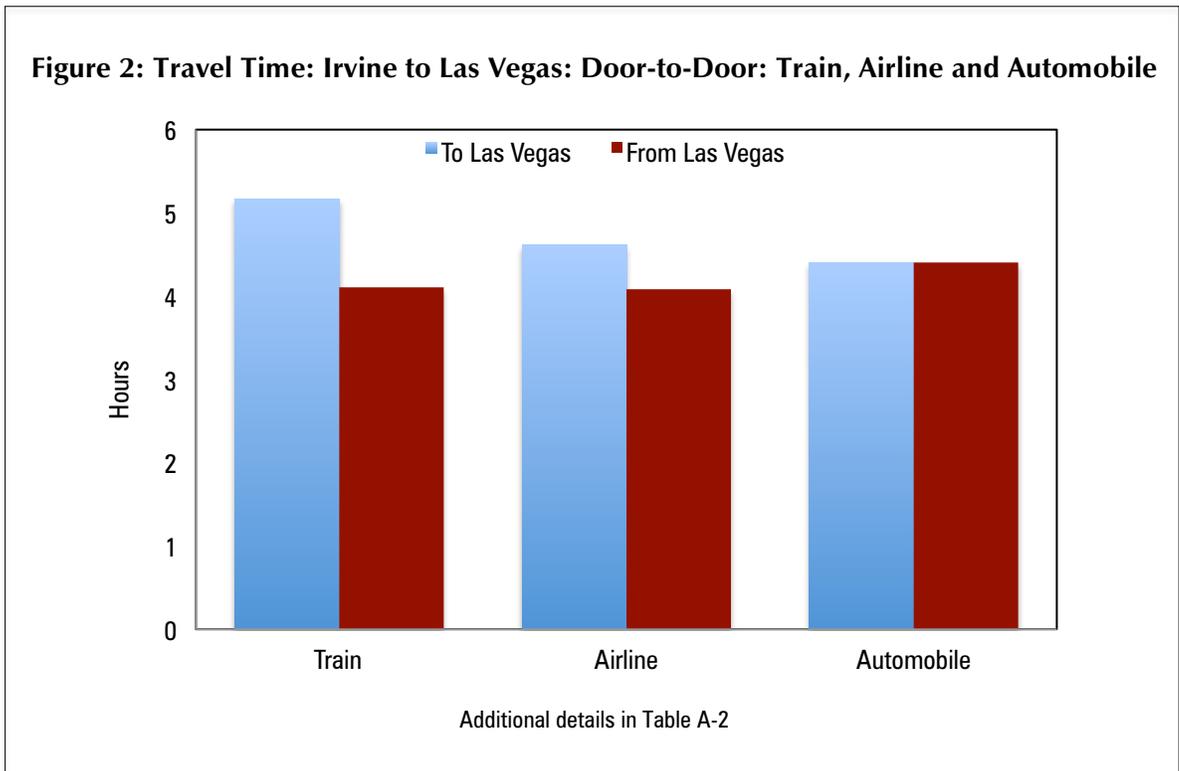
A congestion cushion is unnecessary for automobile-only trips from Southern California to Las Vegas, because there is no necessity to reach the train station or an airport for a scheduled departure. However, traffic congestion could easily be intense enough to cause missing a train or plane, which could substantially increase the travel time and increase costs to passengers. No congestion cushion is assumed, however, for trips from the train station or airports to home, because returning travelers will have already completed their train or plane trip.

Estimated door-to-door travel times are illustrated for automobiles, airline passengers and train passengers from the Los Angeles Basin, the Inland Empire and the Victor Valley (the Victorville area) to Las Vegas in Table 2.²⁴ The elements of the door-to-door travel times are described in Table A-1 and the details of a trip example (Irvine to Las Vegas) are provided in Table A-2 and Figure 2. The travel times assume free-flow driving, plus a “congestion cushion” for automobile

trips to the Victorville station and airports, walking time from parking lots to the train station and to airport ticket lobbies, rail station and airport processing time and connection times in Las Vegas between the train, airlines and hotels.

Table 2: Door-to-Door Travel Times: Normal Travel Conditions			
Area: Location (Airport)	Airline	Automobile	Train
Victor Valley: Victorville (No Airline Service)			
▪ To Las Vegas	--	2:56	2:52
▪ From Las Vegas	--	2:56	2:42
▪ Round Trip	--	5:52	5:34
▪ Compared to Train (Minutes)	--	18	0
Inland Empire: Riverside (Airport: ONT)			
▪ To Las Vegas	4:40	3:47	4:16
▪ From Las Vegas	4:10	3:47	3:31
▪ Round Trip	8:50	7:34	7:47
▪ Compared to Train (Minutes)	63	-13	0
San Gabriel Valley: West Covina (Airport: ONT)			
▪ To Las Vegas	4:43	4:06	4:40
▪ From Las Vegas	4:13	4:06	3:45
▪ Round Trip	8:56	8:12	8:25
▪ Compared to Train (Minutes)	31	-13	0
Orange County: Irvine (Airport: SNA)			
▪ To Las Vegas	4:37	4:25	5:10
▪ From Las Vegas	4:07	4:25	4:05
▪ Round Trip	8:44	8:50	9:15
▪ Compared to Train (Minutes)	-31	-25	0
Central: Los Angeles (Airport: LAX)			
▪ To Las Vegas	5:14	4:20	5:04
▪ From Las Vegas	4:24	4:20	4:04
▪ Round Trip	9:38	8:40	9:08
▪ Compared to Train (Minutes)	30	-28	0
South: Long Beach (Airport: LGB)			
▪ To Las Vegas	4:25	4:32	5:26
▪ From Las Vegas	3:55	4:32	4:16
▪ Round Trip	8:20	9:04	9:42
▪ Compared to Train (Minutes)	-82	-38	0
San Fernando Valley: Northridge (Airport: BUR)			
To Las Vegas	4:46	4:44	5:43
From Las Vegas	4:16	4:44	4:28
Round Trip	9:02	9:28	10:11
Compared to Train (Minutes)	-69	-43	0

Note: Additional details in Appendix A



This comparison represents the best case scenario for the Victorville to Las Vegas train. It assumes that the connection from the Las Vegas train station to the hotel in Las Vegas will be by taxi. This more seamless travel pattern would be quicker and more convenient than making the connection by shuttle bus or Monorail and shuttle bus.²⁵ Indeed, there is the potential for logistical difficulties with more than 500 passengers arriving every 20 minutes at the Las Vegas station on peak days, transferring to taxis and shuttle buses and from shuttle buses to the Las Vegas Monorail.

The trip to Las Vegas would generally be faster by automobile and airline from the Los Angeles Basin. The car trip would average 47 minutes faster, while the air trip would average 28 minutes faster. In both cases, the return trip by train would be faster, at 4 minutes faster than by air and 18 minutes faster than by car. The return trip by train is faster principally because it assumes no congestion for travel from airports in the LA area or the Victorville train station to home (Table 2).

Overall round trip travel times would be somewhat better for airline and automobile travel than train travel between the Los Angeles Basin and Las Vegas under normal travel conditions. Car travel from the Victorville area and air travel from the Inland Empire would be slower than the train:

- The Victorville to Las Vegas train would average 29 minutes slower than automobiles from five Los Angeles Basin locations (Long Beach, Los Angeles, West Covina, Irvine and Northridge) and would average 16 minutes slower than airline travel, using the closest airports. Travel by car and airline would be faster from each of these locations, except for air travel from Los Angeles using Los Angeles International Airport. Earlier recommended

arrival times relative to flights at that airport make travel time longer than at the other airports.²⁶

- The Victorville to Las Vegas train would be 13 minutes slower than the automobile for a round trip from the Inland Empire (Riverside) to Las Vegas. The Victorville to Las Vegas train would be 1:03 (63 minutes) faster than travel by air (using Ontario International Airport).
- The Victorville to Las Vegas train would be 18 minutes faster than the automobile for a round trip from the Victor Valley to Las Vegas. There is no air service in this market.

Yet, according to the FEIS, the maximum travel delay on I-15 could reach seven hours by 2022.²⁷ According to the FEIS, this forecast assumes that “drivers will not modify their travel pattern or departure time.” It is not plausible that such a huge increase in travel time would not elicit a substantial modification in travel behavior. Indeed, the FEIS goes on to say that “by the summer of 2022, 78% of the drivers will find the congestion delay intolerable on Sunday and will leave a day earlier (or not travel at all).”

As the FEIS indicates, the most likely impact would be that drivers would simply travel at different times to avoid the traffic congestion or not travel at all. There are other options as well. California could expand I-15 to increase capacity and reduce travel times long before delays reached seven hours. Failing that, some might opt for a quicker trip via I-40 and US 95, and many others might select other destinations. The already expanding Southern California “Indian” casino industry could attract more people unwilling to tolerate the traffic delays, with both greater gaming and entertainment offerings. Already, casinos operate in the Southern California counties of San Bernardino, Riverside, Imperial and Santa Barbara.²⁸ If traffic were to become significantly congested, the strong international toll road industry might seek to finance alternate capacity between Victorville and Los Angeles, whether through high-occupancy toll lanes or a new toll highway. Truck-only lanes would be another alternative for increasing capacity. Finally, more people could fly.

In short, the apocalyptic future travel time referenced in the FEIS is unlikely to occur because people will not travel from Southern California to Las Vegas if travel times get that long.

A Steer Davies Gleave review of the project, contained in an attachment of the FEIS, indicated that its surveys have found that few people had encountered congestion on the trip to Las Vegas.²⁹ The original URS (the consulting firm for the project) ridership forecasts found that only 13% of drivers experienced significant traffic congestion and that 67% experienced no traffic congestion. Much of this congestion is concentrated on travel to Las Vegas on Friday evenings and on Sunday afternoons and evenings. As is noted below, traffic volumes between Victorville and Las Vegas have grown markedly slower than forecast since 2004. Further, California has cost-effective options for expanding Interstate-15, by adding lanes in the median of the roadway (see Part 8).

Table 3: Average Travel Time Comparison in Minutes: Round Trip and One Way: Normal Traffic Conditions		
	Air Compared to Train	Auto Compared to Train
ROUND TRIP		
Victor Valley		18
Inland Empire: Riverside	63	-13
Los Angeles Basin	-24	-29
To Las Vegas		
▪ Victor Valley		4
▪ Inland Empire: Riverside	24	-29
▪ Los Angeles Basin	-28	-47
From Las Vegas		
▪ Victor Valley		14
▪ Inland Empire: Riverside	39	16
▪ Los Angeles Basin	4	18

Part 5

Ridership and Revenue Forecasts: Predicting Consumer Behavior

This section assumes, as does the FEIS, that the market for the Victorville to Las Vegas train includes all of the Los Angeles Basin and Inland Empire, which is relatively distant from the Victorville Station as well as the Victor Valley. Should a more conventional market definition (limited principally to the Victor Valley) be demonstrated by actual ridership experience, ridership and revenue would be radically below any of the forecasts described in the balance of this report.

Accurate ridership and revenue forecasts are crucial to the financial success of any infrastructure project. Should ridership forecasts be too optimistic, revenue will be lower and financial losses can occur.

Ridership is projected by mathematical (computer) models that seek to predict the behavior of travelers. The mathematical models begin with estimating actual travel demand in a base year (2012), which increases in the early years as the system is introduced (a two-year “ramp up period” in this case). Travel demand is then increased by forecast growth rates to a “horizon” year, which in the case of the Victorville to Las Vegas high-speed train is 2035. High-speed rail ridership is estimated by comparing the attractiveness of alternate travel modes, such as airlines and automobiles, in terms of factors such as consumer price (fares and automobile operating costs) and travel time.

These mathematical models are prone to substantial error, as the international forecasting record indicates (see above). For example, if the estimate of the travel market in the base year is higher than actual, the ridership forecast is likely to be higher than the eventual actual demand. If the growth rates used are higher than actually occurs, actual ridership will likewise be lower than forecast. If the comparison of costs is not accurate, and if it specifically overestimates the cost of airline or automobile travel, fewer people will be attracted because the assumed price advantages of high-speed rail are not reflective of reality.

These are examples of the most obvious difficulties with forecasting ridership. There are, in addition, more technical issues that can bias ridership forecasts too high, such as flawed methodology.

Accurate ridership forecasts are crucial to the success of rail projects. In the case of the Victorville to Las Vegas train, the actual ridership must be high enough to generate sufficient revenue to pay for the project. If ridership falls short, any federal loan would potentially not be repaid and the taxpayers could lose up to \$6.5 billion in a federal loan default. Further, lower ridership and revenue levels could cause the train to sustain losses. Service could be threatened with discontinuance. This would lead to political pressure for open-ended subsidies from state, county or local governments to keep the train running.

External factors can render ridership and revenue forecasts inaccurate. For example, changing economic, demographic or other factors can interfere with the accuracy of ridership forecasts. All of these factors are consistent with the international forecasting errors documented by Flyvbjerg et al.

However, some forecast errors can be avoided by the use of the latest data. Further, comparisons with the actual experience in similar projects can also be helpful to avoid forecasting errors, such as is recommended by the American Planning Association (above). These kinds of safeguards are especially important where taxpayer funding is involved.

The Ridership Forecast: Background

The latest project ridership forecasts, as stated in the FEIS, indicate an average of 25,300 daily one-way trips between the Victorville and Las Vegas by the third year of operation. Forecasts are provided for the first 24 years of operation.³⁰ This converts to an annual ridership of 8.9 million.

The largest market of anticipated riders would be attracted from cars. These riders would travel by car from their point of origin to the train station in Victorville. According the FEIS, approximately 18% of the people traveling by car to Las Vegas would leave the freeway at the Victorville station and complete their journey by the train.³¹

The FEIS also forecasts that approximately 20% of the airline travelers between Las Vegas and the Southern California airports would use the train instead (from Los Angeles International Airport, John Wayne in Orange County, Bob Hope in the San Fernando Valley and Ontario International Airport in Western San Bernardino County). These riders would drive the longer distance to Victorville station to board the train.

The FEIS Victorville to Las Vegas ridership forecasts are based upon work commissioned by the project and performed by URS. The FEIS also includes a review of the forecasts by Steer Davies Gleave,³² with a final review of both documents by Cambridge Systematics. The ridership forecasts in the FEIS were based upon the URS forecasts, as revised by Cambridge Systematics (referred to as the FEIS forecasts).

URS and Cambridge Systematics have been involved in forecasting ridership for major projects in both Nevada and California. URS Greiner, a subsidiary of URS, produced the ridership and revenue forecasts for the Las Vegas Monorail that were the basis of a bond issue for the project. The actual ridership and revenue were well below the level forecast by URS (75% or more below forecast in 2010). The Las Vegas Monorail filed for bankruptcy, leaving bond holders with substantial losses (see Box: Las Vegas Monorail Ridership Forecast and Results).

Cambridge Systematics has played a principal role in developing the ridership forecasts for the California high-speed rail project, which have been criticized for being too optimistic by researchers at the University of California, Berkeley Institute of Transportation Studies and others.³³

Las Vegas Monorail: Ridership Forecast and Results

The Las Vegas Monorail was financed by tax-exempt bonds issued by the state of Nevada Department of Business and Industry. The bonds were rated by (for example) Moody's as "Baa3" and Fitch Ratings as "BBB-", the lowest possible "investment grade" ratings. The project sponsors commissioned an "investment grade" ridership forecast, which was praised in an "independent peer review:"

The Las Vegas Monorail is forecast by URS Greiner to attract ridership of over 52,000 passengers daily (19 million annually) in the first year of operation, based upon a \$2.50 fare. URS Greiner's studies have been accepted by the investment community for decades, and their projections have been the basis for over \$24 billion worth of transportation infrastructure financing. As an extraordinary measure to provide the State and bondholders additional comfort in the reliability of the revenue projections, the URS Greiner study withstood a separate and independent peer review by the respected firm of Wilbur Smith. As a final check, the three year, multi-million dollar Major Investment Study performed by the region's public transit operator, the Regional Transportation Commission (RTC), forecast the Las Vegas Monorail corridor will have considerably more ridership than was forecast by the investment-grade URS Greiner study.³⁴

Despite this glowing endorsement, both ridership and revenue were less than one-half forecast in the first two full fiscal years, even before the bottom of the recession (2005 and 2006). Less than nine months after opening, and well before the beginning of the recession, Moody's downgraded its rating to "Ba1," the highest "speculative-grade" rating and indicated the outlook to be "negative."³⁵

Both ridership and revenue fell to 75% below forecasts in 2010 and the project filed for bankruptcy in 2010. At the end of the 2010 fiscal year, company financial statements indicated a deficit in net assets of \$382 million, compared to a projected \$95 million surplus for the first six full fiscal years of operation and an original project capital cost of more than \$600 million. The investors who relied on the Las Vegas Monorail investment grade ridership forecasts appear likely to suffer virtually total losses. In November of 2011, the federal bankruptcy court ruled against the Monorail's Chapter 11 bankruptcy plan, which "doomed it to failure," even if, as proposed, the debt was reduced from \$658 million to \$40 million.³⁶

Negative financial results had been forecast when the project was in the planning stages. In 2000, Wendell Cox Consultancy³⁷ produced a report that forecast daily Las Vegas Monorail ridership at from 53% to 68% below the URS Greiner forecasts, figures similar to the eventual actual ridership.³⁸ The report also predicted that the project would default on its financial obligations.

The Imperative to Update the 2005 Ridership and Revenue Forecasts

According to the FEIS, it will take from three to four years to construct the project.³⁹ This means that service could not commence until 2015 or 2016 at the earliest, assuming construction begins in early 2012. Yet, the FEIS ridership and revenue forecasts were published in 2005, with an assumption that service would start in 2012.

The ridership and revenue forecasts used in the Final Environmental Impact Statement (FEIS), now seven years old, would be out of date even in normal times. However, these are not normal times.

In describing its ridership forecasts, URS indicated “A continuation of generally good economic conditions, both nationally and with respect to the Las Vegas urban areas.” In fact, as URS could not have foreseen, generally good economic conditions have not continued. Since 2005, the Great Recession has occurred, the deepest economic setback since the Great Depression. It would be unwise to proceed with a multi-billion dollar project based upon seven-year-old ridership and revenue projections under any circumstances. It would be foolhardy to proceed using forecasts that do not reflect the economic impacts of the recession.

The FEIS ridership and revenue forecasts are thus inappropriate for the United States Department of Transportation to use as a factor in any decision on the proposed federal loan. The ridership and revenue forecasts need to be updated to reflect the changed market conditions. This is illustrated by the fact that the market for travel between Southern California and Las Vegas has grown much less rapidly than had been expected before the economic downturn. This *Taxpayer Risk Assessment* offers an update of the FEIS projections with what we call Updated Program Forecast: Current Data, below.

Revisions would be required if the project seeks private investment, as is indicated as a possibility above. It is unlikely that any of the national credit rating agencies (Moody's, Standard and Poor's or Fitch Ratings) would be able to assign an investment grade rating based upon seven-year-old forecasts that predate the Great Recession.

There could be additional implications. If, for example, an initial public offering (IPO) were used to raise private investment, use of the current obsolete forecasts could constitute a violation of Securities and Exchange Commission regulations, which require disclosure of “any other information that is necessary to make its disclosure complete and not misleading.”⁴⁰ There would be a legal duty to disclose the materially changed market conditions (that the ridership base used is obsolete and that indicators of growth rates have fallen significantly since the beginning of the recession). These duties are supported by strong sanctions, such as the potential for Securities and Exchange Commission (SEC) legal action and private litigation by investors. The protections provided to private investors should represent the minimum standard of protections for taxpayer investment. It would be inappropriate to grant a federal loan without up-to-date forecasts that reflect the current market situation. Finally, it seems likely that the FRA's financial assessment consultants will not be able to recommend proceeding with the federal loan using the out-of-date ridership forecasts included in the FEIS.

Ridership and Revenue Forecast: Questionable Issues

The analysis that follows identifies factors that could contribute to an upward or overly optimistic bias in both ridership and thus revenue. No factors were identified that would result in under-estimating ridership. Each of the factors is described below, the first two addressing the need to produce new projections to replace the now stale 2005 projections. Table 4 lists the issues, indicating whether they are included in the least optimistic ridership forecast below (the 2012 *Taxpayer Risk Assessment* forecast).

Table 4: Ridership Forecast Issues			
#	Issue	Type of Issue	Adjustment Made for Issue?
ISSUES THAT COULD BIAS RIDERSHIP FORECAST UPWARD			
1	Outdated tourism market demand: base year	C	YES
2	Outdated future tourism market demand growth rate	C	YES
3	Optimistic tourism market estimation	O	YES
4	Automobile cost assumptions biased in favor of train	O	YES
5	Optimistic attraction from automobiles assumption	O	NO
6	Optimistic bus ridership forecast	O	YES
7	Questioned Survey Methodology	M	NO
8	Sole reliance on conventional forecasting methods	M	NO
ISSUES THAT COULD BIAS RIDERSHIP FORECAST DOWNWARD			
	None		
TYPE OF ISSUE C: Materially changed circumstances that would bias ridership upward M: Methodological issue that could bias ridership upward O: Overly optimistic assumption that could bias ridership upward ADJUSTMENT MADE FOR ISSUE? Refers to (4) 2012 <i>Taxpayer Risk Assessment</i> forecast			

1. Outdated Tourism Market Demand: Base Year Assumption

In the more difficult economy of recent years, Las Vegas tourism has risen at a much slower rate, which renders the 2005 ridership forecast obsolete.

The number of hotel and other tourist rooms is used by URS to estimate travel between Southern California and Las Vegas. URS starts with a 2004 figure and then inflates the number based upon forecasts for additional rooms through 2009.

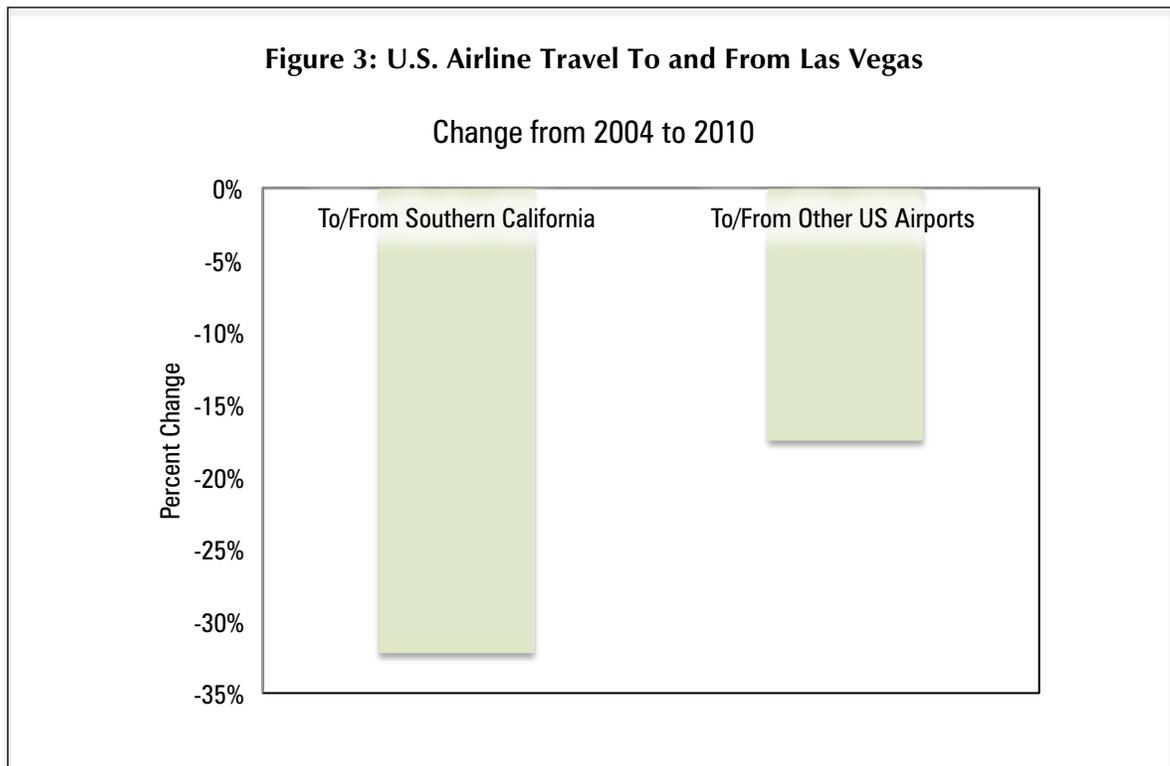
However, as a result of the unfavorable economic conditions, the Las Vegas tourism market has grown less rapidly than had been expected. URS had forecast a 30% increase in total rooms between 2004 and 2009. In fact, the increase in the number of rooms was only 5%.

If the 2004 to 2010 tourism trends were to continue through 2012, the market demand in Las Vegas would be approximately 20% less than the base forecasts developed earlier by URS. The base year ridership forecasts need to be reduced by this amount.

There are other indicators of slower growth in the Las Vegas tourist market.

- **Slowing Population Growth:** Population growth in Southern California has slowed considerably. As late as the mid-2000s, the California State Department of Finance had forecast that Los Angeles, Orange, San Bernardino and Riverside counties would experience population growth of 15.5% between 2000 and 2010. The actual growth was 8.5%, a decline in the growth rate of more than 45% relative to the state forecast. This slower population growth, along with more difficult economic conditions, likely played a substantial role in the Las Vegas decline in tourism.
- **Slowing Highway Demand:** With the more difficult economic situation, travel by automobile from Southern California to Las Vegas has grown more slowly. Traffic growth, as measured by the Nevada Department of Transportation at the Nevada-California border was only 0.6% annually between 2004 and 2010. This growth rate is down more than 80% from the annual growth rate between 1990 and 2000.⁴¹
- **Slowing Airline Demand:** Another indication of the reduced growth in tourism is a decline in airline patronage between the five Southern California airports and Las Vegas. Airline travel in this market declined 32% from 2004 to 2010,⁴² according to US Department of Transportation data.⁴³ A smaller decline was reflected in the balance of the U.S. air travel market to Las Vegas. Between 2004 and 2010, air travel between domestic airports outside Southern California and Las Vegas declined 17%. Thus, while the negative effects of the recession have been profound, the deterioration in the Southern California to Las Vegas travel market on which XpressWest would depend has been even greater (Figure 3).

The decline in tourist market growth suggests less ridership than forecast. This lower growth could not have been foreseen by URS because it developed after the forecast was produced. However, inclusion of the now-outdated forecast in the FEIS could be considered misleading. Revised, current forecasts based upon today's conditions are required.

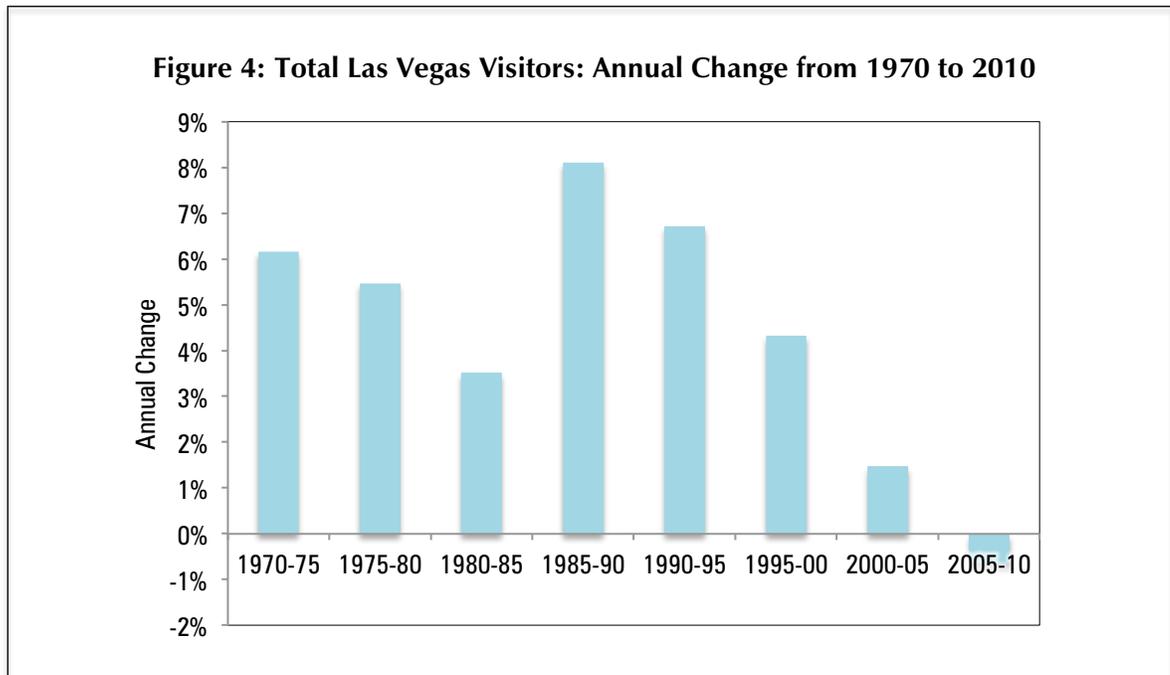


2. Outdated Future Tourism Market Growth Rate

Even before the recent economic difficulties, there were indications that Las Vegas tourism was experiencing less rapid growth, which also renders the 2005 ridership forecast obsolete.

As was noted above, the URS forecast growth rate based upon the number of hotel rooms in Las Vegas was much greater than the intervening increase in visitors between 2000 and 2010. It seems likely that the future 4.0% growth rate forecast by URS will also be unrepresentative of future tourism growth rates. It might seem more reasonable to assume a growth rate for the next decade similar to the 2000 to 2005 growth rate in occupied rooms, which was 1.2% annually, even before the recession.

Moreover, the more modest tourism demand growth in Las Vegas may not be principally the result of the more difficult economic trends since 2005. In the expanding economy of 2000 to 2005, the number of rooms occupied grew 1.2% annually (Figure 4), well below the URS assumed annual room addition rate of 4.0%.⁴⁴



3. Optimistic Tourism Market Estimation

The change in occupied rooms would seem to be more reflective of tourist volume than the number of rooms. Total occupied rooms in 2010 was only 3% greater than in 2004, indicating that the actual growth in the visitor market was at least 90% less than URS forecast using room estimates.⁴⁵ This indicates that the base year (2012) demand is likely overstated. As a result, the ridership in the early years would likely be considerably less than forecast, and future gains in ridership year-to-year would be smaller.

4. Automobile Cost Assumptions Biased in Favor of Train

The automobile cost assumptions used by URS appear to be higher than appropriate, which would tend to skew the ridership forecasts higher for the high-speed train. There are two concerns. The first is that a far higher cost than appropriate was used for automobile travel.

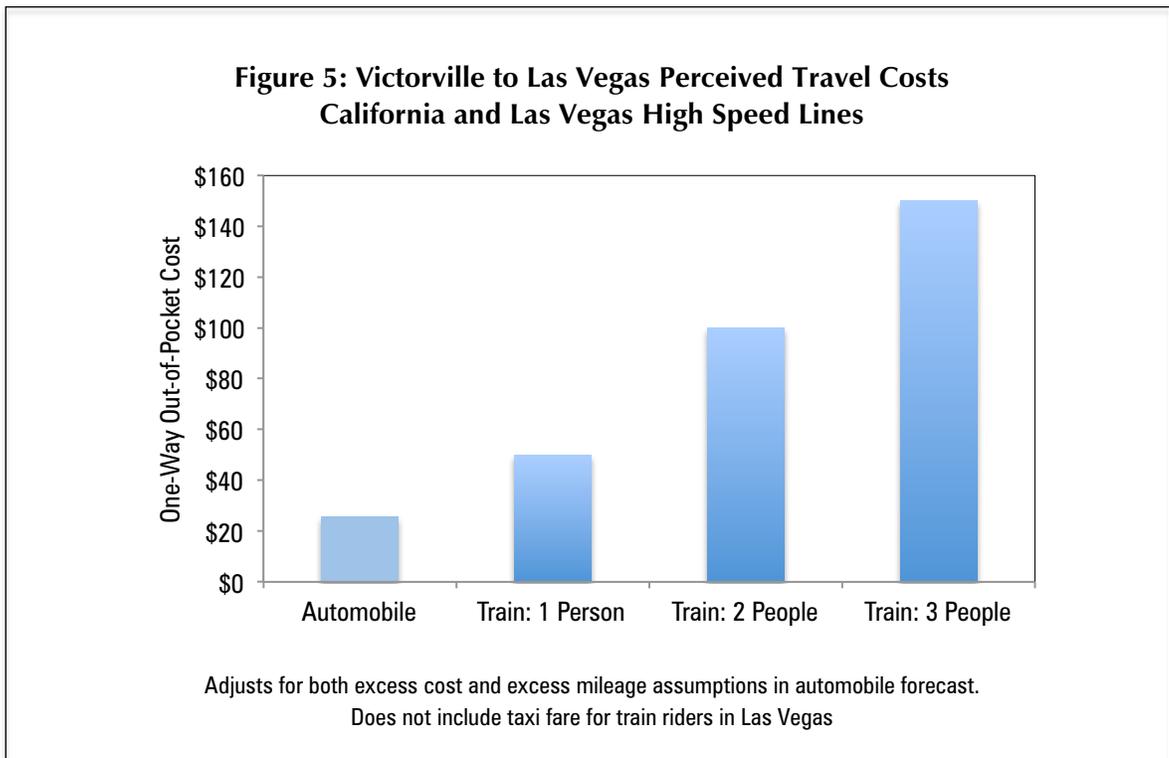
According to the Cambridge Systematics review, URS assumed an unusually high operating cost for cars. Cambridge Systematics noted: “Most regional and intercity models assume auto operating costs that are about one-half of what was used by URS.”⁴⁶ URS used automobile costs that were from 80% to 170% above the rates normal for such estimates according to the information in the Cambridge Systematics and URS reports.⁴⁷ According to Cambridge Systematics: “travelers will rarely consider the full range of auto operating costs in their trip decisions” and they tend to “consider their cost of [automobile] travel to be only their out-of-pocket gas costs.”⁴⁸ Indeed, Cambridge Systematics added:

*The auto costs presented in the choice exercises would have looked surprisingly high to respondents, and might have led to higher rejection of the auto option than would occur in reality...*⁴⁹

The surveys of potential travelers could thus have produced inaccurate perceptions and responses, which would have led to an overstatement of the number of automobile travelers who would transfer to the train.

The higher driving costs assumed by URS appear to be slightly higher than the train fare (\$50). In fact, the out-of-pocket driving costs, which Cambridge Systematics noted were appropriate for the analysis, would be far below the train fare, at under \$26 for the Victorville to Las Vegas segment of travel. Over the 24-year planning period, gasoline costs would likely rise, but that increase would probably be neutralized by improvements in fuel economy, so that out-of-pocket costs would continue to be less than one-half of the train fare.⁵⁰

At the same time, most people who travel to Las Vegas do so with others. URS assumes an average vehicle occupancy of trips to Las Vegas of 2.70 people. In these larger parties, the higher cost is likely to be a deterrent to train use. Three people in one car has roughly the same car travel costs as a car with one person, but on the train would require three tickets. (Figure 5).



Accurate forecasts must replicate the genuine economic and other choices that will be made by people who would choose to travel to Las Vegas by car, plane or train. If driving costs are used, the actual number of people attracted from cars will be less than forecast and revenues will be less, increasing the potential for financial failure.

The ridership implications of these discrepancies could be substantial. According to URS, a 75% increase in train fares would result in a nearly 60% decline in attraction of ridership from automobiles. URS assumes that the costs of driving from Victorville to Las Vegas will be similar (slightly above) to the cost of the train fare. The reality is that a single rail fare is likely to average more than 80% above the cost of gasoline to drive from Victorville to Las Vegas. This would suggest a decline of at least 60% in ridership attracted from automobiles compared to forecasts.

Further, the above calculation is conservative, since it compares the cost for a single driver. The URS assumes that an average of 2.70 people will be in each car taken off the highway by the train. This would mean that the average one-way fare for occupants of the average car would be \$135, more than five times the out-of-pocket automobile cost.

An overall comparison of the costs of a three-day round trip from Orange County to Las Vegas is provided in Table 5. As noted in Figure 5 above, the cost for the train trip would be substantially above that of driving. And note that the costs of the “car” trip could be divided among more than one person, while the train and air trip costs cannot. The cost for travel by air would be substantially higher than the cost of the train trip. However, the train is unlikely to attract a large share of airline passengers, because of the long drive to Victorville and the fact that little or no time would be saved.

Table 5: Comparison of Travel Cost: 3-Day Trip to Las Vegas from Orange County			
	Train	Car	Air
Gasoline	\$35.22	\$86.28	\$4.31
Fare	\$100.00	\$0.00	\$160.00
Airport Parking	\$0.00	\$0.00	\$42.00
Las Vegas Taxi	\$11.80	\$0.00	\$30.00
Total	\$147.02	\$86.28	\$236.31
Assumptions:			
<ul style="list-style-type: none"> ▪ Automobile trip 271 miles (combined mpg to Victorville, highway mpg Victorville to Las Vegas). ▪ Trip to John Wayne Airport 12 miles ▪ Long-term daily parking \$14 per day ▪ Air fare \$80 (approximate average fare from Los Angeles Area to Las Vegas, 4th quarter) ▪ Taxi fares estimated from http://www.lasvegas-how-to.com/taxi-fare.php 			

5. Optimistic Attraction from Automobiles Assumption

Further, and consistent with the finding above, it appears that a far higher share of automobile trips is forecast to be attracted by the train than is typical. The FEIS assumes that approximately 18% of Southern California to Las Vegas car passengers would switch to the train. Other studies of high-speed trains with similar lengths have indicated a 3% average attraction rate of intercity automobile demand.⁵¹ In perhaps the most comparable market, Los Angeles to San Diego, a proposed high-speed train was estimated to capture only 1.1% of the intercity automobile passenger traffic. Many people going to Las Vegas don't need a car to get around once there, whereas in San Diego and Los Angeles they certainly do, so a somewhat higher rate of willingness to switch from car to train makes sense, but not 15 times as many, or even six times as many.

Thus, the FEIS ridership projection assumes an attraction of at least six times the average attraction that was forecast for the most comparable proposed high-speed rail route.

Further, high-speed rail systems do not attract especially large numbers of people who would otherwise travel by car. Research on French high-speed rail systems also indicates that diversion from automobiles is less than from airlines, despite substantially higher gasoline prices and tolls. On two high-speed rail lines, an average of 29% of ridership was attracted from airlines and 21% from cars. The overwhelming majority of the high-speed rail ridership came from existing rail services, a source of ridership that does not exist in the Victorville to Las Vegas market.⁵²

6. Optimistic Bus Ridership Forecast

URS assumes a bus ridership base that is approximately 8% of car passenger volumes. Using Las Vegas Convention and Visitors Bureau information, it is estimated that the actual ratio of bus tourism arrivals to car tourism arrivals is below 4%,⁵³ about half the assumed level.

7. Questioned Survey Methodology

Cambridge Systematics also offers strong criticism of the research technique used by URS to estimate consumer preferences between cars and the train. The method used was a “stated preference” survey, in which people were asked to answer questions about their future travel choices if the train were available for travel to Las Vegas. Cambridge Systematics indicated that the number of respondents in the survey was too small, at 400, and may not have been sufficiently representative.

The model results are less precise than the reported analysis indicates. This probably means that the results of questions about trip details are more vulnerable to recall error than in most transportation surveys, and it raises the question of whether many respondents provided relevant choice information.⁵⁴

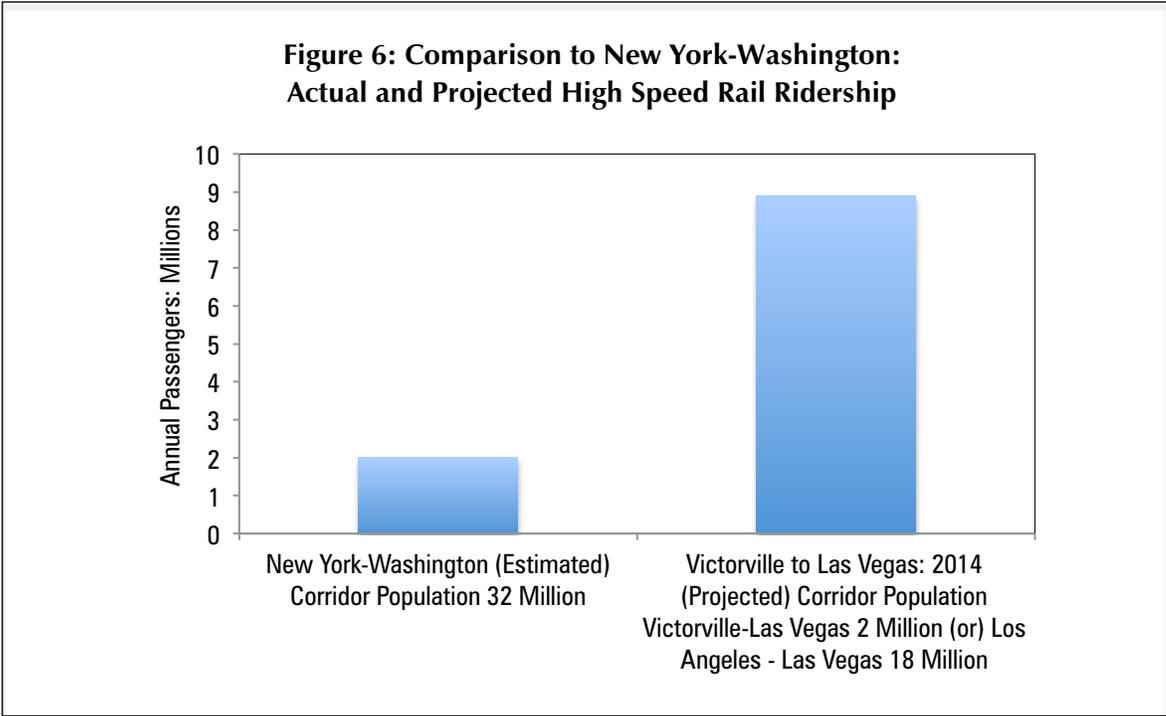
There is a fundamental difficulty with stated preference surveys—that people may not provide answers to questions that are consistent with their future behavior.

The criticism of the stated preference survey used is quite sound. It would seem that a prediction of ridership using a “less than trainload”⁵⁵ sample would be insufficient on which to make multi-billion dollar decisions. Moreover, with a \$6.5 billion or more risk to taxpayers, any survey method should be as accurate as possible. A stated preference survey is not a sufficient basis for proceeding with a multi-billion dollar project.

8. Sole Reliance on Conventional Forecasting Methods

The American Planning Association has recommended that mega-projects not depend solely on conventional forecasting methods and advocates comparisons to the actual results achieved by comparable projects.⁵⁶ However, because there are no high-speed rail projects that assume most riders will drive one-third of the way to the destination, there are virtually no directly comparable projects.

Despite an inability to use comparable projects to aid in estimation, the Victorville to Las Vegas high-speed train ridership is forecast to greatly exceed that of the Amtrak Acela high-speed rail service in the longer Washington to New York corridor, which includes a number of major cities and a long history of commuting and business and leisure travel by train. Indeed, the Victorville to Las Vegas high-speed train ridership is forecast to be more than four times the ridership on Amtrak's high-speed train between Washington and New York (Figure 6). The Amtrak route, which serves two of the three largest central business districts in the United States (Manhattan and downtown Washington), and also serves two other major metropolitan areas, Philadelphia and Baltimore, carried approximately 2 million passengers in 2011, in a corridor with a population of more than 32 million.⁵⁷ By contrast, the forecasts for the Victorville to Las Vegas high-speed train call for third-year ridership of 8.9 million passengers. Only 2 million people live in the Victorville to Las Vegas corridor, while 16 million live in the Los Angeles-Las Vegas corridor, which may not represent a genuine high-speed rail market (see Part 3).



Ridership Forecasts

Based upon the analysis above, this report considers four ridership forecasts, which are presented below (Table 6 and Figure 7):⁵⁸ These include the FEIS forecast, or project forecast (“FEIS Forecast: 2005 Data”). Three revised forecasts are also provided that were developed for this report, one that updates the outdated FEIS forecast (the “Project Forecast: Current Data”) and the other two forecasts that make further revisions (1) to account for the average international forecasting error (the “International Average Error Forecast”) and (2) to adjust for specific assumptions that inflate ridership in the “Project Forecast: Current Data” (the “2012 *Taxpayer Risk Assessment* Forecast”).

The Project Ridership Forecast: The project ridership forecast was developed by URS and published in 2005:

(1) Project Forecast: 2005 Data:

The Project Forecast: 2005 Data (or project forecast) is used in the FEIS published in 2011. ***The Project Forecast: 2005 Data is shown only as an exhibit because it is not considered achievable due to materially changed circumstances.***⁵⁹ As discussed above, this forecast is based upon out-of-date baseline information on the size of the Southern California to Las Vegas tourism market.

The Project Forecast: 2005 Data indicates an annual ridership of 8.9 million one-way trips in the third year of operation.

This forecast is out of date and also fails to account for the substantial decline in market conditions that occurred as a result of the Great Recession. As such, the Project Forecast: 2005 Data is inappropriate for use in project decision-making or loan application approval.

Revised Ridership Forecasts: The following three forecasts, developed for this report, update the project ridership forecast and provide further revisions to adjust for factors in the project forecast that seem likely to bias ridership and revenue forecasts higher.

(2) Project Forecast: Current Data

The Project Forecast: Current Data (developed for this report) uses the Project Forecast: 2005 Data assumptions, simply producing revised results that reflect the changed circumstances over seven years.

The adjustments include (1) the smaller airline market base that developed between 2004 and 2010,⁶⁰ and (2) the slower growth in rooms in Las Vegas, which is applied to the automobile and bus markets. Except for these changes, the Project

Forecast: Current Data uses the assumptions from the FEIS 2005 Data Forecast. However, the Project Forecast: Current Data has not been adjusted to remove overly optimistic assumptions that could lead to errors as significant as in the international research or worse.

This forecast yields an annual ridership of 7.0 million one-way trips in the third year, 21% below that of the FEIS 2005 Data Forecast. However, the Project Forecast: Current Data includes optimistic assumptions that international research shows are typically inaccurate and overestimate ridership. The Project Forecast: Current Data is thus considered overly optimistic and not plausibly achievable.

This forecast ridership represents the changed circumstances of the market, using the general forecasting method in the FEIS 2005 Data Forecast (above).

(3) International Average Error Forecast

The International Average Error Forecast (developed for this report) applies the average ridership forecasting discrepancy from the international research to the Project Forecast: Current Data.

Ridership would be 39% less than the Project Forecast: Current Data (53% below the FEIS 2005 Data Forecast). The International Average Error Forecast yields an annual ridership of 4.2 million in the third year.

(4) Reason Foundation Forecast

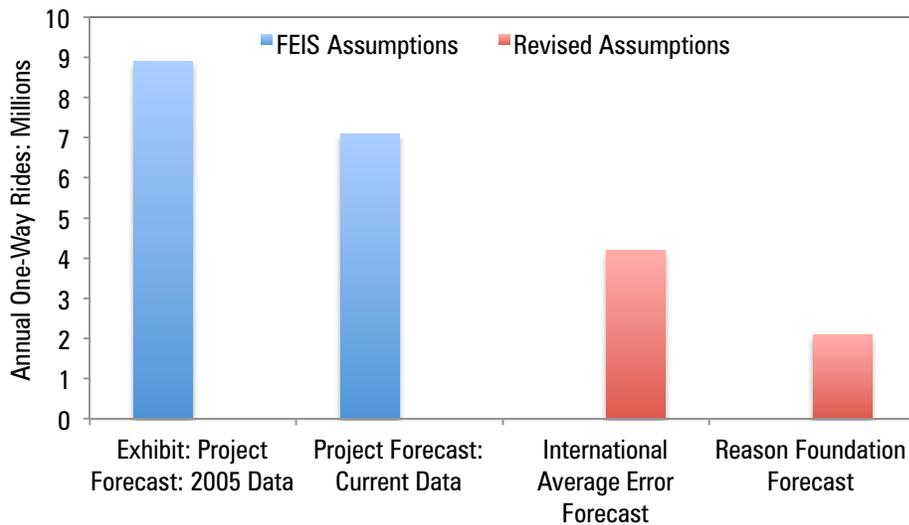
The Reason Foundation Forecast (developed for this report) adjusts for the factors in the project forecasts (#1, original and #2, revised) most likely to materially bias ridership and revenue results higher. The Reason Foundation Forecast is a revision of the Project Forecast: Current Data (#2), which (1) eliminates the automobile operating cost bias that favors high-speed rail relative to automobiles, (2) reduces the first-year ridership base using room occupancy (growth from 2004 to the base year), rather than the number of rooms, (3) reduces the annual future growth rate, based upon the 2000 to 2005 increase in occupied rooms in Las Vegas and (4) reduces bus (intercity coach) ridership, to account for the ratio of automobile to bus ridership indicated by the Las Vegas Convention and Visitors Bureau.

Ridership is forecast to be 2.0 million one-way trips in the third year, 71% less than under the Project Forecast: Current Data (76% less than the FEIS 2005 Data Forecast). The Reason Foundation Forecast does not include adjustment for some questionable issues noted above, which, if included, would result in even fewer passengers.

Table 6: Ridership Forecasts			
Scenario	Annual One-Way Ridership: 3rd Year (Millions)	Ridership Compared to FEIS 2005 Data Forecast	Ridership Compared to Project Forecast: Current Data
(1) <i>Exhibit</i> : Project Forecast: 2005 Data (FEIS)	8.9		
(2) Project Forecast: Current Data	7.0	-21%	
(3) International Average Error Forecast	4.2	-53%	-39%
(4) Reason Foundation Forecast	2.0	-76%	-71%

Notes:
 Forecast Methodology Notes (Appendix B)
The Project Forecast: 2005 Data is shown only as exhibit because it is inappropriate for use due to materially changed circumstances (such as impacts of the Great Recession) and is seven years out of date.
 Each of the above scenarios assumes a consumer market of unprecedented geographic size and remoteness. If the genuine market does not extend beyond the Victorville area and the Inland Empire, ridership levels would be from 75% to 97% less than indicated in each of the forecasts above (See Part 4).

Figure 7: Annual Ridership Forecasts: Victorville to Las Vegas Train: 3rd Year



All projections assume a consumer market of unprecedented geographic size and remoteness. See Part 3.

Part 6

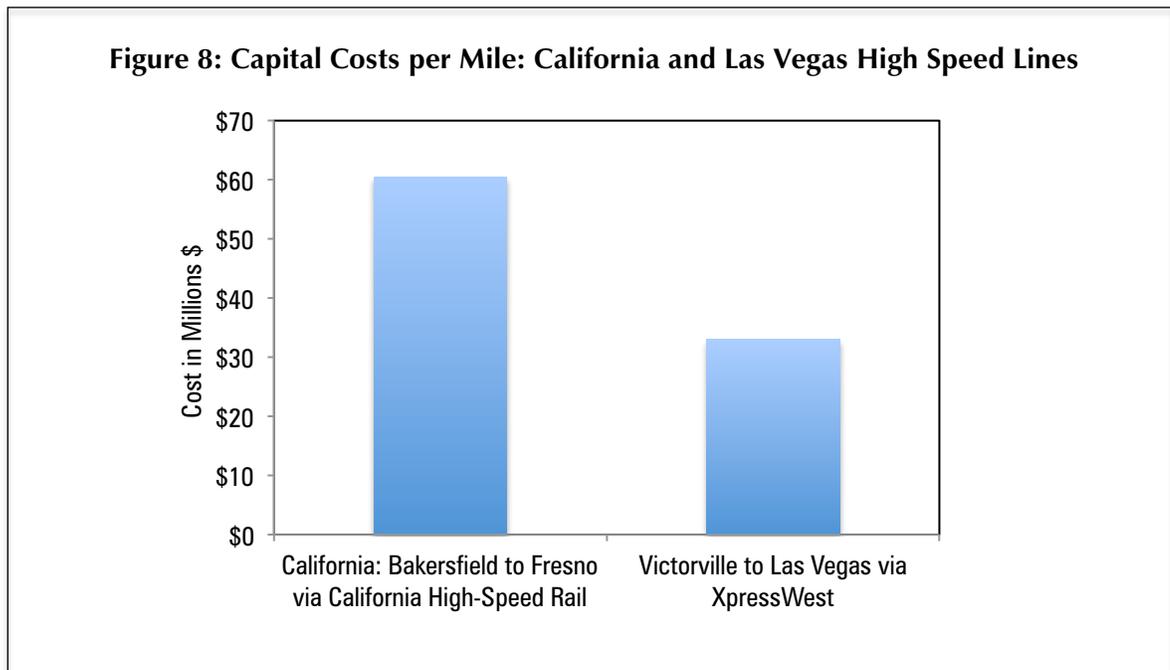
Capital Costs

The Victorville to Las Vegas train is projected to cost between \$6.0 billion and \$6.5 billion. This includes the full cost of the rail infrastructure, any right-of-way purchases, trains and fixed facilities, such as the two stations and parking lots as well as any capital purchases required for the initial operation of the system. The capital costs of shuttle buses are included as lease payments in the operating costs.

As was noted above (Part 2), the leading international research (Flyvbjerg, et al) indicates that capital cost escalation from the point of project approval to completion averages 45% and in some cases exceeds 100%. The following are examples of projects with cost escalation above 100%.

- According to the president of the Korean national railway (Korail), the South Korea high-speed rail system experienced capital costs that were three to four times the original forecast.⁶¹
- A project to increase speeds to high-speed rail standards on the West Coast Main Line in the United Kingdom eventually cost five times the forecast amount and *failed* to deliver the promised service improvements.⁶²
- Data in the recently released California high-speed rail *Draft 2012 Business Plan* forecasts a capital cost for the first phase (San Francisco to Los Angeles/Anaheim) of \$65.4 billion to \$74.5 billion in 2010\$.⁶³ This is between 2.8 and 3.2 times the original cost forecasts on an inflation-adjusted basis.⁶⁴
- In just three years, the cost of the “comparatively inexpensive” Bakersfield to Fresno segment of the California high-speed rail line (all on flat land) increased in cost from \$39 million per mile in 2008 to more than \$60 million per mile in 2011. This compares to an approximately \$33 million per mile projected cost for the Victorville to Las Vegas train (Figure 8).

A privately developed project, such as the Victorville to Las Vegas train, might be expected to be less exposed to capital cost overruns because of market disciplines that do not exist in the government sector (such as with the California high-speed rail project). Even so, privately developed projects have experienced substantial increases in capital costs. For example, the privately financed Eurotunnel experienced a capital cost overrun of 80%.

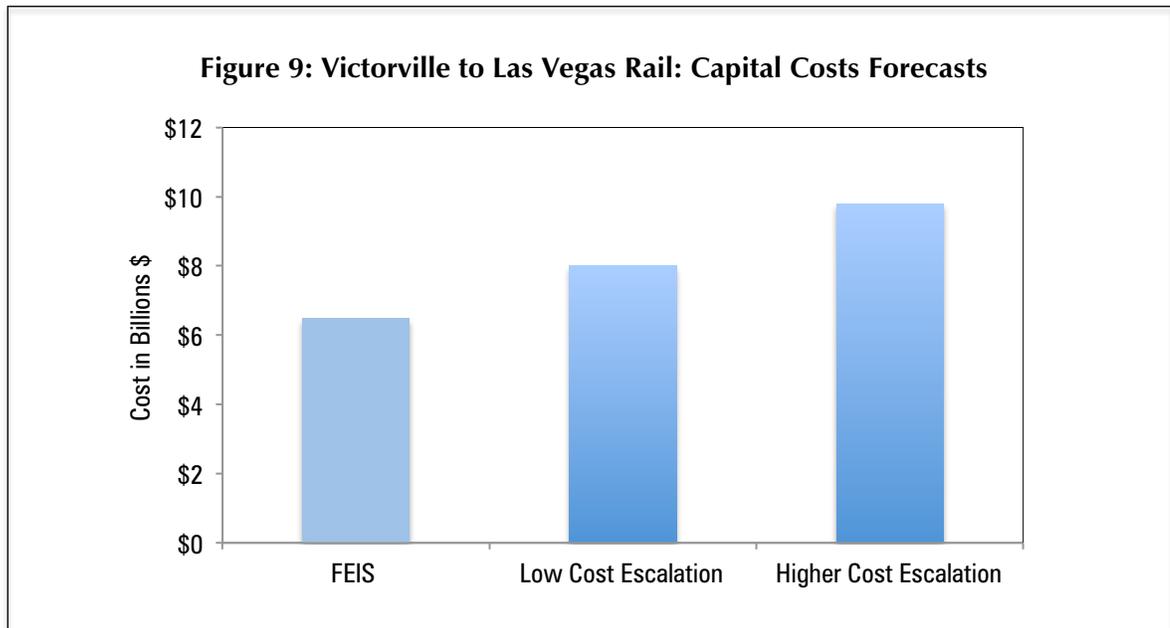


The cost of constructing the Victorville to Las Vegas rail line is forecast at up to \$6.5 billion. This is already a significant increase over the \$3.5 billion that had been reported by the U.S. Government Accountability Office in a 2009 report.⁶⁵

Based upon the pervasive experience of capital cost escalation of high-speed rail projects, the Victorville to Las Vegas rail line will likely experience additional cost escalation. This report conservatively assumes capital costs that would rise at only one-half the rate indicated in the international research (Figure 9).

- **Lower Capital Cost Escalation Forecast:** If the capital costs of the Victorville to Las Vegas train escalate at one-half the average documented in the international research, the final cost would rise to \$8 billion, approximately \$1.5 billion more than the present forecast.
- **Higher Capital Cost Escalation Forecast:** If the capital costs of the Victorville to Las Vegas train escalate at one-half the high estimate in the international research, the final cost would be \$9.8 billion, \$3.3 billion more than the current forecasts.

Virtually any capital cost increase could be financially devastating to the project, because of the difficulty of generating significant additional capital. Additional federal loan funds are unlikely to be available, especially to cover cost escalation. Private investors could be reluctant to provide further financing for a project with escalating costs.



The result could be that federal, state and local taxpayers would face enormous risks. If the project developers are not able to complete the Victorville to Las Vegas rail line with the available capital, including their own funds and the federal loan, it is possible that:

- The Victorville to Las Vegas train system might be only partially built. If this were the case, the project developers might seek additional funding from government sources, which would further increase taxpayer risks. If the U.S. Department of Transportation's intense commitment were to continue, there could be considerable pressure to fund the completion and perhaps even take over operations, following the model of Amtrak.
- Even without federal government involvement, there could be substantial pressure to provide state and local funding to finish and operate the system. This potential is illustrated by the fact that powerful political interests in California remain committed to that state's high-speed rail project, despite the fact that its costs have literally tripled relative to its original estimates. In addition to the states of Nevada and California, there would likely be substantial pressure placed on local governments, such as Clark County, the city of Las Vegas and San Bernardino County (and perhaps even Los Angeles, Orange and Riverside counties) to avoid a white elephant project in the area. Given the tight budgets faced by these jurisdictions, arranging such funding could be difficult, but might not be impossible.

In a sense, the Victorville to Las Vegas train may be “too big to fail.”

Another possibility is that a partially built system might be dismantled or simply abandoned. This and any of the above possibilities would likely result in a taxpayer loss of up to \$6.5 billion (or more than \$7.5 billion if the six-year payment deferral is granted) from the unpaid federal loan, plus interest. State and local taxpayers could also face additional losses if the project is either dismantled or subjected to a public takeover.

Part 7

Commercial Viability

The crucial question for federal, state and local taxpayers is whether the Victorville to Las Vegas train is likely to be sufficiently profitable to repay a potential federal loan and to operate without the necessity of state or local subsidies. This would require that commercial revenues, including passenger fares and ancillary revenues, are sufficient to pay all costs.

Costs

Costs include operations, maintenance, reconstruction and renewal of infrastructure over time, capital renewal and debt service. The operating costs include parking shuttle services at the Victorville train station and shuttle bus operations between the Las Vegas train station and the nearest Las Vegas Monorail Station (see Appendix B, Methodology and General Assumptions). The latter, however, could understate the costs of shuttles in Las Vegas for the project, because of uncertainty with respect to Las Vegas Monorail's bankruptcy proceedings and its future (see page 16, Box: Las Vegas Monorail Ridership Forecast and Results).

Steer Davies Gleave noted the importance of courtesy shuttle buses to meeting ridership projections. Las Vegas Strip hotels, however, do not generally provide free shuttle bus service. If the Las Vegas Monorail were to cease operations, the Victorville to Las Vegas Train would probably need to fund a free shuttle service from the station to Las Vegas Strip hotels, raising costs above the levels assumed in this report.

Credit Rating and Credit Risk Premium: Under RRIF, the borrower (XpressWest) or another non-federal entity would be required to pay a credit risk premium before funds are disbursed. FRA indicates that this could be from 0% to 100% of the project cost (\$0 to \$6.5 billion).⁶⁶ The amount of the risk premium would be largely dependent upon the credit rating associated with the RRIF loan. The FRA financial services procurement documentation indicates that “DOT will be requiring a full investment grade rating on the proposed RRIF debt from a U.S. based rating agency.”⁶⁷

An “investment grade” rating means that the rating agency has evaluated the risk of default (non-payment) on the loan to be low. The alternative to an investment grade rating is a speculative-grade rating, which indicates, at a minimum “an elevated vulnerability to default risk.”⁶⁸

The FRA procurement document indicates that the financial advisor would be expected “to provide their own assessment of an appropriate rating,” which could effectively be a “second guessing of the rating agency.” In light of potential political pressure, and especially in the context of the recent controversial Solyndra loan guarantee, proposal of an alternate credit rating by a firm that is not a recognized credit rating agency may not be in the best interest of taxpayers.

Part of the criteria in establishing the credit risk premium would be the value of the collateral that supports the loan. As is described below, it is likely that the value of the project (trains and infrastructure) would be minimal relative to the amount of the federal loan.

Financial Forecasts

Financial forecasts (Figure 10 and Table 7 on pages 36 and 37, respectively) were developed based upon a \$6.5 billion capital cost and the ridership forecasts. One forecast assumes an RRIF federal loan of \$6.5 billion (100% of the project cost), while the other assumes the loan figure indicated by FRA, at \$5.5 billion. The balance would be provided either by private equity investors or through the issuance of commercial bonded debt.⁶⁹

The extent of private investment, if any, is unclear. As noted above, FRA indicates that 80% or more of the capital cost of the project would be obtained from the federal loan, with the balance from commercial debt and private investors.⁷⁰ It could be difficult, however, to attract private investment and commercial finance because high-speed rail has been pervasively unprofitable. For example:

- Iñaki Barrón de Angoiti, director of high-speed rail at the International Union of Railways, has indicated that only two high-speed rail segments in the world, Tokyo to Osaka and Paris to Lyon have “broken even.”⁷¹
- The California High-Speed Rail Authority recently concluded that private investment in its project can be attracted only after publicly funded initial segments have proven to be profitable, a prospect that seems unlikely in view of the loss record of high-speed rail (indicated immediately above).⁷²
- The Taiwan high-speed line was to have been built and operated by a private company without government funding. But within three years of its opening to traffic, the government took control of the company's board, and nearly \$10 billion in radically reduced interest rate debt has now been guaranteed by the government. More recently, the company has requested an extension of its concession period from 35 years to 99 years, to reduce its depreciation and borrowing costs even further. The project suffered an accumulated loss of two-thirds of its private investment in the first 2.5 years of operation.⁷³

- Brazil has proposed a Rio de Janeiro to Sao Paulo to Campinas high-speed rail line, which its consultants have projected would be profitable. Yet, no bidders have responded to three separate procurement attempts, which indicates the extent to which at-risk investors recognize the lack of potential for profits.⁷⁴ It is possible that the far below-par performance of the Taiwan high-speed rail system was a factor in deterring investors.

A range of financial results is shown for each ridership forecast scenario, assuming a federal loan of from \$5.5 billion to \$6.5 billion.

(1) FEIS 2005 Data Forecast: *The financial data for the Project Forecast: 2005 Data is shown only as exhibit because it is inappropriate for use due to materially changed circumstances and its age.* If the Project Forecast: 2005 Data were current, rather than stale and if the materially changed circumstances had not occurred (principally the effects of the recession), a profit projection of \$1.9 billion over the 24-year planning horizon would have been expected (assumes the \$6.5 billion 100% federal loan). With a \$5.5 billion federal loan and \$1 billion in equity investment, a \$3.0 billion profit would likely have been projected, and a \$1.1 billion profit if the balance of the capital costs were funded by commercial bonded debt. However, even if market circumstances had not materially changed, these profits would likely have been unachievable, given the questionable issues raised above, which would have likely negatively impacted ridership, revenue and financial results.

As a result, financial projections based upon the Project Forecast: 2005 Data would be considered unreliable even if current, and even if the recession had not occurred and the tourist market had grown robustly.

(2) Project Forecast: Current Data: Based on the Project Forecast: Current Data, it is estimated that the Victorville to Las Vegas train would lose \$3.9 billion with a \$6.5 billion federal loan. With a \$5.5 billion federal loan and equity investment, the loss is projected at \$2.7 billion. A loss of \$4.7 billion is projected with a \$5.5 billion federal loan and the balance of the capital costs from commercial bonded debt. Costs (operations, maintenance and renewal costs and debt service) would be covered by commercial revenues for four to five of the first six years, though only because there would be no federal debt service payments because of the six-year payment deferral. Over the first 24 years, it is expected that the project would sustain losses of from 17% to 25% relative to expenditures. Default on the federal loan could be expected, depending on the loan and investment package, between the third and the ninth year.⁷⁵ Further, even after updates to account for the materially changed circumstances, this forecast contains optimistic ridership assumptions that could produce results as erroneous as identified in the international research. As a result, the financial results of the Project Forecast: Current Data are considered highly optimistic.

This forecast represents the changed circumstances of the market resulting from the Great Recession, using the general forecasting method in the (current) FEIS 2005 Data

Forecast (above). As noted above, the projected commercial revenue is unlikely to be sufficient to pay the costs (operating, maintenance, renewal, capital and debt service) of the Victorville to Las Vegas train.

(3) International Average Error Forecast: Under the International Average Error Forecast of ridership, it is estimated that the Victorville to Las Vegas train would lose \$7.3 billion in its first 24 years with a \$6.5 billion federal loan. With a \$5.5 billion federal loan and equity investment, the loss is projected to be \$6.1 billion. With a \$5.5 billion federal loan and \$1 billion in commercial bonded indebtedness, the loss is projected at \$8.1 billion.

Over the first 24 years, it is expected that the project would sustain losses of from 46% to 49% relative to expenditures. Default on the federal loan could occur as early as between the first and the seventh years. There would be some profitable years, however only during the six-year period of federal loan deferral.

Under this forecast, the projected commercial revenue is unlikely to be sufficient to pay the costs (operating, maintenance, renewal, capital and debt service) of the Victorville to Las Vegas train.

(4) Reason Foundation Forecast: Under the Reason Foundation Forecast of ridership, it is estimated that the Victorville to Las Vegas train would lose \$10.3 billion in its first 24 years if financed by a \$6.5 billion federal loan. With a \$5.5 billion federal loan and equity investment, the loss is projected at \$9.1 billion. If commercial bonded debt is combined with a \$5.5 billion federal loan, the loss is projected at \$11.1 billion.

Costs (operating, maintenance renewal, capital and debt service) would be greater than commercial revenues in all years. Over the first 24 years, it is expected that the project would sustain losses of from 72% to 76% relative to expenditures. Default on the federal loan could occur as early as the first year.

Under this forecast, the projected commercial revenue is unlikely to be sufficient to pay the costs (operating, maintenance, renewal, capital and debt service) of the Victorville to Las Vegas train.

Further, the likely capital cost escalation, which is not included in the forecasts above, could lead to default even before the system is opened. As is indicated above, it could be very difficult to obtain additional taxpayer funding and high-speed rail may not be attractive to private investors.

The loss to taxpayers from a default on the federal loan may not be materially reduced by the liquidation value of the project. The FRA procurement document for financial assistance services acknowledges that the collateral (assets of the project) is likely to be insufficient to cover the loan in the event of a default. As a result the applicant proposes that the “going concern” value of the

business be considered the collateral. However, given the financial projections and the inherent failure of high-speed rail to recover its capital costs from commercial sources, it seems likely that the liquidation value of the project will be near-zero. To purchase and operate the Victorville to Las Vegas line profitably, an operator (for example, a winning bidder at auction) could need to discount the value of the collateral (trains and infrastructure) radically. There appear to be no set of circumstances under which default on a federal loan is likely to be avoided and that the eventual loss to taxpayers could approximate the outstanding loan at the time of the default.

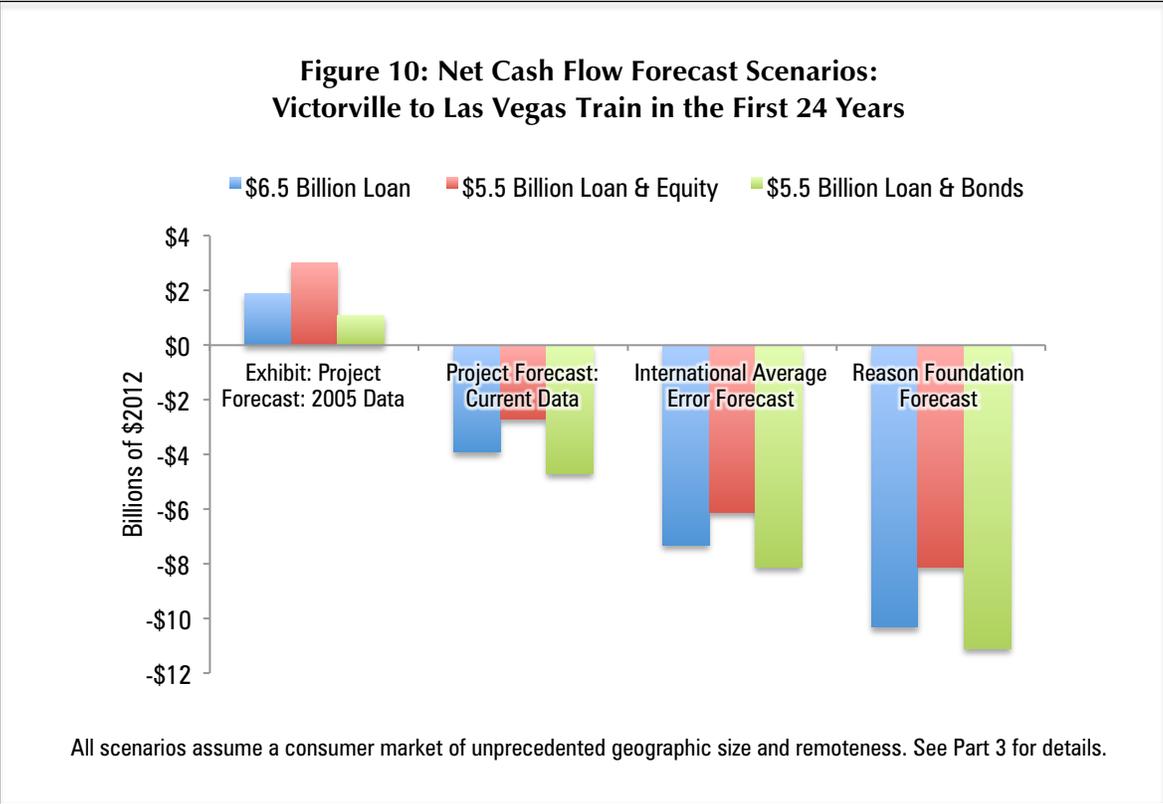


Table 7: Financial Forecasts: No Capital Cost Escalation Assumed				
	Ridership Forecast			
	<i>Exhibit:</i> (1) Project Forecast: 2005 Data	(2) Project Forecast: Current Data	(3) International Average Error Forecast	(4) Reason Foundation Forecast
Ridership: Year 3 (Millions)	8.9	7.0	4.2	2.1
With \$6.5 Billion Federal Loan				
Net Cash Flow: 24 Years (Billions)	\$1.9	-\$3.9	-\$7.3	-\$10.3
Profit/Loss Rate	11%	-22%	-46%	-74%
Default: Earliest Year		9	7	1
Profitable Years*		5	4	0
With \$5.5 Billion Federal Loan: Balance in Equity				
Net Cash Flow: 24 Years (Billions)	\$3.0	-\$2.7	-\$6.1	-\$9.1
Profit/Loss Rate	18%	-17%	-42%	-72%
Default: Earliest Year		9	7	1
Profitable Years*		5	4	0
With \$5.5 Billion Federal Loan: Balance in Bonded Debt				
Net Cash Flow: 24 Years (Billions)	\$1.1	-\$4.7	-\$8.1	-\$11.1
Profit/Loss Rate	6%	-25%	-49%	-76%
Default: Earliest Year		3	1	1
Profitable Years*		4	0	0
<p>Notes: Financial data in 2012\$</p> <p>*Profits occur only in years in which federal loan payments are deferred.</p> <p><i>The financial data for the Project Forecast: 2005 Data is shown as exhibit. Materially changed market conditions have rendered it obsolete.</i></p> <p>Each of the above scenarios assumes a consumer market of unprecedented geographic size and remoteness. If the genuine market does not extend beyond the Victorville area and the Inland Empire, ridership levels would be from 75% to 97% less than indicated in each of the forecasts above (See Part 4).</p> <p>See Appendix B for additional methodology notes.</p>				

Part 8

The I-15 Corridor

For much of the distance between Barstow and the Nevada border, I-15 has a wide median between its westbound and eastbound roadways. At generally 80 feet or more, there is at least enough space to double the capacity of the roadway by adding two lanes in each direction.

Expansion of the roadway in the median would be particularly cost-effective because it would not require rebuilding of overpasses, requiring only the construction of the additional lanes and widening bridges that carry the I-15 roadway. All of this expansion would be within the footprint of the present roadway. Further, expansion in the middle of the roadway would generally not necessitate rebuilding of on-ramps and off-ramps.

Granting right-of-way in or along the I-15 footprint to the high speed train would be giving public right-of-way to a private project for private gain. Thus it would be a direct subsidy to the project. Moreover, it could preclude needed expansion of the roadway, or make such expansion more expensive, at taxpayer's cost.

Much or virtually all of the Victorville to Las Vegas rail line would be built in this same median of I-15. The rail line would require approximately 57 feet of the median. This would leave less than 30 feet for expansion of the roadway. This is theoretically enough space to build another freeway lane in each direction, though it is unclear whether the median could safely accommodate two additional lanes and the rail line. Thus, it is possible that the rail line could preclude any cost-effective expansion of I-15, and would surely preclude cost-effective expansion of a second lane in each direction. Expansion might be forced to the outside of the current roadway, which in many cases would require purchase of additional right-of-way plus expensive lengthening of overpasses and rebuilding of on-ramps and off-ramps. This would make expansion of I-15 considerably more expensive.

Once economic growth resumes, there will be a need to expand I-15, despite the Victorville to Las Vegas train. The most optimistic forecast (FEIS 2005 Data Forecast) indicates less than 20% of the traffic would be diverted from cars. The actual diversion could be as low as 3% of the automobile traffic based upon independent projections for other comparable projects. Thus, after the “ramp up period” (from the third year of train operation), from 80% to 97% of the personal traffic growth in the corridor would be in cars, not the train. Meanwhile, truck traffic would continue to increase.

Even at the highest conceivable ridership levels, there is virtually no potential for the rail line to reduce car travel sufficiently to reduce traffic congestion. In the longer run, however, traffic congestion between Victorville and Las Vegas could be substantially reduced, if not virtually eliminated by the addition of one or two lanes in each direction on I-15, which would cost between \$600 million and \$1 billion, based upon Federal Highway Administration generic cost estimates.⁷⁶ This is a fraction of the \$6.5 billion forecast cost of the Victorville to Las Vegas train, which would be largely paid for by taxpayers in the event of a default on the federal loan, and which would provide little traffic congestion relief.

There is no indication in the project documentation that the budget includes payment for the right-of-way or for the incrementally higher costs that might be necessary for roadway expansion as a result of using the median of I-15. If this is true, then the right-of-way grant to the Victorville to Las Vegas train would in essence be a gift of public funds for a private purpose, in addition to increasing the costs to taxpayers of future I-15 widening by removing the current cost-effective options.

Part 9

Assessment of Taxpayer Risks

There is little prospect that ridership will be sufficient to produce revenues that cover expenses (including operating and maintenance costs and debt service on the federal loan).

Since the project ridership forecasts were prepared, the market has changed, virtually all for the worse. Even so, the FEIS relies upon the outdated ridership projections.

Most importantly, it is not clear that the consumer market assumed in the project documentation is as large as project documentation indicates. It is possible that the market is between 3% and 25% of what is assumed in the FEIS. Drivers and airline passengers may not find it attractive to drive one-third of the way to Las Vegas to board a train, rather than flying from much closer airports or simply continuing on I-15, completing the least congested and least stressful part of the trip. The proposition that there is such a broad geographical market is highly speculative.

Moreover, other factors offer potential for erroneous ridership forecasts at least as significant as indicated in the international research (such as by Flyvbjerg, et al). The principal risks are as follows:

- **A Speculative Consumer Market:** The greatest risk is that the potential consumer market for the train is far smaller, in geographical terms, than is assumed in the project documentation. There is no parallel for large numbers of drivers and airline passengers to travel well outside the urban areas in which they live to connect to a train or (plane) to any destination, much less one as close to Southern California as Las Vegas. As a result, ridership and revenue could be a *mere fraction* of forecast. This could make repayment of the federal loan impossible. This risk to taxpayers that the extent of the market may be exaggerated is evaluated as “unknown, but potentially severe.”
- **Materially Changed Circumstances Not Reflected in the FEIS Forecasts:** Even if the consumer market is shown by the actual experience to be geographically as large as assumed, growth in the Las Vegas tourist market has been far below forecasts. As a result, the base ridership figures are implausibly exaggerated and need to be revised downward (see Part 5). The ridership and revenue risk to XpressWest from this factor is high and could make paying the federal debt impossible.

- **Ridership Forecast Model Concerns:** The international record indicates that rail projects tend to average approximately 39% less in ridership than in the Project Forecast: Current Data. Specific characteristics of the ridership forecast for the Victorville to Las Vegas train indicate that actual ridership could be 70% less than the Project Forecast: Current Data. These factors include an optimistic estimate of the base-year market, a market growth rate greater than the pre-recession years, an optimistic assumption of attraction from cars and an optimistic bus attraction assumption. This would increase the likelihood that the federal loan would not be repaid.
- **Capital Cost Escalation:** Capital costs escalation for rail projects has been pervasive in similar projects. Capital cost escalation could occur on the Victorville to Las Vegas train (see Part 6), which could make it impossible to complete the project and would thereby trigger a default on the federal loan. Governments (federal, state and local) would be faced with difficult decisions about whether to complete the project, at elevated costs, with public funding or to fund dismantlement of a partially completed system.
- **Overall Commercial Losses:** Even if there is no capital cost escalation, it is unlikely that commercial revenues earned by the Victorville to Las Vegas train would be sufficient to cover its operating, maintenance and renewal costs and debt service. This could lead to a default on the federal loan with the loss paid by taxpayers. Further, political pressure to keep the train operating could lead to state and/or local subsidies. The risk of taxpayer loss from this factor is evaluated at “high.”
- **Higher Cost for Highway Expansion:** Use of the median of I-15 for the Victorville to Las Vegas train could preclude the most cost-effective options to expand highway capacity (see Part 8). This would increase costs to taxpayers and highway users. The risk of higher expansion costs on I-15 is evaluated as “moderate.”

Table 8: Victorville to Las Vegas Train: Summary of Taxpayer Risks		
Issue		Taxpayer Risk
1	A SPECULATIVE MARKET (See Part 3): The consumer market may not be as large as the Los Angeles Basin and the Inland Empire. This could result in ridership and revenue being a small fraction (3% to 25%) of the expected amount (See Part 3).	Extent of Risk: UNKNOWN, BUT POTENTIALLY SEVERE Because this could lead to a default on the federal loan.
If the consumer market includes all of the Los Angeles Basin and the Inland Empire		
2	MATERIALLY CHANGED CIRCUMSTANCES (See Part 5): The FRA FEIS ridership forecast does not reflect materially changed circumstances. The recession has brought substantial deterioration to the Las Vegas tourist market. The 2005 ridership forecast, used in the 2011 FEIS, does not reflect these changes and the current ridership forecast must therefore be considered highly optimistic. The lower likely ridership and revenue would increase the likelihood that the project could not repay the federal loan.	Could contribute to taxpayer risk, see #5, “Commercial Losses,” below
3	RIDERSHIP AND REVENUE MODEL FORECAST CONCERNS (See Part 5): The ridership forecasts include factors that predict unrealistically high ridership and revenue: (1) International research shows there are a number of common errors made that inflate ridership forecasts, errors that are included in the	Could contribute to taxpayer risk, see #5, “Commercial Losses,” below

Table 8: Victorville to Las Vegas Train: Summary of Taxpayer Risks		
Issue		Taxpayer Risk
	ridership estimates for this project, (2) The base-year market is inflated by using the change in number of hotel rooms in Las Vegas rather than using the change in room occupancy and (3) The forecast for diversion of riders from charter buses is unrealistically high. Adjusting these factors would reduce ridership and revenue, increasing the likelihood that the project could not repay the federal loan.	
4	CAPITAL COST ESCALATION (See Part 6). Capital cost escalation could prevent project completion and thereby preclude service. This would make it impossible for the project to repay the federal loan.	Could contribute to taxpayer risk, see #5, "Commercial Losses," below
5	LIKELY COMMERCIAL LOSSES (See Part 7). The losses from #1 to #4, above could be substantial. This could impede repayment of the federal loan, and if the project is completed, there would likely be political pressure to provide subsidies to operate the system. The collateral on the federal loan is likely to provide little reduction in the eventual loss to taxpayers in a default.	Extent of Risk: HIGH Because: (1) This could lead to a default on the federal loan. (2) Political pressure could lead to federal, state and/or local operating subsidies to keep the train operating.
6	RIGHT OF WAY SUBSIDY AND HIGHER HIGHWAY EXPANSION COSTS (See Part 8): Building the rail system in the I-15 median (1) is a grant of public right of way to a private project, a direct subsidy, and (2) takes space that would be used to widen the Interstate, which will have to use more expensive means when it eventually is expanded.	Extent of Risk: MODERATE Increased costs to federal and state taxpayers and highway users when the highway is expanded.

Ridership and Financial Projections

On the basis of this evaluation, the *Taxpayer Risk Analysis* concludes that the Victorville to Las Vegas train project, as proposed, entails *enormous and inappropriate risks* for taxpayers. It appears that there is little or no prospect for the Victorville to Las Vegas train to generate sufficient fares and commercial revenues to pay its obligations. A default seems likely to occur on the proposed federal loan of up to \$6.5 billion (or more than \$7.5 billion if the six-year payment deferral is granted) and in its early years of operation. This would represent a potential loss that could near 15 times as great a taxpayer loss as expected from the Solyndra federal loan guarantee.

Taxpayers as Venture Capitalists? The current proposal effectively places federal taxpayers in the role of venture capitalists, who are forced to not only provide the capital to underwrite risky ridership and revenue projections, but would also gamble on whether the consumer market is fundamentally larger than ever demonstrated before. The XpressWest could be considered a “stealth” government subsidy project, because of the likelihood of default and taxpayer losses.

Based upon the analysis below, it is forecast that ridership and revenue will likely fall considerably short of the project forecasts and short even of the Project Forecast: Current Data (#2). It is expected that ridership would be from 39% to 71% below the Project Forecast: Current Data (#2). It is further forecast that net project revenues over the 24-year planning horizon would be from a minus \$7.3 billion to a minus \$11.1 billion, assuming a \$6.5 billion federal loan (Table 8).

Part 10

XpressWest and the Railroad Rehabilitation and Improvement Financing Program

The Railroad Rehabilitation and Improvement Financing Program (RRIF) was established in 1998 and has been used largely for loans to government entities (such as Amtrak, the Denver Union Station transit and Amtrak project and the Virginia Railway Express) and to short-line and regional freight railroads. The three government entities have accounted for more than 55% of the RRIF loan proceeds.⁷⁷

The XpressWest loan application represents an unprecedented use of the federal RRIF program. The proposed federal loan would be approximately three to four times the total of loans approved by RRIF in its nearly one-decade lending history. The proposed XpressWest loan would be more than 10 times the largest previous loan.

Although the federal government takes on some risk in these loans, to date all have been loans to existing, commercial businesses or government entities, and there have been no reported defaults. Use of RRIF to make very large loans to speculative high-speed rail projects would fundamentally change the nature of this program.

Yet there are signs that some in Congress may be seeking such a change. In the House, Rep. John Mica (R-Florida) has spoken favorably about using RRIF for passenger rail programs, instead of the Administration's grants (from federal general funds) for high-speed rail. Recent House budget and appropriations measures have zeroed out that source of high-speed rail funding, and the Administration's proposals for a National Infrastructure Bank are not included in the draft surface transportation reauthorization bills in either the Senate or the House of Representatives. Since the Administration seems to be committed to continuing funding for high-speed rail, it may turn to RRIF for this purpose if other funding mechanisms are precluded.

There is strong support in both House and Senate for expanding another surface transportation loan program: the Transportation Infrastructure Finance & Investment Act (TIFIA). TIFIA was enacted in 1998⁷⁸ to provide credit support (loans and/or loan guarantees) to highway and transit programs. In contrast to RRIF, which can provide loans for up to 100% of a project's capital cost, TIFIA

loans are limited to a maximum of 33% of capital cost. As a result, private investors take much of the speculative risk, instead of taxpayers. And a TIFIA loan is intended as a subordinated loan. The primary debt on a TIFIA project is commercial debt, which must receive an investment-grade rating in order for the project to be eligible for a TIFIA loan. These provisions provide powerful safeguards for federal taxpayers, by requiring a kind of market test for potential TIFIA borrowers. The various toll-lane and toll-road projects that have received TIFIA loans typically get 20–25% of their capital as private equity investment, another 20% state investment (of dedicated highway or transit tax revenues), and up to 33% as a TIFIA loan, with 20–30% in the form of investment-grade revenue bonds or bank loans. Thus far in TIFIA’s history, there has been only one default out of 22 loans, and even in that case, the re-organized project is still making debt-service payments.⁷⁹

The TIFIA program would seem to be a far better source of funding for mega-projects, given its greater taxpayer protections. The RRIF program was simply not designed to support mega-projects such as the Victorville to Las Vegas train.

Part 11

Conclusion: A Likely Default

On the basis of this evaluation, the *Taxpayer Risk Analysis* concludes that the Victorville to Las Vegas train project, as proposed, entails enormous risks for taxpayers. There appears to be little or no prospect for the Victorville to Las Vegas train to generate sufficient fares and commercial revenues to pay a federal loan of between \$5.5 billion and \$6.5 billion. The likely default would represent a loss to taxpayers. Moreover, this could lead to further taxpayer losses, at any or all of the federal, state or local levels, as political pressure is placed upon governments to operate (and perhaps even complete construction of) the system.

Federal taxpayer risks from similar financial commitments have become a matter of considerable political debate, especially as a result of the federal loan guarantees to Solyndra, a solar panel company.

Table 9: Summary of Ridership and Profit (Net Revenue) Projections				
	Annual One-Way Ridership: 3rd Year (Millions)	Ridership Compared to (2) Project Forecast: Current Data	Net Profit: 24 Year Projection Period (\$6.5 Billion Federal Loan)	Assessment
Project Forecast				
(1) Exhibit: Project Forecast: 2005 Data	8.9 Million			Rendered invalid by changed circumstances (principally the Great Recession) and secondarily by the passage of time. Shown as exhibit because of its obsolescence.
Revised Forecasts: Developed for this Report				
(2) Project Forecast: Current Data	7.0 Million	0%	-\$3.9 Billion	Adjusts Project Forecast: 2005 Data to account for changed circumstances. However, significant ridership forecast factors make this scenario overly optimistic (Part 5)
(3) International Average Error Forecast	4.2 Million	-39%	-\$7.3 Billion	Reduces Project Forecast: Current Data to reflect average ridership bias in international projections.
(4) Reason Foundation Forecast	2.1 Million	-71%	-\$10.3 Billion	Eliminates upward bias of some of the questionable assumptions in the FEIS Forecast: 2005 Data (and the Project Forecast: Current Data).

Note: It is possible that the principal customer market (in the Los Angeles Basin and the Inland Empire) is too remote from Victorville Station to be attracted in material numbers. Should this occur, ridership would be well below the lowest projection indicated above and financial performance would be considerably worse.

Part 12

Policy Recommendations

Based upon the analysis above, the following policy recommendations are offered:

The RRIF Loan Application Should Be Declined: It is recommended that the Victorville to Las Vegas train RRIF loan application be denied. With much or all of the investment being in the form of a federal loan, taxpayers—rather than private investors—have the principal speculative stake in a major project of doubtful financial viability. The Victorville to Las Vegas train project would be appropriate for consideration under the TIFIA program, which relies principally on commercial financing and minimizes speculative risk on the part of taxpayers.

RRIF Should Not Finance Highly Speculative Projects: In reauthorizing the federal surface transportation program, Congress should reduce the risks inherent in RRIF as currently structured, drawing lessons from the successful TIFIA credit-support program to significantly reduce speculative risks to taxpayers. Under TIFIA, private investors assume most of the speculative risk. Specifically, it is recommend that:

- RRIF should provide subordinate loans, rather than primary loans.
- Projects eligible for RRIF loans must secure an investment-grade rating on their primary debt.
- The maximum amount of an RRIF loan should be no more than 33% of the project's capital cost.

About the Author

Wendell Cox is principal of Demographia, a St. Louis region-based public policy firm. He was appointed to three terms on the Los Angeles County Transportation Commission by Mayor Tom Bradley, where he introduced the amendment to Proposition A (1980) that established the local funding set-aside for the Los Angeles light rail and metro lines. He was also appointed to the Amtrak Reform Council by Speaker of the House Newt Gingrich to complete the unexpired term of New Jersey Governor Christine Todd Whitman. There, he was instrumental in forging the final financial self-sufficiency plan that was required by the U.S. Congress.

He has worked on numerous projects in the United States and internationally. Mr. Cox's professional endeavors on urban and intercity transport have the objective of ensuring that riders and taxpayers receive fair value in return for their funding and that scarce public resources are directed to the most beneficial projects and programs.

Mr. Cox is co-author of *The California High Speed Rail Proposal: A Due Diligence Report* published by the Reason Foundation in September 2008, which anticipated many of the project's shortcomings that have recently been outlined in other studies.

He was author of the 1997 James Madison Institute evaluation report on the proposed Florida Overland Express high-speed rail system, and authored reports on subsequent Florida high-speed rail proposals. He was also author of the Reason Foundation's *The Tampa to Orlando High Speed Rail Proposal: Taxpayer Risk Assessment*.

His analysis of the proposed Las Vegas Monorail contained accurate ridership projections, in contrast to the project-sponsored "investment grade" projections that were more than double the eventual ridership. His prediction that the Las Vegas system would ultimately be unable to service its bonded indebtedness has now been repeated by Wall Street analysts. His 2000 commentary in the *Apple Daily*, Hong Kong's largest newspaper, argued for vigorous expansion of that urban area's rail system.

He lectures widely and is a frequent op-ed commentary contributor. His regular "newgeography.com" column includes "The Evolving Urban Form" series, consisting of profiles of world urban areas.

He served for nine years as a visiting professor at the Conservatoire National des Arts et Metiers in Paris, where he lectured on transport and demographics.

Demographia's "Public Purpose" website (www.publicpurpose.com) was designated twice by the *National Journal* as a "Top Transport Internet Site." Demographia's principal website (Demographia.com) is home of the *Annual Demographia International Housing Affordability Survey*, with metropolitan area data in 6 nations and Hong Kong and *Demographia World Urban Areas*, the only annual compendium of population, land area and density data for identified urban areas with more than 500,000 population.

Appendix A

Appendix A: Travel Time Assumptions

The assumptions underlying the travel times in Table 2 are shown in Table A-1.

Table A-1: Travel Time Elements	
Travel Time Element	Assumption
Car travel and connections to airports or train stations	Driving time (free flow) from <i>Google Maps</i>
Congestion Security Cushion	Trips to airports in the Los Angeles Basin and the Inland Empire and the Victorville train station: <ul style="list-style-type: none"> ▪ Minimum of 30 minutes plus an additional 5 minutes for each 10 minutes of free flow driving time Trips to Las Vegas airport: 30 minutes Trips to Las Vegas train station: 10 minutes
Parking lot to terminal walk	Airports in the Los Angeles Basin and the Inland Empire: 15 minutes Victorville train station: 10 minutes
Arrival at terminal before departure	Airports in the Los Angeles Basin and the Inland Empire: 90 minutes Except Los Angeles International Airport: 120 minutes Las Vegas airport: 90 minutes Train stations: 20 minutes
Airline travel time	60 to 65 minutes, as indicated by airline schedules
Train travel time	1:40 (100 minutes)
Travel by taxi from air/train arrival to hotel door in Las Vegas	Airport: 60 minutes Train: 20 minutes
Walk/shuttle from airport arrival in LA Basin/Inland Empire to parking lot	Airports in the Los Angeles Basin and the Inland Empire: 30 minutes Except Los Angeles International Airport: 40 minutes
Walk from train arrival in Victorville to parking lot	15 minutes
Origin and destination assumed locations <i>Google Maps</i> definitions for all Southern California trip ends.	

Table A-2: Trip Elements: Orange County: Irvine (Airport: SNA) Example			
IRVINE TO LAS VEGAS	Air	Car	Train
Drive to Airport/Train	0:17		1:35
Congestion Cushion (Buffer Time)	0:30		1:05
Minimum Arrival Time Before Departure	1:30		0:20
Walk from Parking Lot to Terminal	0:15		0:10
Plane/Car/Train Travel Time to Las Vegas	1:05	4:25	1:40
Plane/Train to Hotel (Las Vegas)	1:00		0:20
Door to Door Time	4:37	4:25	5:10
<i>Compared to Train (Minutes)</i>	<i>-33</i>	<i>-45</i>	
RETURN: LAS VEGAS TO IRVINE	Air	Car	Train
Taxi to Train/Plane from Hotel	0:15		0:05
Congestion Cushion (Buffer Time)	0:30		0:10
Minimum Arrival Time Before Departure	1:30		0:20
Plane/Car/Train Travel Time to Southern California	1:05	4:25	1:40
From Plane/Train to Parking Lot	0:30		0:15
From Parking Lot to Home	0:17		1:35
Buffer	0:00		0:00
Door to Door Time	4:07	4:25	4:05
<i>Compared to Train (Minutes)</i>	<i>2</i>	<i>20</i>	
ROUND TRIP	Air	Car	Train
Door to Door Time	8:44	8:50	9:15
<i>Compared to Train (Minutes)</i>	<i>-31</i>	<i>-25</i>	

Additional Assumptions

Las Vegas Connection by Taxi: For these travel time estimates, it is assumed that the trip from the Las Vegas train station to the final Las Vegas destination will be by taxi. The return trip from Las Vegas to Southern California would also be by taxi ride from the hotel to the airport or train station. Project documentation also indicates that, as an alternative, the Las Vegas Monorail might be extended to the train station.⁸⁰ However, the costs of such an extension are not included in the project. Use of the Las Vegas Monorail would generally add to the travel time between hotels and the train station, because of the necessity to walk or take a shuttle to the monorail station. Further, it is not unusual to encounter long waits for taxicabs at airports or rail stations. However, it is assumed that there will be virtually no wait for taxicabs on either inbound or outbound trips. Connections by shuttle bus or Monorail and shuttle bus would add to the travel times.

Security Inspections: It is assumed that train passengers will not be subject to security inspections. However if such inspections were to be required in the future by security regulations, the door-to-door train travel time for trips using the Victorville to Las Vegas train would increase.

Appendix B

Appendix B: Methodology and General Assumptions

The ridership, revenue and profit forecasts use the following assumptions:

Capital cost: \$6.5 billion

Federal loan:

- Principal (range): \$5.5 billion to \$6.5 billion
- Interest rate: 3.05% fixed rate, using the average 30-Year Constant Treasury Maturity Rate for the last quarter of 2011⁸¹
- Amortization: 35 years
- Payments deferred for six years

Private investment:

\$1 billion, where the federal loan is \$5.5 billion and the capital cost \$6.5 billion

If debt

- 30 years
- 7.0% annual interest
- Not tax exempt
- Assumes low investment grade rating, such as Ba3 (Moody's) or BBB- (Fitch), which would be the same as the bond ratings for the Las Vegas Monorail

Base-year tourist market

FEIS 2005 Data Forecast (#1) and Project Forecast: Current Data (#2): The base tourist market (first year) is estimated at 20% less than in the FEIS 2005 Data Forecast. This is based upon lower growth rates in the number of rooms between 2004 and 2010, as indicated in data from the Las Vegas Convention and Visitors Bureau.⁸² A further downward adjustment is made to account for

the reduction in airline patronage between Southern California and Las Vegas, with a base year assumption at 50% of the reduction.

International Average Error Forecast (#3): The base tourist market (first year) is estimated at 39% below the Project Forecast: Current Data (#2), reflecting the average ridership forecast error from the international research.

Reason Foundation Forecast (#4): The base tourist market (first year) is estimated at 19% less than in the Project Forecast: Current Data. This is based upon lower room occupancy growth rates from 2004 to 2010 indicated in data from the Las Vegas Convention and Visitors Bureau.⁸³

Tourist Market Growth

FEIS 2005 Data Forecast (#1): The annual growth rate was forecast at 4.0% to 2020, 2.3% to 2030 and 1.2% thereafter. These forecasts were based upon anticipated growth in number of rooms.

Project Forecast: Current Data (#2) and International Average Error Forecast (#3): The annual growth rate was revised to reflect the slower trend evident from 2000 to 2005 in the number of rooms in the Las Vegas market. The resulting annual growth rates are forecast at 2.7% to 2020, 1.6% to 2030 and 0.8% thereafter. These figures represent mid-points between the higher growth rates in the Project Forecast: 2005 Data and the 2000–2005 room occupancy growth rates.

Reason Foundation Forecast (#4): the base tourist or travel market annual growth rate was revised to reflect the slower trend evident from 2000 to 2005 in room occupancy. The resulting annual growth rates are forecast at 1.2% to 2020, 0.7% to 2030 and 0.4% thereafter.

Automobile Costs and Attraction to the Train

Factors not applied to the FEIS 2005 Data Forecast (#1), Project Forecast: Current Data(#2) and International Average Error Forecast (#3):

Reason Foundation Forecast (#4): The cost of driving is estimated at the cost of gasoline (consistent with the approach indicated by Cambridge Systematics). Gasoline prices are estimated using U.S. Department of Energy Energy Information Administration (EIA) forecast prices in California, with an adjustment for the lower prices in Las Vegas. It is assumed that drivers would buy their gasoline for the trip to Las Vegas in California and for the return trip in Nevada. The length of the automobile trip has been changed from 188 miles (per URS) to 175 miles, the approximate distance between the Interstate 15 exit at the Victorville station and the Las Vegas Strip (per Google maps). The average light vehicle fleet fuel economy is used, based upon EIA forecasts.

Based upon the price elasticity (response of ridership to changes in fares) estimates in the URS report, it is estimated that the revised cost of driving will reduce forecast attraction from automobiles by approximately 70%.

These assumptions may overstate the cost of driving, since proposed federal fuel economy standards could increase fuel economy more than current forecasts and fuel economy is better on intercity trips than in the combined city-highway miles-per-gallon mix in the Department of Energy projections.

Bus ridership: Under the Reason Foundation Forecast (#4), bus ridership is estimated at approximately 4% of automobile travel to Las Vegas. This is lower than the approximately 7% assumed by URS. The lower figure is consistent with data from the Las Vegas Convention and Visitors Bureau. No adjustments are made in Forecasts #1, #2 and #3.

Train operating, maintenance and renewal costs: Based upon the cost per seat-mile for similar systems (under 300 miles) the train operating cost is assumed to be \$0.108 per seat-mile in 2012 (2012\$).⁸⁴ The following costs are added to this figure: shuttle bus systems in Las Vegas and at the Victorville train station parking lot. It is assumed that one-half of the passengers to Las Vegas will be accommodated by free shuttle buses to the Las Vegas Monorail and destinations not served by the Monorail along the Las Vegas Strip and downtown.

Ancillary revenues: Non-fare commercial revenues (such as advertising) are assumed to be 4% in relation to total fare revenues, based upon data for similar systems (under 300 miles).⁸⁵

Credit risk premium: The financial projections do not include the required credit risk premium. This figure will be recommended by FRA's financial assessment services consultant.

Endnotes

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- ¹ Both proposed locations are to the west of Interstate 15. One, the “Southern Station” is to the northwest of the I-15/Russell Boulevard interchange, while the other, the “Central Station B,” is to the southwest of the I-15/Flamingo Road interchange.
 - ² “Desertxpress Enterprises, LLC and Desertxpress high speed rail Corporation—Construction and Operations Exemption—In Victorville, Cal. and Las Vegas, Nev,” October 25, 2011, Surface Transportation Board Decision Document, Surface Transportation Board, [http://www.stb.dot.gov/decisions/readingroom.nsf/UNID/B229E375A8D3C69985257934007493DA/\\$file/41791.pdf](http://www.stb.dot.gov/decisions/readingroom.nsf/UNID/B229E375A8D3C69985257934007493DA/$file/41791.pdf)
 - ³ *High Speed Passenger Rail: Future Development Will Depend on Addressing Financial and Other Challenges and Establishing a Clear Federal Role*, United States Government Accountability Office, 2009. www.gao.gov/new.items/d09317.pdf
 - ⁴ This range is specified in the Federal Railroad Administration solicitation documents for its due diligence consultant (“Financial Assessment Services Related to Desert Xpress RRIF Loan Application,” Federal Business Opportunities, 2011, https://www.fbo.gov/index?s=opportunity&mode=form&id=e1546cc025eb83425e44b0ecd605f199&tab=core&_cview=1, p. 4). Press reports have indicated the loan amount to be as small as \$4.9 billion (Lisa Caruso [November 23, 2011], “Gamblers Train Seeks \$4.9 Billion U.S. Loan as Rail Grants Stop,” Bloomberg). This report assumes the range indicated in the Federal Railroad Administration document.
 - ⁵ Federal Business Opportunities, 2011, https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=93b201d9e400ddc84bbc0f0df521b399&_cview=0
 - ⁶ “Financial Assessment Services Related to Desert Xpress RRIF Loan Application,” Federal Business Opportunities, 2011, https://www.fbo.gov/index?s=opportunity&mode=form&id=e1546cc025eb83425e44b0ecd605f199&tab=core&_cview=1
 - ⁷ Flyvbjerg is a professor at Oxford University in the United Kingdom. Bruzelius is an associate professor at the University of Stockholm. Rothengatter is head of the Institute of Economic Policy and Research at the University of Karlsruhe in Germany and has served as president of the World Conference on Transport Research Society (WCTRS).
 - ⁸ Bent Flyvbjerg, Nils Bruzelius and Werner Rothengatter, *Megaprojects and Risk: An Anatomy of Ambition* (Cambridge, UK: Cambridge University Press, 2003)
 - ⁹ *Ibid.*, p. 15-16
 - ¹⁰ *Ibid.*, p. 14.

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- ¹¹ Stated in the text as forecast levels averaging 65% above actual, which is the equivalent of a 39% ridership shortfall.
- ¹² Flyvbjerg, Bruzelius and Rothengatter, *Megaprojects and Risk*, p. 26.
- ¹³ <http://www.sbs.ox.ac.uk/centres/bt/Documents/Flyvbjerg11OverBudgetOverTimeOverAndOverAgainManagingMajorProjects.pdf>
- ¹⁴ The Nobel Prize was awarded to Dr. Kahneman, who characterized it as a “joint” award. Dr. Tversky had died before the award was granted.
- ¹⁵ *Planners Called to Help End Inaccuracies in Public Project Revenue Forecasting*, American Planning Association, <http://www.planning.org/newsreleases/2005/apr07.htm>
- ¹⁶ The freeway driving distance from the Victorville station freeway exit to Las Vegas is approximately 175 miles. More than one-half of the population in the Los Angeles Basin and Inland Empire is more than 260 miles from Las Vegas (based upon an analysis of census county divisions from the 2010 US census). Thus, the driving distance to Victorville station will be, on average, one-third the distance to Las Vegas.
- ¹⁷ While not a terminal station, Shanghai's Hongqiao station is 12 miles from the core of Shanghai, a fraction of the Victorville to Los Angeles distance.
- ¹⁸ For example, driving one-third of the way to Las Vegas, 40 miles beyond the urban fringe would be akin to Amtrak's Acela high-speed rail service to Washington requiring a drive 40 miles beyond the urban fringe of New York, with people having to drive to the northern suburbs of Philadelphia. The market for such a service would not reasonably include people traveling from most of the New York urban area and would surely be much smaller than the market from Penn Station in New York.
- ¹⁹ Emphasis in original.
- ²⁰ Such as from Shanghai's Honquiao Airport station.
- ²¹ Emphasis in original.
- ²² Estimated from 2010 US Census data.
- ²³ There could be additional attractions to the train, such as the ability to access the internet (“wi-fi”) and the novelty of riding one of the few high-speed trains in the nation. Neither of these factors, however, seems likely to attract a large number of travelers.
- ²⁴ No broadly accepted metrics were identified for some segments of the average trip. The exceptions are recommended arrival times before flights by airlines and free-flow travel time estimates available through sources such as Google Maps.
- ²⁵ Steer Davies Gleave noted the importance of seamless travel (between the station and the hotels) to achieving the ridership forecasts.
- ²⁶ Airport arrival times in Las Vegas and Southern California are all recommended by United Airlines and Jet Blue (for Long Beach Airport) at 90 minutes, except for Los Angeles International Airport, at which two hours (120 minutes) is recommended.
- ²⁷ FIES, p. 1-6.
- ²⁸ “Inland Empire Casinos,” *500 Nations*, http://500nations.com/Inland_Empire_Casinos.asp

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- ²⁹ Steer Davies Gleave, *Ridership and Revenue Audit*, p. 5, Federal Railroad Administration, Final Environmental Impact Statement, Appendix B, http://www.fra.dot.gov/downloads/rrdev/Appendix_B_Ridership_Forecast_Review.pdf.
- ³⁰ The forecasts are provided for 2012 to 2035, with a “ramp up” of ridership to a sustained base in 2014 (from which growth would be consistent with tourist market growth in Las Vegas). If the project proceeds, service will start later than in 2012, but for the purposes of analysis, this report uses the forecast years used in the FEIS and supporting documentation.
- ³¹ Estimated from data in FEIS and attachments. The original URS forecast of 24% was reduced in the FEIS documentation by Cambridge Systematics.
- ³² The Steer Davies Gleave analysis is non-proprietary material from a report prepared for a potential investor in the project.
- ³³ David Brownstone, Mark Hanson and Samer Madanat, *Review of “Bay Area/California High-Speed Rail Ridership and Revenue Forecasting Study*, (University of California, Berkeley, Institute of Transportation Studies, 2010), <http://www.its.berkeley.edu/publications/UCB/2010/RR/UCB-ITS-RR-2010-1.pdf>
- ³⁴ Thomas J. Stone, Carlos A. Banchik and Jeffery B. Kimmel (2001). “A Unique Rapid Transit Project for a Unique City,” *The Monorail Society*, <http://monorails.org/tMspages/LasVeg5.html>.
- ³⁵ Las Vegas Monorail Corporation, NV, Moody's, <http://www.moodys.com/credit-ratings/Las-Vegas-Monorail-Corporation-NV-credit-rating-805022402>. Credit rating descriptions from *Moody's Rating Symbols and Definitions*, <http://www.moodys.com/sites/products/AboutMoodyRatingsAttachments/MoodysRatingsSymbolsand%20Definitions.pdf>.
- ³⁶ Tim O'Reiley (November 18, 2011), “Judge Rejects Las Vegas Monorail Bankruptcy Plan,” *Las Vegas Review Journal*, <http://www.lvrj.com/business/judge-rejects-las-vegas-monorail-bankruptcy-plan-134143548.html>
- ³⁷ Wendell Cox, *Analysis of the Proposed Las Vegas LLC Monorail* (2000), Wendell Cox Consultancy <http://www.publicpurpose.com/ut-lvmono-0006x.htm>
- ³⁸ See: Demographia, *Las Vegas Monorail Ridership & Revenue: Forecasts and Actual*, <http://www.demographia.com/db-lvmonoride.pdf>.
- ³⁹ FEIS, p. 3.1-17.
- ⁴⁰ See SEC Regulation: *Registering a Public Offering*, <http://www.gopublicusa.com/regulations.htm>.
- ⁴¹ Las Vegas Convention and Visitors Authority (2011), *Historical Visitation Statistics*, <http://www.lvcva.com/getfile/80/Historical%201970%20to%202010.pdf>.
- ⁴² Representative periods selected to illustrate the period during which the ridership projections were produced and the last comparable period available at the time of this analysis.
- ⁴³ Change in air travel calculated from second and fourth quarter data from 2004 and 2010, using the United States Department of Transportation consumer fare reports for travel between Las Vegas and Los Angeles, Ontario, Orange County, Burbank and Long Beach.
- ⁴⁴ The 2000 to 2005 room and occupancy data was not available to URS when the projections were prepared.

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- ⁴⁵ Assumes continuation of the URS forecast trend from 2009 to 2010. Room occupancy is likely to reflect the number of visitors more accurately than the number of rooms.
- ⁴⁶ Cambridge Systematics (2008), *Desert Xpress Ridership Forecast Review*, p. 17, Steer Davies Gleave, *Ridership and Revenue Audit*, p. 5, Federal Railroad Administration, Final Environmental Impact Statement, Appendix B, http://www.fra.dot.gov/downloads/rrdev/Appendix_B_Ridership_Forecast_Review.pdf.
- ⁴⁷ Cambridge Systematics notes that automobile costs per mile of between \$0.10 and \$0.15 would have been expected in the models. According to Cambridge Systematics, URS used a range of \$0.25 to \$0.29 per mile.
- ⁴⁸ Cambridge Systematics, p.8.
- ⁴⁹ Ibid.
- ⁵⁰ Gasoline costs and fuel efficiency based upon U.S. Department of Energy, Energy Information Administration data. 2012 light vehicle fuel economy averages 21.2 miles per gallon, adjusted upward 21.8% to account for better highway mileage (based upon average from 2009 EPA new car differential between combined mileage and highway mileage). 6.7 gallons of gasoline used at an average price per gallon of \$3.81 (average for all grades, West Coast, May 2011 to April 2012). Total one-way gasoline cost \$25.53.
- ⁵¹ This data includes Federal Railway Administration studies of three lines of 300 miles or less, including Los Angeles to San Diego, Chicago to St. Louis, Chicago to Detroit. Data from *High Speed Ground Transportation for America*, United States Department of Transportation, Federal Railway Administration, 1997 and in the FEIS.
- ⁵² Calculated from data in Jean-Noel Chapulet and Jean Pierre Taroux, “Trens Ans LGV: Comparision de Prevision et Realisations,” *Tranports*, July-August 2010.
- ⁵³ Calculated from Las Vegas Convention and Visitors Authority (2011) *2010 Las Vegas Visitor Profile Study*, <http://www.lvcva.com/getfile/107/2010%20Las%20Vegas%20Visitor%20Profile.pdf> 2010
- ⁵⁴ Cambridge Systematics, p. 17.
- ⁵⁵ According to the FEIS, each train would have a seating capacity of 675 (FEIS, Appendix C, pages not numbered).
- ⁵⁶ *Planners Called to Help End Inaccuracies in Public Project Revenue Forecasting*.
- ⁵⁷ Assumes that 60% of the ridership on this Washington to Boston line was between Washington and New York.
- ⁵⁸ See Appendix B for assumptions.
- ⁵⁹ These changes could not have been foreseen by URS when it produced the forecasts in 2005.
- ⁶⁰ To be conservative, only one-half of the airline market decline is used.
- ⁶¹ David Briginshaw, “KTX Takes The Lead in Korea,” *International Railway Journal*, January 2007, p. 21.
- ⁶² James Meek, “The £10Bn Crash,” *The Guardian*, April 1, 2004, <http://www.guardian.co.uk/world/2004/apr/01/transport.politics>.
- ⁶³ \$98.5 billion to \$117.6 billion in year-of-expenditure dollars.

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- ⁶⁴ Estimated from California High Speed Rail Authority documentation.
- ⁶⁵ *High Speed Passenger Rail: Future Development Will Depend on Addressing Financial and Other Challenges and Establishing a Clear Federal Role*, United States Government Accountability Office, 2009. www.gao.gov/new.items/d09317.pdf
- ⁶⁶ See presentation by Barbara Amani, Chief, Credit Programs Division, Federal Railroad Administration, at [http://rail.transportation.org/Documents/Outreach%20Presentation%20031411%20Updated%20\(3\).pptx](http://rail.transportation.org/Documents/Outreach%20Presentation%20031411%20Updated%20(3).pptx)
- ⁶⁷ “Financial Assessment Services Related to Desert Xpress RRIF Loan Application,” Federal Business Opportunities, 2011, https://www.fbo.gov/index?s=opportunity&mode=form&id=e1546cc025eb83425e44b0ecd605f199&tab=core&_cview=1, p. 10
- ⁶⁸ Fitch Ratings, *Definitions of Ratings and Other Forms of Opinions*, http://www.fitchratings.com/web_content/ratings/fitch_ratings_definitions_and_scales.pdf.
- ⁶⁹ Assumptions in Appendix B.
- ⁷⁰ “Financial Assessment Services Related to Desert Xpress RRIF Loan Application,” Federal Business Opportunities, 2011, https://www.fbo.gov/index?s=opportunity&mode=form&id=e1546cc025eb83425e44b0ecd605f199&tab=core&_cview=1
- ⁷¹ Victoria Burnett (May 29, 2009), “Spain’s High-Speed Rail Offers Guideposts for U.S.,” *The New York Times*, http://www.nytimes.com/2009/05/30/business/energy-environment/30trains.html?_r=2&em=&adxnnl=1&adxnnlx=1245164423-dWyLEqWIOk53FwbSfTcZCQ
- ⁷² California High Speed Rail Authority (2011), *Draft 2012 Business Plan*, http://www.cahighspeedrail.ca.gov/Business_Plan_reports.aspx
- ⁷³ *The China Post*, “Syndicated loans for debt-ridden high-speed rail granted,” January 9, 2010. <http://www.chinapost.com.tw/taiwan/national/national-news/2010/01/09/239973/Syndicated-loans.htm>.
- ⁷⁴ Paulo Winterstein (July 9, 2011), “Brazil Receives No Proposals For High-Speed Train Auction,” *Fox Business*, <http://www.foxbusiness.com/industries/2011/07/11/brazil-receives-no-proposals-for-high-speed-train-auction/#ixzz1cli2yYwl>
- ⁷⁵ If investors supply healthy reserves, the earliest default dates could be later.
- ⁷⁶ A one-lane addition is assumed in each direction for the 113 miles from Barstow, California to Primm, Nevada (the section of I-15 that has not been expanded to six lanes). In 2008, the Federal Highway Administration “normal” estimate for adding one lane in each direction in rural rolling terrain was \$2.4 million per mile, while the “high cost” was \$3.9 billion (See U.S. Department of Transportation, *Status of the Nation’s Highways, Bridges and Transit, 2010 Conditions and Performance Report*, <http://www.fhwa.dot.gov/policy/2010cpr/appa.htm#5>). While the route crosses mountain ranges, the terrain is largely flat, inclined or rolling. The more expensive “mountainous” category was not used in the estimate, since it assumes significant blasting, which would not be necessary with virtually all of the construction being in an existing right of way. From 2010 to 2011, the FHWA National Highway Construction Cost Index remained essentially the same, so that the 2008 cost factors are reflective of 2011 costs. The estimate of \$600 million to \$1.0 billion includes a 26.2% adjustment for the higher

cost of construction in California.

(<http://www.fhwa.dot.gov/asset/hersst/pubs/tech/tech06.cfm>). There is sufficient room in the median along virtually the entire route to add the additional lanes.

⁷⁷ Calculated from data in Federal Railway Administration, “Railroad Rehabilitation & Improvement Financing (RRIF),” <http://www.fra.dot.gov/Pages/177.shtml>

⁷⁸ United States Department of Transportation, *2010 Report to Congress on the Transportation Infrastructure Finance and Innovation Act of 1998*, http://www.fhwa.dot.gov/ipd/tifia/technical_resources/2010_report_to_congress.htm

⁷⁹ United States Department of Transportation, *2010 Report to Congress on the Transportation Infrastructure Finance and Innovation Act of 1998*, http://www.fhwa.dot.gov/ipd/tifia/technical_resources/2010_report_to_congress.htm

⁸⁰ The costs of a Las Vegas Monorail extension are not included in the project.

⁸¹ Federal Reserve Bank of St. Louis, *30-Year Constant Treasury Maturity Rate*. <http://research.stlouisfed.org/fred2/series/DGS30>.

⁸² Las Vegas Convention and Visitors Authority (2011), *Historical Visitation Statistics*, <http://www.lvcva.com/getfile/80/Historical%201970%20to%202010.pdf>.

⁸³ Ibid.

⁸⁴ Data from *High Speed Ground Transportation for America*, United States Department of Transportation, Federal Railway Administration, 1997.

⁸⁵ Ibid.



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