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**POLICY AND FINANCIAL ANALYSIS OF
HIGH-SPEED RAIL VENTURES
IN THE STATE OF TEXAS**

by

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ABSTRACT

A renewed interest in high-speed rail as an alternative transportation mode in Texas remains mostly as an idea, with opinions based primarily on perceptions about the state's past experience with this technology. If this concept is to advance toward a realistic alternative for transportation planners, future policies should be formulated with consideration of past policies, corporate behavior, forecasting reliability, and financial feasibility. Therefore, previous public and private efforts to bring high-speed rail to Texas have been investigated with the hope that future ventures will be timely, cost effective, and reliable. This report presents an alternative feasibility assessment methodology to assist in achieving these goals.

EXECUTIVE SUMMARY

Public officials in Texas are justifiably concerned that the financial and natural resources needed to expand the transportation network will be overwhelmed by disproportionate growth in the state's population in coming years. Some contend that the development of a high-speed rail system that reduces vehicular emissions, energy consumption, land use requirements, and highway construction can alleviate the inevitable strain on these resources. However, the pursuit of such a system would be a considerable deviation from traditionally risk-free investments in highway infrastructure, and can be validated only following the completion of a costly rail project. Perhaps the allure of what may or may not be the preeminent intercity travel solution is actually perpetuated by the fact that the initial development of a high-speed rail corridor would amount to a very risky "proof of concept" exercise. Nevertheless, the state's transportation problems persist and the public continues to propose high-speed rail as a preferred alternative to existing intercity travel modes. Most recently, the Texas Department of Transportation has proposed the inclusion of high-speed passenger and freight rail in plans for a Trans Texas Corridor, and the Texas High Speed Rail & Transportation Corporation has proposed the development of a two-corridor high-speed rail system called the "Texas T-Bone."

Shortfalls in desperately needed transportation funding and the investment risks of high-speed rail have forced the state to promote this concept as a private venture, supported by enabling state policies and cooperative efforts, but with minimal public funding. Public officials claim that this approach – in which a consortium would finance most of the project's cost with bonds supported by toll revenues – will prevent the State of Texas from being "on the hook for private sector debt." However, the research presented herein contends that the state has much more at stake in a potential rail venture than the avoidance of debt. By nature, revenues in the near term from high-dollar infrastructure projects will be of greater interest to a consortium of construction and rail manufacturing companies than the uncertain ridership revenues of the long term – this predicament has in fact prevailed in railroad franchises since the development of the first transcontinental railroad. While the failure to meet ridership and revenue projections may still result in profits to individual consortium members, the consortium itself might default on debt obligations that were facilitated by actions of the state. Furthermore, the failure of a franchisee to earn expected revenues would result in the termination of rail service barring public support, the consequence being either the absence of necessary transportation infrastructure or an unplanned expenditure of public funds. Rather than adopting a laissez-faire approach to promoting high-speed rail, it is therefore essential for the state to evaluate proposals from both the public and private perspectives so that only viable projects are pursued.

The award of Texas' only high-speed rail franchise occurred in 1991 following several years of promotional efforts on the part of the private sector. With the franchise's eventual failure in 1994, the Texas High Speed Rail Authority (THSRA) chairman advised that every aspect of the project would have to be re-evaluated from the start if high-speed rail was to succeed in Texas – the research herein has performed this re-evaluation from both the public and private perspectives, and has used the findings to support an alternative approach to the evaluation of high-speed rail projects.

High-Speed Rail Policy

A high-speed rail study funded by German interests and prepared by private consultants was presented to the Texas Legislature in 1987, proposing the development of a Houston-Dallas/Fort Worth rail system using German technology. Even though this proposal was not itself incorporated into legislation, the concept persuaded the Texas Turnpike Authority (TTA) to seek legislative support for its own investigation into the feasibility of high-speed rail, and subsequently employed its own team of private consultants with the passage of House Bill 1678. Coincident with this new investigation came the recommendation of Governor William Clements' jobs creation task force to support legislation for a public-private high-speed rail project if the TTA study found this concept to be financially viable.

With adequate legislative support, the state-funded (but consultant-prepared) high-speed rail investigation culminated in Senate Bill 1190, which created the THSRA and directed it to review franchise applications and then make an award if such a system was found to be in the public convenience and necessity. This legislation neither defined "public convenience and necessity" nor did it prescribe the standard by which it was to be assessed. Although, the THSRA itself was created as a result of the TTA study concluding that such a system was in fact a public need – that is, the study team recommended that the legislature recognize the importance of high-speed rail to the state, create a high-speed rail authority, and appropriate funding for the project. Consequently, the TTA study both predetermined the need for high-speed rail and led to legislation that required proof of this need prior to the award of a franchise; leaving the selection of a franchisee as the overriding administrative issue.

With regard to rail infrastructure, Senate Bill 1190 defined and, therefore, required high-speed rail to be technologically capable of operating at speeds in excess of 150 mph. Apparently this was based on the results of the TTA study, which recommended to the state the use of Very High Speed rail technology in the range of 125-200 mph. However, the 1987 TTA study based the feasibility of high-speed rail in this speed range using a cost estimate of approximately \$8.3 million/mile (in 1991 dollars), while estimates prepared by the Transportation Research Board in 1991 found 125-mph, 150-mph, and 180-200-mph technologies to range from \$10.25-17.76 million/mile. Therefore, Senate Bill 1190 appears to have prevented a thorough investigation into the most cost effective high-speed rail technology while basing project expectations on perhaps unachievable economics. Furthermore, ridership volumes from the eventual high-speed rail franchise applicants seemed to be quite optimistic when compared to benchmark data such as airline or highway travel volumes that, when coupled with the low cost estimates, suggest classic promotional biases were included throughout each stage of development, with no apparent public mechanisms in place to safeguard against these tendencies.

Overall, the process that resulted in the award of a high-speed rail franchise appears to have been completely reliant upon the private sector for the development of conceptual proposals and subsequent feasibility analyses, and on their testimony in favor of high-speed rail to the THSRA; thus introducing unnecessary bias into the transportation planning process. The state seems to have deferred their role in assessing the feasibility of high-speed rail to the private sector since Senate Bill 1190 prohibited the use of public funds, and perhaps this absence of financial risk was interpreted as an absence of all risks. Considering that nearly one full decade elapsed between concept proposal and franchise failure, this research also found the decision-making

process to be an impractical (as well as unreliable) means of assessing alternative infrastructure systems that rely on public-private arrangements.

High-Speed Rail Financing

Skepticism and criticism of high-speed rail proposals in the early 1980s motivated the High Speed Rail Association (HSRA) to develop its Standard Guidelines for Revenue and Ridership Forecasting so that ridership studies would gain credibility among the public. However, a substantial share of HSRA membership and board governance consists of representation from private firms that regularly perform high-speed rail feasibility studies for the public sector. What appears to be a biased process is further accentuated by the fact that the HSRA itself was established to promote the construction and operation of high-speed ground transportation systems. Even though the TTA required the use of these standards in its 1987 study, the study team's ridership projections appear to have lacked a degree of reasonableness that would be expected as an essential basis for Senate Bill 1190. For example, the TTA study projected Houston-DFW rail ridership as 3.06 million passengers in Year 1998 while Charles River Associates projected in 1993 that Houston-DFW air travel in Year 1998 would only be 2.27 million passengers. This discrepancy suggests that, assuming this volume of air travel to be accurate, the high-speed rail system was expected to carry the equivalent of 134 percent of all existing airline traffic in the corridor.

Questionable ridership projections were also noted in the high-speed rail franchise applications that were submitted to the state in 1991. Of the two applicants, Texas FasTrac reported the most conservative ridership projections, anticipating approximately 5.3 million rail passengers between Houston-DFW in Year 2002; but still much higher in comparison to the actual 3 million Houston-DFW airline passengers in that year. On the other hand, Texas TGV expected Houston-DFW rail ridership in Year 2002 to be 6.6 million passengers; more than twice the number that actually traveled by air in that year. This research found the Texas TGV projections to differ from those of Texas FasTrac by no less than 7.9 million passengers annually once the Houston-DFW and San Antonio/Austin-DFW corridors were expected to be in use. As independent advisor to the THSRA, the Texas Transportation Institute (TTI) found Texas FasTrac's ridership forecasting methodology to be understandable but optimistic, and that of Texas TGV to be beyond understanding and unreliable. Nevertheless, the THSRA awarded Texas' first and only high-speed rail franchise to Texas TGV despite these overly optimistic ridership projections since it was the only consortium willing to claim that the system could be built without public funds – which is further evidence that the state's prevailing issue was the selection of a franchise and not whether a franchise should be awarded.

Consequently, the state awarded a high-speed rail franchise to a consortium that appeared willing to build and operate a facility to be financed with revenues from ridership that would never materialize. In fact, the leadership of Texas TGV's managing partner characteristically underbid on initial work with the hope of recouping losses on follow-up work – perhaps in anticipation of federal funding for intermodal projects following the authorization of the Intermodal Surface Transportation Act of 1991 – and attempted to generate construction work by agreeing to own proposed infrastructure facilities. The ability of Texas TGV's managing partner to impose a particular strategy was most likely attributable to the fact that initial equity participation in the

consortium was limited to one major corporation (Morrison Knudsen) and a few private investors. In comparison, equity investors in the Texas FasTrac consortium consisted of six separate corporations; an arrangement that most likely resulted in collective judgments regarding financial commitments and an adherence to fairly conservative expectations.

Texas TGV released a public offering in November 1993, which included an independent ridership study prepared by the consulting firm that had previously developed ridership projections for the Texas FasTrac application. Even with a new high-speed rail alignment and the addition of service in the Houston-San Antonio/Austin corridor, this second study still resulted in ridership projections that were on average 3.6 million annual passengers less than the original Texas TGV franchise application. A financial analysis of the cash flows anticipated from these new ridership projections found that the public sector would have needed to fund 60 to 70 percent of project costs in order to earn private investors a 12-16 percent rate of return. In fact, a modest 8 percent return would have required the public sector to fund 40 percent of the project, which contradicts Texas TGV's claim in December 1993 that (as it turned out) 25 percent of project costs would indeed need to be covered by the public sector. Thus, the State of Texas most certainly would have been on a financial hook had it not been for the stipulation in Senate Bill 1190 that public funds could not be used. A separate financial analysis of the cash flow schedule included in Texas TGV's 1991 franchise application found that a 16 percent return would have been earned had the consortium's initial ridership and revenue projections been accurate, but this finding was based on ridership projections that were higher than those in the preliminary offering circular by an average of 3.6 million passengers annually and on an unexplained \$28 billion annuity in Year 2018.

Looking to the Future

The findings in this research demonstrate considerable deficiencies in the means by which the feasibility of high-speed rail in Texas has been assessed. In terms of policy, Senate Bill 1190 seems to have both promoted a tolerance among public officials for irregularities in project proposals and prevented the loss of public funds with their inevitable failure. Furthermore, time and cost requirements of high-speed rail studies have thus far involved decision-making processes that do not provide state transportation planners with "up-front" information.

Past problems associated with the assessment of high-speed rail projects can in part be remedied by performing the concept-stage screening process presented herein, which assumes some easily supportable project parameters, such as the private-sector threshold rate of return, competitive ticket pricing, project life, and the cost of available technologies. A simple computer program can then be used to assess each available technology to determine the portion of existing corridor traffic that would need to use the high-speed rail system in order to meet the assumed criteria. This approach would allow transportation planners to deal primarily with transportation statistics, and would provide early answers to potential planning options.

In light of the renewed interest in high-speed rail, the concept-stage screening methodology was used to study the Houston-DFW corridor by evaluating 90- 110- 125- 150-mph and Maglev technologies. The results of this process suggest that 110- to 125-mph rail technologies may in fact have potential as viable rail projects and warrant further investigation. However,

realistically sustainable private rail ventures may require some level of public funding, which in turn requires that the state be able to perform its own cost-benefit analyses. This of course means that the state would need staff prepared to analyze the feasibility of rail projects from both the public and private sector perspectives, and that the Texas Department of Transportation (TxDOT) would become an integral part of feasibility studies instead of outsourcing all responsibilities to the private sector.

Whereas the stipulation of no public funding in Senate Bill 1190 had protected the state against loss, future policies of similar inflexibility may protect the state against gain. For example, new high-speed rail policies might be more effective if they prescribe economic standards – such as minimum net present value (NPV), maximum required-to-available passenger ratio, and minimum private-sector rate of return – that prevent the waste of public funds while maintaining the flexibility to engage in viable partnerships with the private sector. In the event that such policies are in place, the assessment of these standards can be performed simultaneously in order to identify levels of public funding that are attractive to both the public and private sectors. Regardless of the level of public funding, the state has a vested interest in evaluating private-sector feasibility so that it does not become a facilitator of high-speed rail projects that are doomed to fail, and so that transportation planners can determine if these projects can be relied on to meet the public's needs.

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DISCLAIMER

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CHAPTER 1 – INTRODUCTION

Several recent public initiatives in Texas have proposed the construction of high-speed rail within the state's transportation corridors, with plans to rely on the private sector for some degree of project financing. The Texas Department of Transportation (TxDOT) unveiled plans in 2002 for a Trans Texas Corridor that calls for both high-speed freight and passenger rail, which are thought to hold promise as privately financed toll facilities that operate under franchise agreements. At the same time, the Texas High Speed Rail & Transportation Corporation began to advance the idea of a high-speed rail network, named the "Texas T-Bone," that connects the Beaumont-Houston-Bryan/College Station-Waco corridor to a perpendicular corridor comprised of San Antonio-Austin-Waco-Dallas/Fort Worth. In general, the corporation has established a role as advocate for multimodal projects before federal, state, and local agencies and officials, as well as to the private sector.

The state will ultimately need to evaluate the viability of high-speed rail concepts in order to determine which of the many possible transportation projects might best meet the public's needs and comply with state funding requirements. The state's transportation authorities have historically devoted the bulk of their resources to the provision of public streets and highways, with much lesser involvement in private-sector rail projects. However, with expectations for TxDOT to explore public-private rail partnerships comes the need for them to consider corporate behavior, managerial philosophy, financial investment incentives, and the needs and motives of private consortiums. Despite Texas having only one experience with a high-speed rail franchise, the wealth of information generated by the project contributed significantly to understanding these corporate issues and, thus, warrants a detailed investigation from both a policy and financial perspective.

The award of a high-speed rail franchise by the state to Texas TGV Consortium in 1991 was the culmination of events that began with the marketing of a foreign-financed study to the Texas Legislature; and ended with a state authority that was created upon the recommendation of a private study team awarding the franchise to a consortium essentially comprised of the same study team. While this process might now seem rather convoluted, what may be even less clear is the rationale for the private sector to pursue the project in light of the results of some fairly simple feasibility analyses performed herein. Ironically, the failure of this single high-speed rail project offers considerable insight into how the state can formulate more effective policies involving public-private partnerships, and how the feasibility of high-speed rail proposals can be more efficiently assessed by the state at the conceptual stage.

Precursors to Texas

The Federal Railroad Administration (FRA) identified the San Diego-Los Angeles corridor in 1981 as the most feasible high-speed rail prospect of 25 rail corridors under review (1). In that same year, the American High Speed Rail Corporation (AHSRC) was organized to amass the private investment necessary to develop a high-speed rail system in the corridor, with intentions of expanding its rail ventures into other markets, such as Houston-DFW, in the near future (2). The AHSRC was primarily owned by former AMTRAK and other railroad executives, and by

1983 had submitted an unsolicited proposal to construct, operate, and maintain a \$3.1 billion high-speed rail system in the Los Angeles-San Diego corridor. The corporation had hoped to attract equity participation with the idea of increased land values, preferred vendor status, and tax advantages that the project might create. Although, the single largest portion of the \$2.909 billion financing plan included \$1.250 billion in tax-exempt industrial revenue bonds, made possible by the passage of a bill by the California Legislature in August 1982, and that was to be issued under the authority of the California Passenger Rail Financing Commission (3). The ambitious project schedule required the completion of both state and national environmental reviews, as well as the issuance of a Certificate of Public Convenience and Necessity by the California Public Utilities Commission, all by the end of 1984.

AHSRC planned to construct a new rail line capable of operating trains at 160 mph that, by diverting 20 million automobile trips from the highway each year, would produce net income before taxes of \$957 million annually. Even these optimistic forecasts could not prevent the project's termination in 1984 with AHSRC's inability to secure short-term financing, perhaps because potential investors foresaw its financial viability as too dependent upon suspect travel demand forecasts. AHSRC was heavily criticized for the lack of an impartial ridership study, with some groups fearing that the state might feel obligated to rescue a failed project at the taxpayer's expense (1). The AHSRC certainly weakened the case for high-speed rail further by refusing to disclose marketing and ridership studies for "competitive advantage reasons," and by attacking its critics for "spending scarce public tax dollars to harass a private company" (1). Coincident with these concerns came a report by the U.S. Office of Technology Assessment declaring that "any U.S. corridor with totally new high-speed rail service would have difficulty generating sufficient revenues to pay entirely for operating and capital costs" (1, 4).

The High Speed Rail Association

A public distrust of ridership projections like those of the San Diego-Los Angeles project motivated high-speed rail proponents to develop a more credible forecasting process. Perhaps one of the most influential such proponents is the High Speed Rail Association (HSRA), which was established as a nonprofit organization to promote the construction and operation of high-speed ground transportation systems. The Board of Directors of this nonprofit association have regularly included representation from large engineering and construction companies such as Parsons Brinkerhoff, URS Consultants, Gannett Fleming, Bechtel, and Morrison Knudsen; from rail technology companies such as GEC Alstom and Bombardier; and from public high-speed rail authorities.

The HSRA's contribution to reliable forecasting methods took form as a set of standard guidelines for revenue and ridership forecasting, which were first used in a 1986 study on the feasibility of building a high-speed rail system in Pennsylvania between Pittsburgh and Philadelphia (5). As the ridership consultants to the Pennsylvania High Speed Intercity Rail Passenger Commission, Parsons Brinkerhoff and Gannett Flemming explained in its report the significance of the HSRA's guidelines as follows:

"The Pennsylvania high speed rail travel analysis closely follows the Standard Guidelines for Revenue and Ridership Forecasting developed by

the High Speed Rail Association Demand Forecasting Committee. By clearly stating all the assumptions that have been made in this study, and by showing forecasts and sensitivity tests that are based on an evaluation of all aspects of travel demand analysis, the study aims to credibly answer questions that the public, reviewing agencies and investigators might raise.

The HSRA's Standard Guidelines were developed because of the tentative quality, lack of disclosure of methods and uncertain comprehensiveness of some early high speed rail travel analyses in proposed corridors elsewhere in the United States. These early studies had led to confusion and even disbelief among the public, and the investment community and government officials. Though these efforts were the fruit of good intentions and enthusiasm, the Pennsylvania study must avoid repeating this experience, and therefore closely follows the HSRA guidelines" (5).

Pennsylvania High Speed Rail Feasibility Study: Market Demand, 1986

Duties of the Pennsylvania High Speed Intercity Rail Passenger Commission were limited to investigating and making recommendations on the need for high-speed rail in the Commonwealth, as stipulated in the 1981 version of House Bill 305 (6). Section 11 of this bill further limited the commission's power by mandating its expiration in five years. However, the Parsons Brinkerhoff/Gannett Flemming team recommended the creation of a more permanent entity in the form of a public-private venture, similar to that of the Pennsylvania Turnpike Commission, to build and operate a high-speed rail system (7). The most important part of the team's preliminary assessment was the following feasibility analysis:

- The existing system could be upgraded to 110-120 mph high-speed rail service at a cost of \$1.8 billion, reducing travel times to 3 hours, 58 minutes. Ridership would range from 4.1-10.2 million passengers by Year 2000.
- A substantial realignment would allow trains to operate between 160-180 mph at a cost of \$7.0 billion, reducing travel times to 3 hours, 16 minutes. Ridership would range from 5.1-11.6 million passengers by Year 2000.
- Magnetic levitation (Maglev) technology would allow for speeds up to 250 mph for a cost of \$10 billion, reducing travel times to 2 hours, 36 minutes. Ridership would range from 5.8-12.6 million passengers by Year 2000.

On a cost basis, the HSRA standard guidelines produced ridership projections for the Pennsylvania project as shown in Figure 1, in which a large disparity between high and low ridership projections is apparent. This plot also shows that the variation in expected ridership for a particular rail technology could be greater than the gains made in ridership by using more expensive technology. For example, the difference between high and low ridership projections for all three technologies averages 6.5 million annually, while ridership differs by only 2.0 million annually when comparing the 110-mph and Maglev technology using either the high or low estimates. Even so, the chairman of the Pennsylvania High Speed Intercity Rail Passenger Commission reported to the HSRA in 1988 that the commission voted near unanimously in favor of Maglev technology, and expressed confidence that the ridership and demand model was "good enough to go to financing" (8).

1986 Pennsylvania Study

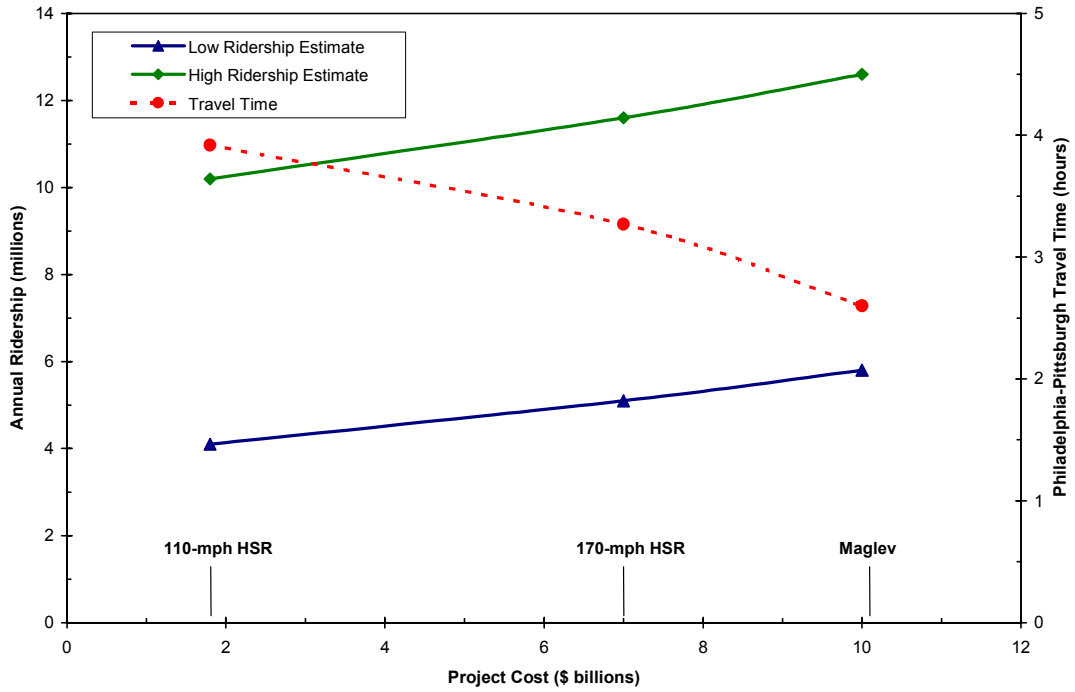


Figure 1. Time and Ridership Projections for the Pennsylvania Study.

CHAPTER 2 – A FAILED PROJECT REVISITED

The High Speed Rail Association welcomed a representative from Siemens AG of Germany as a new director of the organization in 1986; described as being recently transferred to Austin, Texas, “where he is involved in the on-going Houston-Dallas high speed train project” (7). In fact, this train project was the first in a series of continuing high-speed rail studies performed by the private sector that would culminate in the award of Texas’ first and only high-speed rail franchise. An understanding and assessment of past high-speed rail policies, therefore, necessitates a review of the state’s relationship to the private sector, beginning with the German Consortium.

Germany Visits the Legislature

The award of a high-speed rail franchise in Texas began with a campaign by The German High Speed Consortium in the early 1980s. The consortium was comprised of 10 separate German firms assembled to create a market for high-speed rail in the U.S. and, more specifically, to promote the adoption of Germany’s Intercity Express (ICE) technology (9). A \$1.2 million study – funded equally by the consortium and the Federal Research and Technology Department of the Federal Republic of Germany – was completed in 1985 by a joint venture of Parsons Brinkerhoff Quade & Douglas and Deutsche Eisenbahn Consulting (7).

The German study evaluated high-speed rail service between Houston and Dallas/Fort Worth (DFW), proposing the use of what is now Burlington Northern Santa Fe right-of-way. Assuming an electrified double track totally dedicated to passenger service, the consortium contended that riders would be transported at speeds exceeding 185 mph and could be delivered from downtown Houston to downtown Dallas in 100 minutes (9). The feasibility report listed among its findings the following:

- Ridership would exceed 12,000 daily passengers by 1992 and 20,000 daily passengers by 2000 (this report assumed 330 operating days per year).
- Capital costs would range from \$1.4 billion to \$4.4 billion, based on five alternative configurations of the mainline track and structures.
- Revenues from passenger operations would fully cover annual operating and maintenance costs.
- Revenues from passenger operations would be sufficient to finance the capital costs of the project subject to adequate public-sector support.

The report concluded by recommending that key activities such as institutional and governmental participation should be initiated “in order to maintain continuity of the project,” and that these activities should begin immediately (9). The report’s hypothetical financing program, shown in Table 1, suggested that if the State of Texas would agree to guarantee revenue bonds issued to support construction costs, as much as \$1.9 billion might be raised in tax-exempt debt.

Table 1. High-Speed Rail Financing Package Proposed by the German Consortium.

Source of Funds	Capital Proceeds (\$ million)	Annual Debt Service (\$ million)
Tax Exempt Revenue Bonds	1,401	158
Equipment Vendor Loans	531	42-149
Leveraged Leases	617	49
Direct Grants	117	-
Total	2,306	249-356

Source: German Consortium Feasibility Report, page 10-7 (9).

High-Speed Rail and the Texas Turnpike Authority

The German High Speed Rail Consortium’s 1985 report was updated for the 1987 session of the Texas Legislature, whereby the consortium unsuccessfully pressed for legislation to implement its proposal (10). However, the Texas Turnpike Authority (TTA) did support legislation to support its own high-speed rail study, resulting in the 70th Legislature directing a study to that effect through passage of House Bill 1678 (11). Backed by legislative support and a \$375,000 grant from the FRA, proposals were solicited from the private sector to perform TTA’s high-speed rail feasibility study with the stipulation that the study must use the Standard Guidelines for Revenue and Ridership Forecasting developed by the High Speed Rail Association (8). A short list of four study teams was selected for final consideration as follows:

- Lichliter/Jameson & Associates, with Morrison Knudsen Engineers, Wilber Smith Associates, Underwood Neuhaus & Co., Andrews & Kurth, and M. Ray Perryman;
- Barton-Aschman, with Brown & Root USA, De Leuw Cather, Ernst & Whinney, and Garner & Holman;
- Touche Ross & Co., with URS Corp., Kaiser Engineers, Merrill Lynch, and Simat, Helliesen and Eichner; and
- Turner, Collie & Braden, with Mott, Hay & Anderson U.K., Peat Marwick Main, Prudential Bache, the Canadian Institute of Guided Ground Transportation, and Michael G. Page, Esq. (8).

Simultaneous to TTA’s effort to commission the feasibility study, Governor William Clements had appointed a task force of 72 distinguished members – which included notable Texans such as H.R. Bright, Robert Crandall, H. Bartell Zachry, Jr., Louie Welch, and Clayton Williams, Jr. – with the charge to “identify specific action that can be taken to remove obstacles or provide new stimulus for job creation in the state” (12). Although the task force identified several different prospects for business development and jobs creation in the state, they observed that a high-speed rail system from Houston to Dallas would be perfectly suited as a public-private effort that warranted the Governor’s attention:

“The Governor should monitor the preliminary assessment being undertaken by the Texas Turnpike Authority for a High Speed Rail System. Pending determination that the project is financially viable, the Governor should actively support passage of enabling Legislation” (12).

Business Development and Jobs Creation Task Force Recommendations, 1987

Creation of the Texas High Speed Rail Authority

On March 10, 1988, TTA selected the team led by Lichliter/Jameson & Associates to conduct the state's high-speed rail feasibility study. Under this arrangement, Lichliter/Jameson supplied project management and system planning, Morrison Knudsen provided expertise in rail technology, and Wilbur Smith prepared ridership and revenue projections (11). The study team supported its conclusion that "based on a specific set of current conditions and assumptions, high speed rail service on all legs of the Texas Triangle is a feasible and attractive option" with the following findings:

- Very High Speed (VHS) rail technology (125-200 mph) is recommended due to a high ratio of revenues to capital costs,
- High-speed rail should be constructed on an independent right-of-way for exclusive use of passenger service,
- Completion of the rail system in three stages – Houston-DFW in 1998, Houston-San Antonio/Austin in 2003, and San Antonio/Austin-DFW in 2008 – is the financially preferred approach,
- Capital costs in 1988 dollars for the entire system would amount to approximately \$4.4 billion:
 - Stage 1, Houston-DFW = \$2.02 billion (\$7.23 million/mile)
 - Stage 2, Houston-San Antonio/Austin = \$1.41 billion (\$6.63 million/mile)
 - Stage 3, San Antonio/Austin-DFW = \$0.96 billion (\$7.59 million/mile)
- Tax-exempt revenue bond financing under the Technical and Miscellaneous Revenue Act of 1988 (HR 4333) could provide financing for over 70 percent of capital costs, and
- Repayment of debt would be from revenues generated in excess of funds required for debt service, operation and maintenance, and franchisee return on investment.

As part of this study, ridership and revenue projections were prepared for both Year 1998 and Year 2015 (from Section IV: Ridership, page IV-18) assuming VHS technology, as listed in Table 2. Although, the implications of these ridership and revenue projections are difficult to discern since they were presented separately from the team's recommended implementation schedule. For example, Year 1998 and Year 2015 ridership and revenues in Section IV were considered to have "realistic potential"; but while construction staging was briefly discussed thereafter, specific dates for the recommended construction sequencing were given in a later section (i.e., Sections VIII and XII). Figure 2 approximates the difference between what could be perceived as the study's ridership projections to what was actually being recommended by the implementation schedule, which serves to illustrate the attention that must be given to detail in the interpretation of results in feasibility studies.

The study found that the Texas high-speed rail system was an economically sound project that justified the issuance of up to 70 percent of capital costs in tax-exempt revenue bonds under the Technical and Miscellaneous Revenue Act of 1988 (HR 4333). The financial plan also called for advances of pre-construction costs that would be repaid from revenues generated in excess of funds used for debt service, operations and maintenance, and franchisee return on investment. Even though the study projected economic gains from jobs creation, economic development, and increased tax revenues, the determination of economic soundness was based on the ability

of public financing to cover project costs (financial feasibility) rather than on an economic assessment that compared the costs and benefits of high-speed rail.

Table 2. High-Speed Rail Ridership Estimates from the TTA Study.

City Pair	Year 1998		Year 2015	
	Ridership (million)	Revenue (\$ million)	Ridership (million)	Revenue (\$ million)
DFW-Houston	3.063	107.2	7.570	264.9
Houston-Austin	1.050	36.7	2.848	99.7
Houston-San Antonio	1.040	36.4	2.902	101.6
DFW-San Antonio	0.671	3.5	1.679	58.8
DFW-Austin	0.591	20.7	1.421	49.7
San Antonio-Austin	1.112	20.0	3.129	56.3
Total	7.527	224.5	19.549	631.0

Source: Texas Triangle High Speed Rail Study, Table IV-14 and Table IV-15 (11).

Based on the overall findings of the Lichliter/Jameson team, the report recommended that “the following specific actions be taken” to proceed with high-speed rail:

1. that the 71st Texas Legislature, acting in regular session, issue such directives and enact necessary legislation to recognize the importance of high-speed rail to the state;
2. that the 71st Texas Legislature, acting in regular Session, designate the Texas Turnpike Authority as the “interim” executing agency for the high-speed rail project until such time as a Texas high-speed rail authority is created that would be responsible for financing, constructing, managing, and operating the system;
3. that the 71st Texas Legislature, acting in regular Session, appropriate funding for the biennium beginning September 1, 1989, to carry forward the planning, administration, and management of the high-speed rail program; and
4. that staged development of a high-speed rail system in Texas is undertaken utilizing VHS rail technology on a dedicated independent alignment (11).

Texas Triangle Corridors

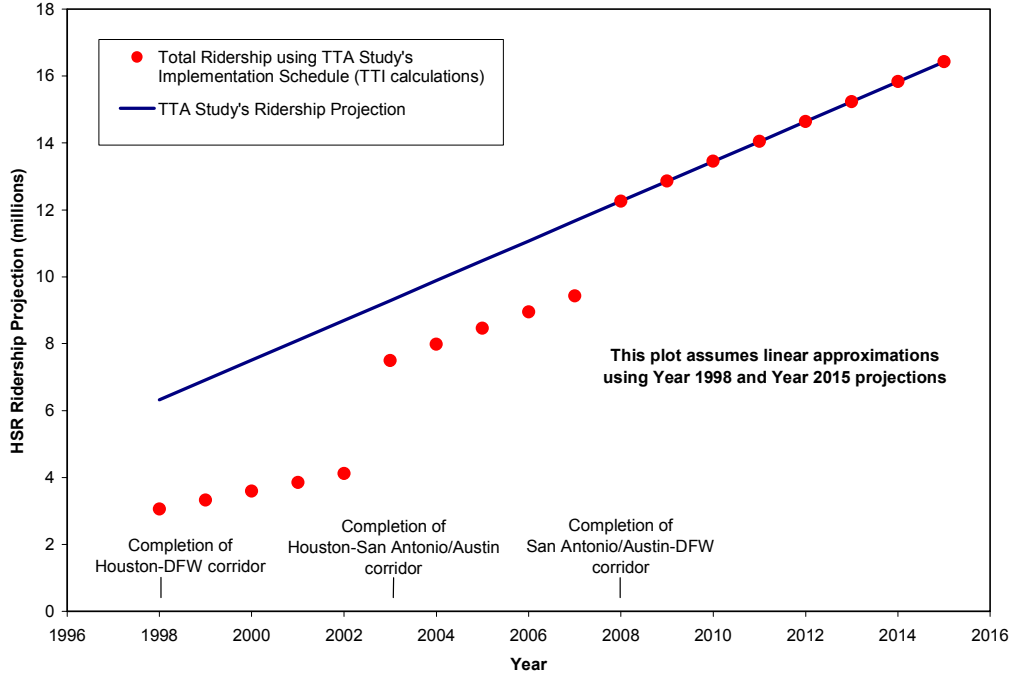


Figure 2. Comparison of Ridership Projections/Construction Schedule from the TTA Study.

The Texas High-Speed Rail Act

Subsequent to the completion of the TTA study, the Texas Legislature acted upon the report’s recommendations and created the Texas High Speed Rail Authority (THSRA) through the passage of Senate Bill 1190, referred as the Texas High-Speed Rail Act. In Part 1, Section 2 (a)(1), of this bill, the legislature indicated that the THSRA should: (A) objectively review franchise applications which provide ridership refinements, engineering analysis, environmental analysis, safety analysis, rolling stock, and a financial plan for the private development of a high-speed rail facility; and (B) grant a franchise for the financing, construction, operation, and maintenance of a high-speed rail facility, provided it finds that it is for the public convenience and necessity. Section 7 (10) of this act limited the assessment of high-speed rail’s viability to rail technology capable of operating at speeds in excess of 150-mph, which not only defined minimum standards for rail service but also effectively placed a price floor on the prospective system (13).

Public Convenience and Necessity

As Burns noted in 1995, the Texas High-Speed Rail Act was written in a way that allowed the project to begin without first undergoing the substantial scrutiny that transportation projects must typically withstand; presumably deemed acceptable in this case since the Act disallowed the

expenditure of public funds on the high-speed rail project (10). Furthermore, the TTA study seems to have been used both as the rationale for creating the “enabling legislation” to develop high-speed rail *if* merited by public convenience and necessity, and as preliminary evidence that high-speed rail *is in fact* a public convenience and necessity. For example, the TTA study recommended that the 71st Legislature create a high-speed rail authority and, at the same time, recommended that the Legislature recognize the importance of high-speed rail to the state and carry forward the planning, administration, and management of such a program. As a consequence, since the public convenience and necessity had been favorably predetermined (at least, inferred), the Act predisposed the inevitable high-speed rail authority toward the award of a franchise.

Burns also observed that the Act was based partly on a Florida statute that was perhaps unsuitable to Texas’ needs, and that the Act failed to define the term “public convenience and necessity” (10). In 1992, Bob Neely, then executive director of THSRA, described to fellow members of the High-Speed Rail Association that the merits of a high-speed rail franchise would be based on this standard and that “the public convenience and necessity was spelled out in our statute” (14). Actually, the Act did in fact fail to define this critically important term, although it did define more familiar terms such as “maintenance facility” and “revenues.” In contrast, the proposed San Diego-Los Angeles high-speed rail project would have required the California Public Utilities Commission to provide a Certificate of Public Convenience and Necessity prior to the start of construction, as prescribed in the California Public Utilities Code.

Award of a Texas Franchise

A chronology of important events in the award of Texas’ only high-speed rail franchise has been extracted from Burn’s post-assessment of the project and presented in Appendix A (10). Of three consortia that submitted franchise application materials to THSRA, only Texas FasTrac and Texas TGV met the deadline for submitting a required \$500,000 application fee. The breadth of information in both applications was considerable, and included information on estimated costs, financing, rail technology, ridership projections, and corporate profiles. Texas FasTrac’s proposal incorporated the use of Germany’s Intercity Express rail technology while Texas TGV adopted the French “Train Grand Vitesse,” or “Train of Great Velocity,” technology creating a unique contrast among competing applications. A comparison of the applications also shows significant differences in the approach, scope of work, and financing of the high-speed rail systems that were to use these technologies.

The Texas FasTrac Application

Texas FasTrac followed the earlier efforts of the German High Speed Rail Consortium to market the Intercity Express technology to the Texas Legislature, and included participation from several of the same firms involved in the 1985 German study. The consortium’s \$500,000 application fee to THSRA was financed as an equity investment among the following consortium stockholders:

- Brown & Root USA; Houston, Texas;
- H.B. Zachry, San Antonio, Texas;
- Siemens AG, Munich and Berlin, Germany;
- ABB Verkehrstechnik, Mannheim, Germany;
- AEG Westinghouse Transport-Systeme, Berlin, Germany; and
- HCB Contractors, Dallas, Texas.

Among the team members of Texas FasTrac, the following respectable consultants provided (or were prepared to provide) services to the consortium:

- Charles River Associates – ridership studies;
- Parsons Brinkerhoff – planning, engineering;
- Duetsche Eisenbahn – engineering;
- Law Engineering – geotechnical and environmental services; and
- Huitt-Zollars – planning, engineering.

Texas FasTrac proposed three distinct routes within the Texas Triangle, as shown in Figure 3. Line 1 was to extend from Houston’s central business district, through Bryan/College Station and Waco, and to the central business districts of Dallas and Fort Worth. Line 2 was to extend from San Antonio and Austin to Line 1 at Waco (15). Line 3 was envisioned between Houston and Austin, but was not recommended for immediate development in the application due to significantly lower ridership projections than either of the north-south lines (from Volume 1, Chapter 4: Ridership Estimates and Marketing Plan, page IV-1). Texas FasTrac explained that their route selection process “resulted in the creation of an optimized system which has the least total track miles serving the greatest number of urban areas in the fastest time possible” (15).

Texas FasTrac estimated the capital costs for Line 1 to be approximately \$3.38 billion, and that of Line 2 to be \$1.84 billion, resulting in a total system cost of \$5.22 billion. The eventual completion of a Houston-Austin corridor was expected to add an additional \$1.58 billion to these initial costs, which were exclusive of ongoing expenses such as preventative maintenance (from Volume 3, page VIII-1 and Tables 8.1.1-1, 8.1.1-2). Texas FasTrac also conducted an on-site review of German high-speed rail structures and construction techniques, and concluded that the highway-based construction cost estimates for structures in the 1989 TTA study resulted in considerable error.

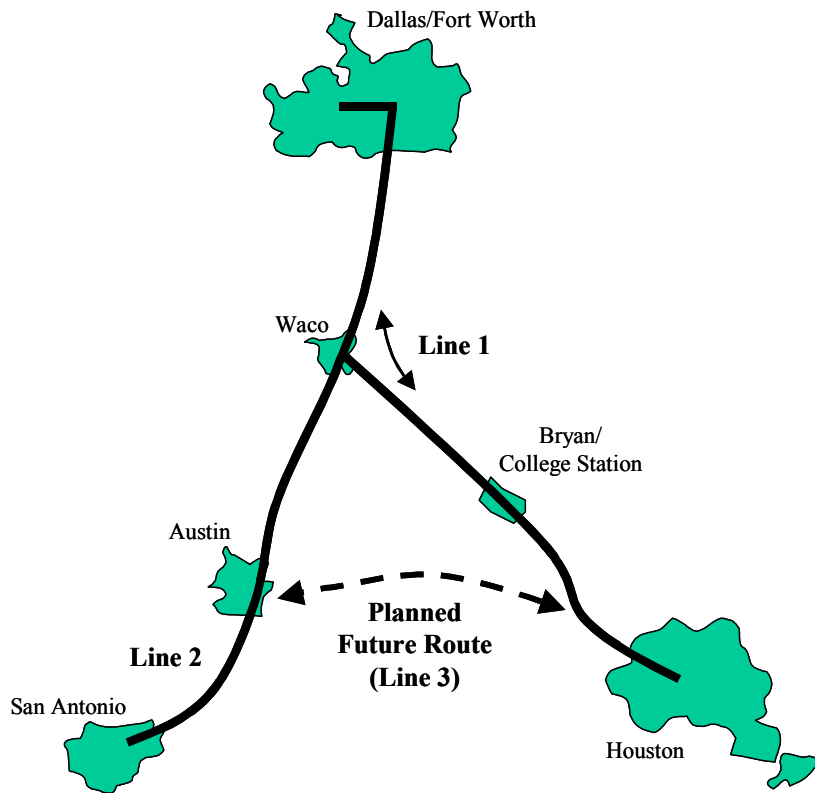


Figure 3. High-Speed Rail Routes Proposed by Texas FasTrac.

Ridership projections for each corridor of the system shown in Figure 3 were based on the mathematical modeling of four general travel segments diverted from: 1) intercity automobile traffic, 2) intercity air traffic, 3) connecting air traffic, and 4) DFW commuter services. Line 1 was anticipated to be operational by 1998 and Line 2 was expected to be operational in 2008; the ridership and revenue projections shown in Table 3 were based on this implementation schedule (from Volume 1, Table 4.4.1-2).

Table 3. Texas FasTrac Ridership and Revenue Estimates for Intercity and Commuter Travel.

Year	Houston-DFW		Houston-DFW + San Antonio-DFW	
	Annual Ridership (millions)	Annual Revenue (\$ millions)	Annual Ridership (millions)	Annual Revenue (\$ millions)
1998	4.6	178.2	4.6	178.2
1999	4.8	186.2	4.8	186.2
2000	5.0	194.2	5.0	194.2
2001	5.1	202.2	5.1	202.2
2002	5.3	210.1	5.3	210.1
2003	5.4	218.2	5.4	218.2
2004	5.6	226.1	5.6	226.1
2005	5.8	234.1	5.8	234.1
2006	5.9	242.1	5.9	242.1
2007	6.1	250.1	6.1	250.1
2008	6.3	258.1	9.3	419.8
2009	6.4	266.1	9.5	432.8
2010	6.6	274.1	9.8	445.8
2011	6.7	282.1	10.0	458.8
2012	6.9	290.1	10.2	471.8
2013	7.0	298.1	10.5	484.8
2014	7.2	306.1	10.7	497.8
2015	7.4	314.1	11.0	510.8
2016	7.6	322.1	11.2	523.8
2017	7.7	330.1	11.4	536.8
2018	7.9	338.1	11.7	549.8

Source: Texas FasTrac Franchise Application, Volume 1, Table 4.4.1-1 and Table 4.4.1-2 (15).

The Texas TGV Application

Texas TGV was initially known as the Texas High Speed Rail Corporation (16). In contrast to Texas FasTrac’s equity participation by a diverse array of large corporations, Texas TGV’s stockholders consisted of one large U.S. corporation and a few select individuals, namely:

- Morrison Knudsen Corporation (managing partner), Boise, Idaho;
- Mannai Investment Company, Doha-Qatar, Arabian Gulf;
- Brad Corbett, Fort Worth, Texas; and
- Ben Barnes, Austin, Texas.

Texas TGV’s application included among its expertise the following list of distinguished subcontractors:

- Lichliter/Jameson – engineering, environmental consulting;
- Wilbur Smith – ridership studies;
- Carter & Burgess – engineering and design;
- Austin Industries – construction;
- Southwestern Laboratories – geotechnical; and
- Bombardier – rolling stock.

Texas TGV proposed the implementation of the project in a phased sequence, beginning with construction of Phase 1, which extended from Houston to the DFW Airport, as shown in Figure 4 (17). Phase 1 was to be followed by construction beginning on the San Antonio-Navarro Junction segment (Phase 2) one year later, followed by completion of Phase 1 and Phase 2 in 1998 and 1999, respectively (from Volume 1, Exhibit 2.6.2-1, Sheets 1-4). Phase 3 consisted of the construction of a commuter rail line between DFW Airport and Fort Worth, and Phase 4 was a segment anticipated to connect Hockley Junction near Houston to San Marcos Junction in order to provide service between Austin-Houston and San Antonio-Houston (17). Over time, the original routing of these corridors was modified to include service to Bryan/College Station and Waco (see Figure 4).

Despite the Houston-San Antonio/Austin segment being shown in Texas TGV's route map (Volume 1, Exhibit 2.6.1-2), their implementation plan explained that the "Implementation of this phase contemporaneously with Phases 1 and 2 is beyond the capability of the private financing plan and the financial markets. Accordingly, the design and construction of Phase 4 will be deferred pending the realization of the necessary levels of support or identification of an alternative financing plan" (Section 2.6). Texas TGV estimated the capital costs for Phase 1 to be approximately \$2.50 billion, Phase 2 to be \$1.72 billion, and Phase 3 to be \$0.14 billion; resulting in a total system cost of \$4.36 billion. If constructed, the Houston-San Antonio/Austin corridor would add an additional \$1.44 billion to these initial costs (from Volume III, pages 8-3 to 8-10).

Texas TGV's ridership estimates were derived from two models. First, a price and time elasticity model, designated as the "macro" model, was used to evaluate major macroeconomic factors as they affected ridership projections. Second, a complementary model to the macro model, designated as the "micro" model, was used to evaluate microeconomic comparative pricing and the results of competition on the ridership projections. Texas TGV used the results from micro modeling as their formal ridership projections, as well as for use in the engineering and financial analyses (from Volume I, page 4.4-24).

Ridership projections for each corridor of the original alignment shown in Figure 4 were based on five distinct rail travel segments in the micro model: 1) "single air connect" traffic that travels to a hub airport from another city, 2) "local air" intercity traffic that does not connect to the national air system, 3) "auto" intercity traffic that would have otherwise traveled by automobile, 4) "induced" traffic that would otherwise not have traveled at all, and 5) "commuter" traffic that travels between end stations within a city due to the availability of very low prices and empty seats at the end of a run. Texas TGV's ridership projections for intercity travel within Phases 1-3 of the rail system are shown in Table 4.

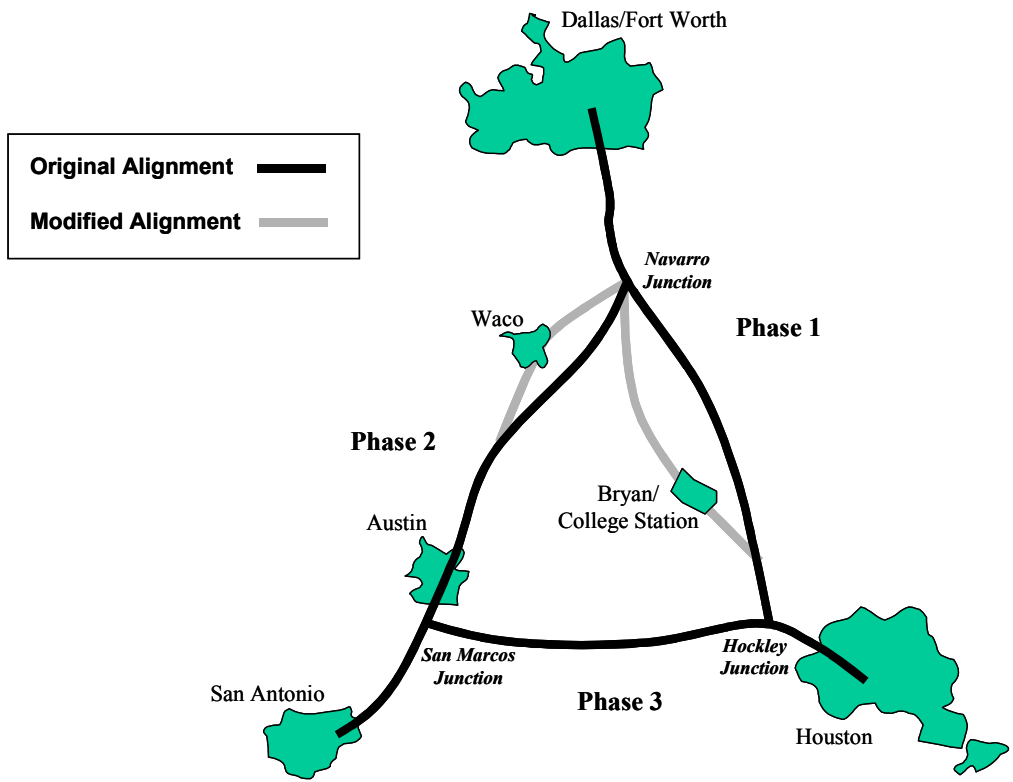


Figure 4. High-Speed Rail Routes Proposed by Texas TGV.

Like the Texas FasTrac application, tables providing ridership estimates in Volume I of Texas TGV’s franchise application were accompanied by revenue projections for Phases 1 and 2; although separately. These revenues were incorporated into a subsequent financing model from which Texas TGV determined that the high-speed rail system would produce a “healthy investment prospect with a long term rate of return at 15%” and that would “be able to stand on its own as an operating entity relying on revenues from quality service to provide an adequate return on investment.” The final section of Texas TGV’s financing plan explains that a 22-year annuity was added to the Year 2018 cash flow in order to calculate the project’s internal rate of return over the 50-year franchise period (from Volume III, page 9-6).

Table 4. Texas TGV Ridership and Revenue Estimates for Intercity and Commuter Travel.

Year	Houston-DFW	Houston-DFW + San Antonio-DFW	
	Annual Ridership (millions)	Annual Ridership (millions)	Annual Revenue (\$ millions)
1998	1.4	1.4	58.6
1999	4.7	6.6	257.1
2000	6.1	12.4	484.8
2001	6.4	13.9	549.6
2002	6.6	14.3	569.5
2003	6.8	14.8	590.1
2004	7.0	15.2	611.5
2005	7.2	15.7	633.6
2006	7.4	16.2	656.6
2007	7.6	16.7	680.4
2008	7.9	17.2	705.0
2009	8.1	17.7	730.5
2010	8.4	18.3	757.0
2011	8.6	18.7	776.6
2012	8.8	19.2	796.7
2013	9.0	19.6	817.3
2014	9.2	20.0	838.5
2015	9.4	20.5	860.2
2016	9.6	21.0	882.5
2017	9.8	21.5	905.4
2018	10.0	22.0	929.0

Source: Texas TGV Franchise Application, Volume I, Exhibits 4.4.1.2-1 and 4.6-1 (17).

Opportunity, Optimism, and a Franchise

Section 23 (a) of the Texas High Speed Rail Act directed the THSRA board to adopt rules and standards governing the solicitation of proposals for and the award of a high-speed rail franchise that ensures that the franchisee is financially and technically capable of constructing and operating high-speed rail facilities. However, a basis and formal finding of need – or public convenience and necessity – was not defined prior to the THSRA’s impending review of franchise applications (10). While this act prescribed the award of a franchise providing that the THSRA found high-speed rail to be in the public’s interest, it did not prescribe the standard by which this need was to be assessed, nor did it outline a process for the THSRA to follow in assessing the need.

In June 1990, the THSRA adopted its own administrative rules on agency operation and application processing (see Appendix A). As part of this process, a team of advisors was selected in January 1991 to draft a Request for Proposal (RFP) for a high-speed rail franchise, and then to consult and advise the THSRA following their review of the franchise applications. As leader of the THSRA’s advising team, L.S. Gallegos and Associates concluded from the franchise applications that: 1) both applications demonstrated the need for high-speed rail, 2) both applicants were capable of implementing a high-speed rail project, and 3) neither applicant demonstrated financing plans consistent with requirements of the Texas High Speed Rail Act (10). In addition, TTI reviewed the ridership estimates of both applicants, and

submitted a report to the THSRA in February 1991. TTI's summary comments on the Texas FasTrac application were as follows:

“In conclusion, this applicant concentrated on documenting the ridership and revenue forecasting process very thoroughly and clearly. As a result we are able to understand how they arrived at their forecasts and are therefore able to dissect and criticize them carefully. We are concerned that the procedure of the survey, which was the basis of their forecasting effort, has a considerable opportunity to over-estimate high speed rail travel” (18).

Ridership and Related Issues: A Review of the Applications for Development of a Texas High Speed Rail Service, 1991

Although Texas FasTrac's ridership forecasting methodology was met with some skepticism, they were commended for providing a clear and thorough description of procedures and assumptions in their application. The same cannot be said, however, of Texas TGV's application according to the following summary by TTI:

“In conclusion, the questions and concerns about assumptions, input data, model forms, model adequacy, and final adjustments make it difficult to recommend with confidence the travel forecasts presented by this applicant. It is not clear that a more careful scrutiny of the applicant's procedures would permit a recommendation with more confidence. There are just too many opportunities for error, bias, and compounding in the approach presented” (18).

Ridership and Related Issues: A Review of the Applications for Development of a Texas High Speed Rail Service, 1991

Overall, the advisors indicated that Texas FasTrac's projections were understandable, yet optimistic; while Texas TGV's projections were beyond understanding and overly optimistic. In an address to the High Speed Rail Association in 1991, Bob Neely, Executive Director of the THSRA, seemed to place a good deal of importance on the entire team of advisors, saying that they were “some of the very best in the world and they've emerged as real winners in this project” (14). However, the THSRA also conducted evidentiary hearings through which evidence could be received to support the need for high-speed rail and to demonstrate an applicant's qualifications to hold a franchise. Essentially, this process allowed each applicant to provide testimony and present witnesses in front of a hearing examiner to justify the award of the franchise to their consortium (10). Consequently, while Neely seemed to portray the process as impartial, he failed to point out that not only his new position as director of the authority, but the powers of the THSRA, and the legislation that supported its existence were all precipitated from the beginning by the actions of companies largely comprising the two consortiums whose testimony in support of high-speed rail was now being heard. Previous passenger rail studies in the 1970s had examined high-speed rail technology, but this work was directed by the Governor and Texas Legislature and performed by the state (19). In contrast, the process leading to the THSRA's reliance on testimony from Texas FasTrac and Texas TGV on the need for high-speed rail appears both redundant and biased. Figure 5 illustrates the sequence of events that characterized this process, showing how the high-speed rail concept's idea, its validation, and its award involved a select group of private participants.

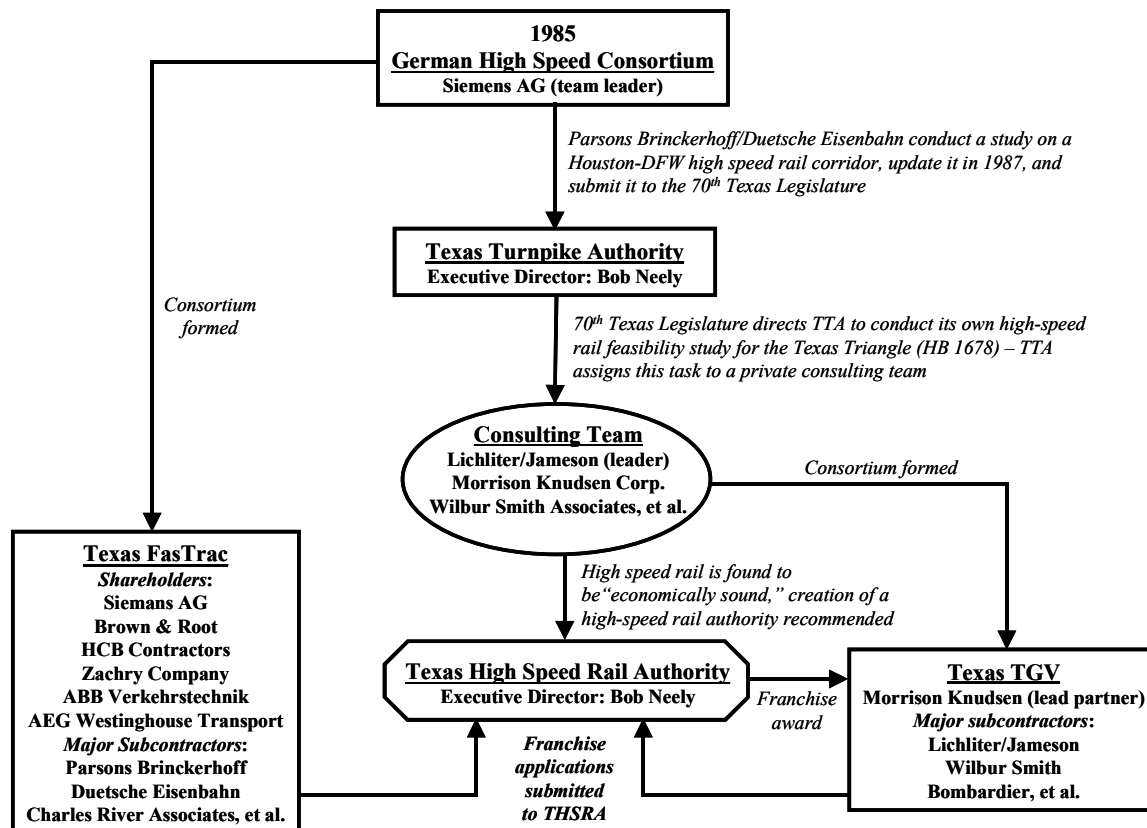


Figure 5. Sequence of Events Leading to the Award of a High-Speed Rail Franchise.

Section 2 (B)(6) of the Texas High Speed Rail Act stated that “it is not in the public interest that a high-speed rail facility be built, financed, or operated by the public sector,” which was at odds with both consortiums’ position that a system could not be completed without public support. Considering this impasse, the shortcomings of both franchise applications, and the critical nature of the independent reports, the THSRA apparently liked what it heard when William Agee, head of Texas TGV’s managing partner (Morrison Knudsen), declared that the project could be funded without public money (20). Thus, a clear understanding of why Texas awarded its first and only high-speed rail franchise, and what its opportunities for success were, cannot be obtained merely through the analysis of ridership estimates, the political environment, or public sentiments toward the project; it must also consider the perspective of the private participants – particularly Texas TGV’s leadership.

Texas TGV’s Managing Partner

Harry Morrison was 19 years old in 1904 when he began working as a timekeeper for the construction of a dam on the Snake River in Idaho. At the time he met Morris Knudsen four years later, he was already managing parts of large construction projects for the Bureau of Reclamation. Described as a strong, quiet man of moderate tastes, young Morrison found an

ideal partner in Knudsen because of the seasoned and sound judgment that someone with an additional 23 years experience would bring. By the time Morrison Knudsen began searching for partners to bid on the Hoover Dam project in 1930, the firm had considerable experience building railroad lines, dams, and bridges (21).

Through Morrison Knudsen's initiative, the Six Companies – a name taken from the Chinese Six Companies in San Francisco – developed as a joint venture with Utah Construction (lead partner), Pacific Bridge, J.F. Shea, Kahn Construction, and a team consisting of Bechtel, H.J. Kaiser, and Warren Brothers Construction. Each of these companies was managed by intelligent men having significant experience in large construction projects, and who recognized the value of self-control (21). The completion of Hoover Dam in 1935 marked Morrison Knudsen's rise to preeminence among worldwide construction companies and, while other Six Companies partners were absorbed into other corporations, the company maintained its status as a traditional heavy construction contractor into the 1980s.

While more than 75 percent of annual revenues in the 1980s came from engineering and construction, Morrison Knudsen was also engaged in mining, manufacturing railcars and rebuilding locomotives, developing real estate, and shipbuilding. Despite an economic downturn early in the decade, Bill McMurren, the company's chief executive officer (CEO), was able to maintain revenues and profits until 1986, at which time McMurren became seriously ill and Morrison Knudsen was left without an adequately prepared leader. The coincidence of economic and corporate distress resulted in fewer new contracts and declining net income, whereby ensuing losses in 1987 prompted Morrison Knudsen to seek new leadership – someone who could bring about significant change.

New Leadership at Morrison Knudsen

Cash flow problems at Morrison Knudsen had made the Boise, Idaho-based company susceptible to a hostile takeover bid by another firm, which may have influenced the board's decision to select a finance-oriented CEO experienced in corporate takeovers (22). William "Bill" Agee, himself a Boise native and onetime chief financial officer at Boise Cascade, was certainly familiar with corporate takeovers. In fact, his attempt as chairman of the board and CEO of Bendix Corporation to acquire Martin Marietta in 1982 resulted in what is referred to as the most interesting war in American corporate history (23).

Bill Agee was appointed chairman of the board and CEO of Bendix in 1977, becoming the youngest person to hold such a position at any of the top 100 American corporations. Despite showing strong profits in the 1970s, Agee decided in 1980 that the company should diversify its primary position as a manufacturer of automotive parts (Fram auto filters, brakes, etc.) as a hedge against a weakening automotive market. In order to finance this strategy, Bendix businesses and stocks were sold to generate \$700 million in cash that, in turn, earned peak interest rates in the bank. Hartz reports that a common joke on Wall Street was that Agee "was making more money on his money than he could on operations" (23). In August 1982, Bendix had announced its intent to purchase for cash up to 15,800,000 shares of common stock in Martin Marietta Corporation at \$43 per share (a total value of \$679 million) to gain controlling interest in the prime defense contractor. Regulations governing the actions of stockholders favored

Martin Marietta, a Maryland corporation, over that of Delaware-based Bendix by providing Martin Marietta time to arrange for a counter purchase of Bendix stock, resulting in a standoff that by 1983 concluded with a third company, Allied Corporation, owning a majority of Bendix and left Agee unemployed.

Morrison Knudsen's board was comforted by the agenda Bill Agee first brought to the company in 1987; a three-part plan that included: 1) selling off businesses (such as real estate and shipbuilding) to generate investment capital that would produce income, 2) concentrating on obtaining fewer but larger, high-profile construction jobs by submitting low bids with the intention of recouping losses on recurring or follow-up work, and 3) creating new business in repairing and building railcars, with the expectation that government support for infrastructure projects would soon grow (22). One of his early ideas on how to achieve these goals was a seemingly novel approach to building infrastructure, whereby the construction group would actually own a facility and take full responsibility for its financing, design, construction, and operation. Furthermore, authorization of the Intermodal Surface Transportation Act in 1991 had made federal funding that was previously reserved for highway construction available for intermodal freight and urban transit projects, convincing Agee that Morrison Knudsen's rail group would prosper (21).

Breaking Institutional Form

The fact that Bill Agee removed the portraits of Harry Morrison and Morris Knudsen from the Boise headquarters, converted the massive boardroom to his personal office, and ran much of the company's affairs from a new home in Pebble Beach, California, was perhaps the least of what changed at Morrison Knudsen upon his arrival. Agee was leading the historically operations-based company by his preferred method of financial and accounting maneuvers rather than by operational or strategic initiatives. For example, the *Wall Street Journal* reported that Agee went as far as telling other top managers "You construction guys have been trying to run the company for seventy-five years. Now I'm going to show you how the financial guys do it" (22).

The credibility and project history that Morrison Knudsen offered to the Texas High Speed Rail Authority as a franchise applicant was built under a completely different system of leadership than at the time the Texas TGV proposal was submitted. Prior to Agee's arrival, one-third of corporate officers came from an operations background, but within a few years, none of the officers had this orientation and most were associated with finance, law, and corporate communications (22). Also, Agee's fascination with the rail group caused some tenured construction talent to flee to other firms while validating in others their initial fears of hiring a financial man to lead a construction company (21). Emphasis was now placed on improving financial statements by selling assets to generate cash flow, investing in securities, and acquiring work through the risky proposition of generating future profits subsequent to winning initial projects at a net loss – a strategy that explains Agee's declaration that Texas TGV could fund the high-speed rail project without public funding.

The "financier" approach that Agee took as CEO of Bendix and Morrison Knudsen is of a completely different mindset than that of operations-based leaders, and it is important to understand that a project's financial success does not necessitate operational success. While the

idea that a construction firm could acquire new work by offering to design, build, operate, and maintain a facility might have seemed new to some, the franchise concept had existed at that time in railroading for over 125 years. The original Union Pacific Railroad may be the most recognizable government rail franchise, having been authorized by Congress through the Pacific Railway Act of 1862 to fulfill the need for a transcontinental railroad. In this case, it was financiers who answered the call to build the railroad by establishing their own construction company to insure financial success, as explained by Klein:

“Congress expected the necessary funds to be raised from three sources: sale of stock, the government subsidy, and sale of first mortgage bonds. However, promoters knew from experience that a road could not be built from the proceeds of stock sales. Investors realized that on railroad stocks the risks were great and dividends (if any) long in coming. Bonds were more attractive because they promised a regular return provided the road earned enough to pay its interest. The Union Pacific was rich in potential assets [land grants and mineral rights], but these could be tapped only after the road was built. Construction required an enormous amount of working capital on which little or no return could be expected until the road opened for business. To minimize risk, therefore, some way had to be found not only to raise money but to earn short-term profits as well.

Shrewd promoters had already discovered a neat solution to this dilemma. By organizing themselves into a construction company, they could earn immediate profits from building the road. If the completed road proved successful, they could also make money from its operation; if not, they would still come away with something. The construction company also enabled promoters to limit their liability. If the road was built by a corporation rather than by individual stockholders, they would be liable only to the extent of their investment in that corporation. All profits on construction would accrue to them and could be easily divided according to their share in the construction company. As stockholders in both the railroad and the construction company they would in effect make a contract with themselves, which allowed them to put the work at figures guaranteeing a profit. They would have little difficulty selling stock if they wished to do so, for investors who would not touch railroad securities would gladly buy into a construction company. Along the way they would also have contracts, jobs, and other benefits to distribute to “friends” of the road” (24). *Union Pacific: The Birth of a Railroad, 1862-1893*

Traces of a Storied Past

The successful completion of projects such as Hoover Dam, the San Francisco-Oakland Bay Bridge, and the Trans-Alaska pipeline were all attributable to an organizational behavior at Morrison Knudsen characterized by hard work, expertise, and discipline. The effect of shifting the company’s emphasis from construction engineering to financial engineering had caught up

with the firm by 1993, at which time Agee's leadership had produced on average 43 percent of pretax income from nonoperating activities (22).

Agee's bolstering of profit reports by selling off pieces of the company, and his pursuit of risky ventures, would most certainly have become apparent as Texas' high-speed rail franchisee beyond 1993. While the Texas High Speed Rail Authority was taking issue with Texas TGV's failure to secure \$170 million in equity financing commitments, the consortium's majority participant was on its way to incurring over \$300 million in losses, undergoing an 80 percent drop in its pre-1993 stock price, and defaulting on much of its \$200 million debt (21). Although Agee faced no challenge from a board filled with his own slate of directors, banks refused to extend Morrison Knudsen additional credit unless he was removed (22). Consequently, the board fired Agee in March 1995 and hired Robert S. Miller to revive the company. Contracts for Morrison Knudsen to build hundreds of railcars at a loss of \$1 million each was but one of the challenges Miller faced during a restructuring process that resulted in the cancellation of all debt in exchange for new stock to the Washington Construction Group (25). The newly merged companies became Washington Group International, Inc.; an unbecoming end to what Harry Morrison and Morris Knudsen had started 88 years earlier.

CHAPTER 3 – ANALYSIS OF THE TEXAS HIGH-SPEED RAIL PROPOSALS

Public officials in Texas may believe with good reason that providing sufficient transportation infrastructure in the future may be an insurmountable task given the expected population growth and shortfalls in projected funding. So it is understandable why transportation projects involving public-private partnerships have begun to be initiated by the public sector in lieu of proposals that have historically come from the private sector. However, the fact remains that efforts toward public-private rail ventures in the modern era characteristically have shown to be quite speculative, require a good deal of time and money, and usually produce no results. While the history of these efforts may seem uninspiring, the research herein is based on the premise that a string of failures is exactly what is needed to begin formulating effective relationship strategies between the public and private sectors. Of course, the state's unsuccessful high-speed rail ventures can only be useful by conducting a critical examination of the details in each proposal.

High-Speed Rail Ridership Studies

The primary shortcoming of ridership forecasts (or any forecast) is that they can only be proved or disproved with the passage of time. Although, enough time has passed since ridership projections that led to the award of a high-speed rail franchise were made that, with appropriately selected benchmark data and a little intuition, their accuracy can be evaluated. Moreover, the availability of ridership projections from the multiple studies completed between 1985 and 1993 allows for the credibility of future forecasts to be placed in some context.

A Brief Look Back at Forecasts

A first source of benchmark data was obtained from Year 2000 traffic maps produced by TxDOT's Transportation Planning and Programming Division, and then used to generate the plot of Interstate 45 vehicular traffic shown in Figure 6. In this plot, passenger traffic in the corridor was calculated by subtracting truck traffic from total vehicular traffic, resulting in an average minimum traffic level of 13,463 passenger vehicles per day (4.91 million per year) in the portion of I-45 between Centerville and Buffalo. If this minimum traffic volume is assumed to represent the maximum possible amount of direct Houston-DFW traffic on I-45 in Year 2000, then this would also represent the number of potential high-speed rail passengers traveling between the two cities if, say, the average number of passengers per car averaged 1.2 and if 85 percent of the 4.91 million vehicles actually traveled directly between Houston and DFW (or an average of 1.5 passengers per car and 67 percent direct Houston-DFW traffic, etc.).

Year 2000 TxDOT Traffic Volumes

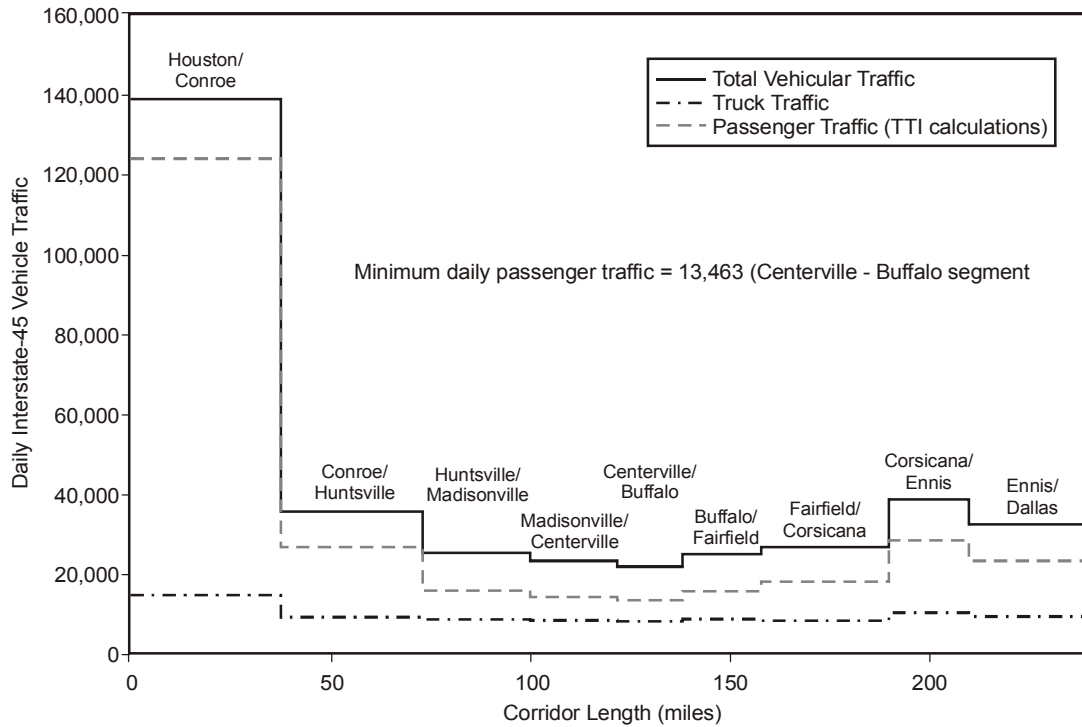


Figure 6. Interstate 45 Vehicle Traffic Patterns for Year 2000.

Figure 7 shows that the German Consortium’s ridership projection of 6.6 million rail passengers for the Houston-DFW corridor in Year 2000 was significantly beyond the likely availability of automobile passengers at that time. The TTA study’s 3.6 million rail passengers (a linear interpolation from 1998 and 2015 projections) represent approximately 73 percent of available travelers; and Texas FasTrac’s 3.2 million intercity passengers (calculated by reducing Year 2000 data by the percent of expected commuter traffic) represent approximately 65 percent of these travelers. Also, Texas TGV’s intercity rail passenger projection suggests that they expected the equivalent of almost all existing automobile passengers on I-45 to ride the high-speed rail system in Year 2000.

Houston-Dallas/Fort Worth Corridor

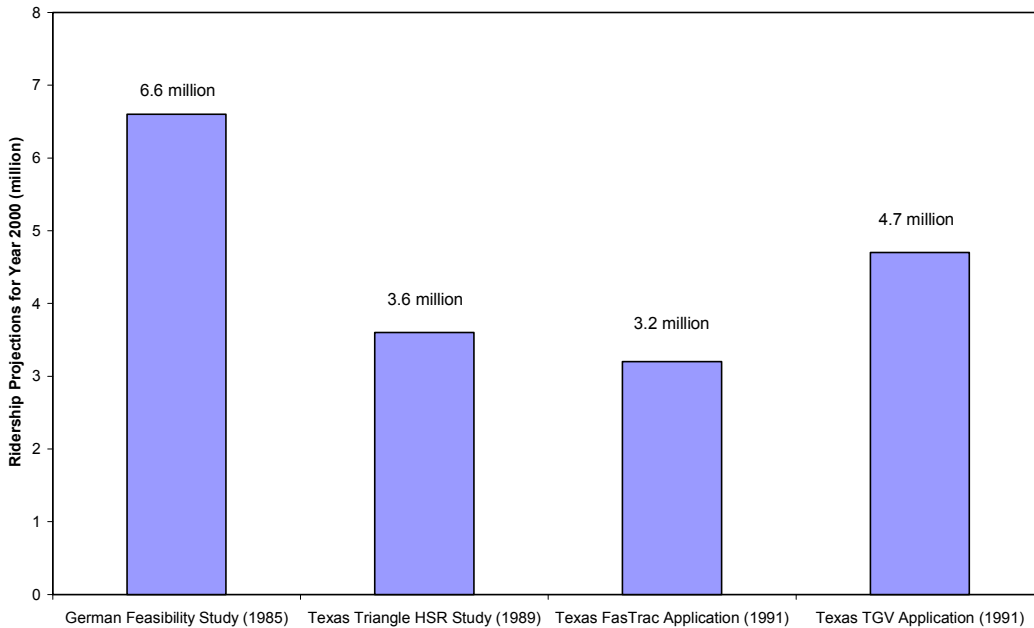


Figure 7. Year 2000 Ridership Projections in the Houston-DFW Corridor.

A second, and perhaps more useful, source of benchmark data was obtained from airline industry statistics. Airline travel data may be more foretelling of potential high-speed rail ridership since, as Texas TGV noted in their franchise application, high-speed rail's "basic appeal is to the airline passenger, as this type of traveler is already exhibiting a preference for high speed travel as well as a willingness to transfer from an automobile to a high speed travel mode" (from Volume I, page 4.4-15). The Air Transport Association of America listed the Houston-DFW corridor as the tenth largest domestic airline market in Year 2002, with 1.52 million passengers boarding local flights at all commercial airports that provided service between these two cities (26). Also, Charles River Associates produced an independent ridership study – for use in Texas TGV's Preliminary Offering Circular – that included historic and projected air travel volumes in the Houston-DFW corridor (27). This report predicted the total volume of air travel between Houston-DFW to be 3.02 million passengers in Year 2002 (from pages 2-15, 2-16). Therefore, this suggests that connecting plus local travel in the Houston-DFW market (3 million) was roughly twice that of local trips (1.5 million). These conclusions are substantiated by Texas TGV's summary of air travel histories, which indicated that the volumes of local and connecting trips in this corridor are approximately equal in number (from Volume I, page 4.2-6).

Assuming that somewhere close to 3 million passengers also traveled between Houston and DFW by air in 2000, a reexamination of Figure 7 indicates that each high-speed rail forecast predicted, at a minimum, the equivalent of all Houston-DFW air traffic using their system. The ridership projections prepared by Parsons Brinkerhoff/Deutsche Eisenbahn for the German Consortium in 1985 offer the greatest contrast to recent air travel, having expected more than twice the total air traffic between Houston and DFW to use the Intercity Express rail system in that corridor by Year 2000.

Precision and Accuracy in Ridership Forecasting

Not only can the high-speed rail ridership projections made 10 to 15 years ago be compared to recent travel patterns, but a comparison of the studies themselves can also offer some insight to their degree of precision. In this regard, the following studies and their association with ridership consultants are considered:

- Texas TGV Public Offering Circular, 1993 – Charles River Associates (20, 27);
- Texas FasTrac franchise application, 1991 – Charles River Associates (15);
- Texas TGV franchise application, 1991 – Wilbur Smith Associates (17); and
- Texas Turnpike Authority study, 1989 – Wilbur Smith Associates (11).

A plot of each study’s ridership projections is provided in Figure 8 in order to contrast any variability that time and source may have created. As a reminder, Wilbur Smith’s 1989 projections in the TTA study should have actually reflected the consulting team’s recommended implementation schedule (see Figure 1); therefore, the assumed completion dates for all studies are provided in Table 5.

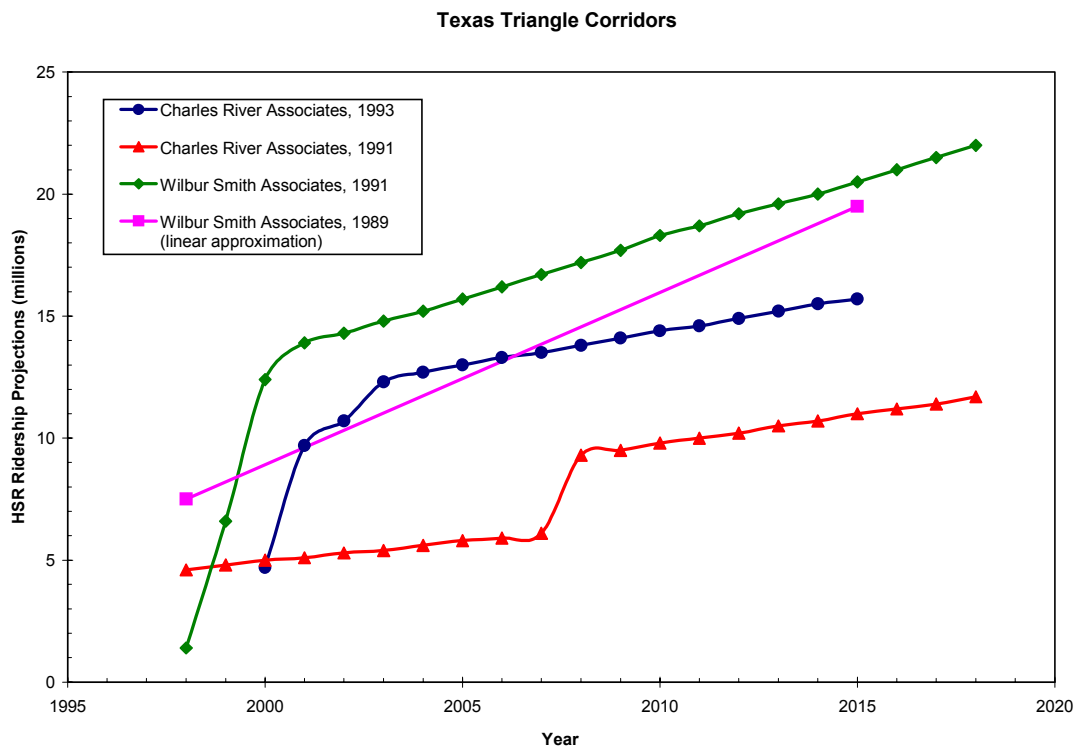


Figure 8. Comparison of Ridership Projections for the Texas Triangle.

As Figure 8 shows, a comparison of Wilbur Smith’s 1989 TTA forecast to its 1991 Texas TGV forecast suggests very little variability, other than providing more detailed year-by-year projections in 1991. More importantly, significant differences are apparent in the comparison of Wilbur Smith’s 1991 Texas TGV forecast to Charles River Associates’ 1991 Texas FasTrac forecast. Both of these 1991 franchise applications recommended the indefinite postponement of

the Houston-San Antonio/Austin corridor (see Table 5) until this segment became economically viable. However, even after accounting for Texas FasTrac’s plan to not complete the San Antonio/Austin-DFW segment until 2008, projections from the two franchise applications varied by no less than 7.9 million riders per year.

Table 5. Comparison of Assumed Construction Completion Schedules.

Ridership Projection	Assumed Year of Construction Completion		
	Houston-DFW	San Antonio/Austin-DFW	Houston-San Antonio/Austin
Texas TGV Offering Circular	2000	2001	2003
Texas TGV Application	1998	1999	Not Recommended
Texas FasTrac Application	1998	2008	Not Recommended
TTA Study	1998	2008	2003

Following the award of the high-speed rail franchise to Texas TGV, the consortium solicited Charles River Associates to perform an independent ridership study (1993) for use in the consortium’s securities offering (27). At first glance, Figure 7 seems to suggest that Charles River Associates significantly raised its projections in 1993 from those it made for Texas FasTrac in 1991. However, a closer examination of the consultant’s 1991 and 1993 studies reveals that the two separate projections were virtually identical in the first year that both the Houston-DFW and San Antonio/Austin-DFW corridors were to be operational. In reality, the discrepancy between Charles River Associates’ two forecasts is due to Texas TGV including Houston-San Antonio/Austin traffic in Year 2003 (see Table 5) through the adoption of a new “Corporation Preferred Alignment,” as shown in Figure 9. This alignment seems to have been a compromise between the original Texas FasTrac alignment and the modified Texas TGV alignment shown in Figures 3 and 4, respectively. Nevertheless, the addition of Houston-San Antonio/Austin travelers in the independent ridership study still resulted in projections averaging 3.6 million annual passengers less than had been projected in Texas TGV’s original application. The overall assessment indicates that, while multiple sets of results from a single consultant may be consistent, results from among competing firms are substantially different – suggesting a serious lack of precision in the ridership projection process for high-speed rail projects.

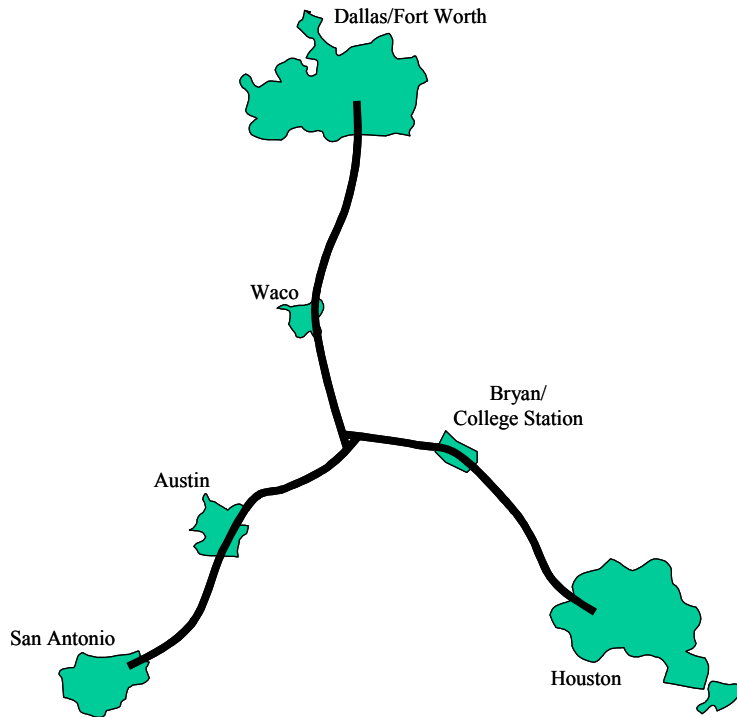


Figure 9. Texas TGV's New "Corporation Preferred Alignment."

In terms of accuracy, an assessment of the ridership projections in Figure 8 can only be made using benchmark data that are known to be true, and then intuitively gauging the relation of this data to the near future. For example, Figure 10 re-plots the ridership projections in Figure 8 as a percentage of the 3 million passengers that traveled between Houston and DFW by air in Year 2002. The plot of ridership projections for Texas TGV's franchise application shows that, in Year 2002, an equivalent of 477 percent of the actual Houston-DFW air traffic was expected to use Phases 1 and 2 of the high-speed rail system; and within another 15 years, Phases 1 and 2 would carry the equivalent of over 700 percent of this traffic. From this perspective, it would be rational to conclude that the winning high-speed rail franchise application was prepared with aggressive optimism. Charles River Associates' 1991 ridership projections assumed that the only service offered prior to 2008 would be in the Houston-DFW corridor, yet this comparatively conservative estimate assumed to capture the equivalent of between 150 to 200 percent of the corridor's total Year 2002 air traffic on an annual basis. Assuming that the Year 2002 air travel data is correct, there seems to be adequate evidence to suggest that competing ridership projections submitted in high-speed rail proposals to the State of Texas appear to be neither precise nor accurate.

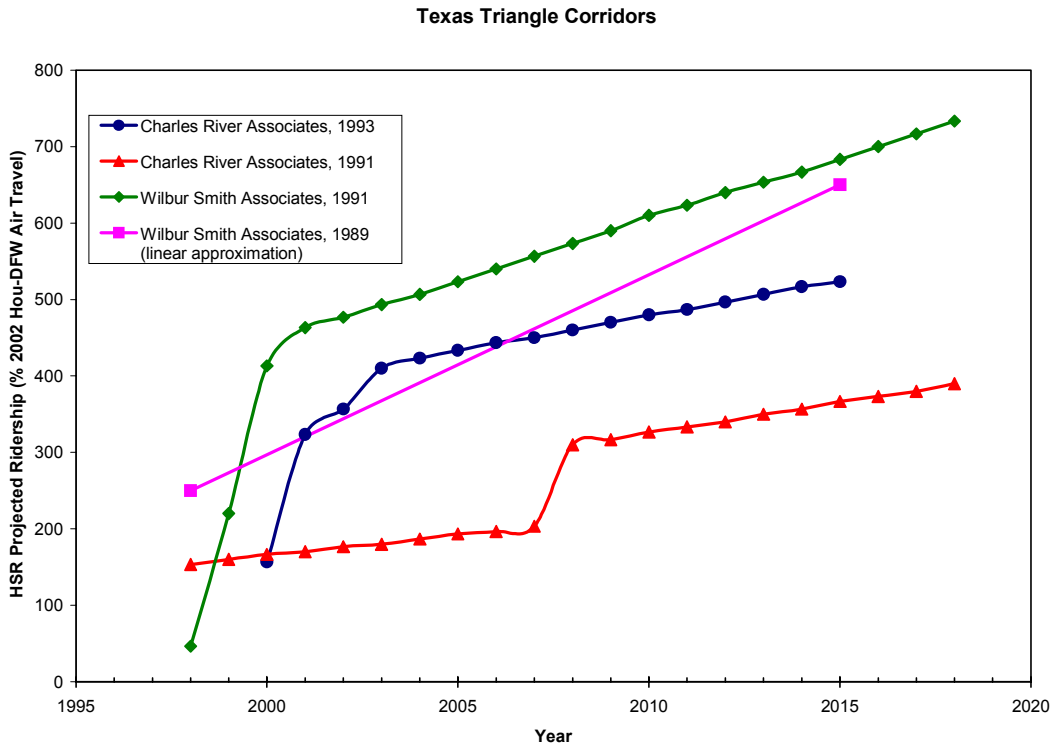


Figure 10. Ridership Projections as a Percentage of Year 2002 Houston-DFW Air Travel.

Financial Analysis of the Texas TGV Project

One of the criticisms by the THSRA’s independent advisors was that neither franchise applicant provided enough information in the submittal to perform an in-depth analysis of their financing plans (10). As the idea of public-private partnerships begin to gain favor with some public officials, the need for agencies to analyze projects from both the public and private perspectives will become imperative. After all, a high-speed rail franchise can certainly be profitable to engineering/construction companies despite shortfalls in ridership, particularly when the design and construction of infrastructure is financed more with revenue bonds rather than with a consortium’s equity. While it is certainly understandable that securing design and construction work will remain the first priority for engineering/construction companies, the public sector must remain steadfast in first insuring that reliable and effective infrastructure is in place. Therefore, even with privately funded franchise agreements, the public sector has a vested interest in promoting design/build/transfer projects only when the private sector can earn sufficient rates of return from operations – or else it will fail to provide *effective* infrastructure (i.e., continuous operations). If operations from joint high-speed rail ventures fail to generate adequate returns, all that might be shown for the expenditure of sizable consulting and contracting fees may be infrastructure that will languish barring unanticipated and continuous public support.

Considering the inherent predisposition toward conflicting motivations among the public and private sectors, the Texas TGV project can be used to demonstrate the challenges faced by the

public sector in assessing the value of a high-speed rail system. As an example, what may be the only documented rate-of-return calculations from revenues listed in Texas TGV's securities offering was made by Ng in 1995, which showed that the project would have been financially unattractive to the private sector if the cost of capital was 15.5 percent (20). Considering that a sizable number of Texas residents blame the state for not financially supporting the Texas TGV, these findings inspire an even closer look at cash flows from the consortium's proposed high-speed rail operations in order to understand how all participants would have fared from the project.

The Cost of Capital

Higgins explains that owners of risky assets should expect to earn a return from three sources: 1) compensation for the opportunity cost of investment; the risk-free interest rate, 2) compensation for the loss of purchasing power over time; the inflation premium, and 3) compensation for bearing risk; the risk premium (28). Since U.S. government bonds consist of a risk-free interest rate plus an inflation premium, a concise form of the cost of capital can be thought of as the long-term interest rate on government bonds plus a risk premium. This nominal cost of capital (COC) is expressed as:

$$\text{COC} = \text{Government Bond Rate} + \beta_e (\text{Excess Return on Common Stock})$$

Historically, annual returns on common stock have exceeded that of government bonds by 7.5 percent (28). While Ng studied the Texas TGV project assuming a long-term rate for government bonds of 7.5 percent, 10-year rates today are closer to 5 percent. Therefore, the cost of capital as a threshold rate of return on the Texas TGV project can be studied using:

$$\text{COC} = (\text{about } 5\% \text{ to } 7.5\%) + \beta_e (7.5\%)$$

The equity beta (β_e) is used in securities analysis to adjust the average risk premium of 7.5 percent according to an individual asset's perceived risk, where $\beta_e < 1.0$ for low-risk investments and $\beta_e > 1.0$ for high-risk investments. A plot of capital costs for several firms is shown in Figure 9, calculated using equity betas from the Investment Data Book by Vestek Systems and a long-term government bond rate of 5 percent. If the Texas TGV project were assumed to be of average risk ($\beta_e = 1.0$), then the cost of investment capital would be about 13 to 15 percent, depending on government bond rates. However, Figure 11 suggests that the risk of a high-speed rail project would be higher than the average investment risk considering that the computer, banking, and electronics industries all have $\beta_e > 1.0$.

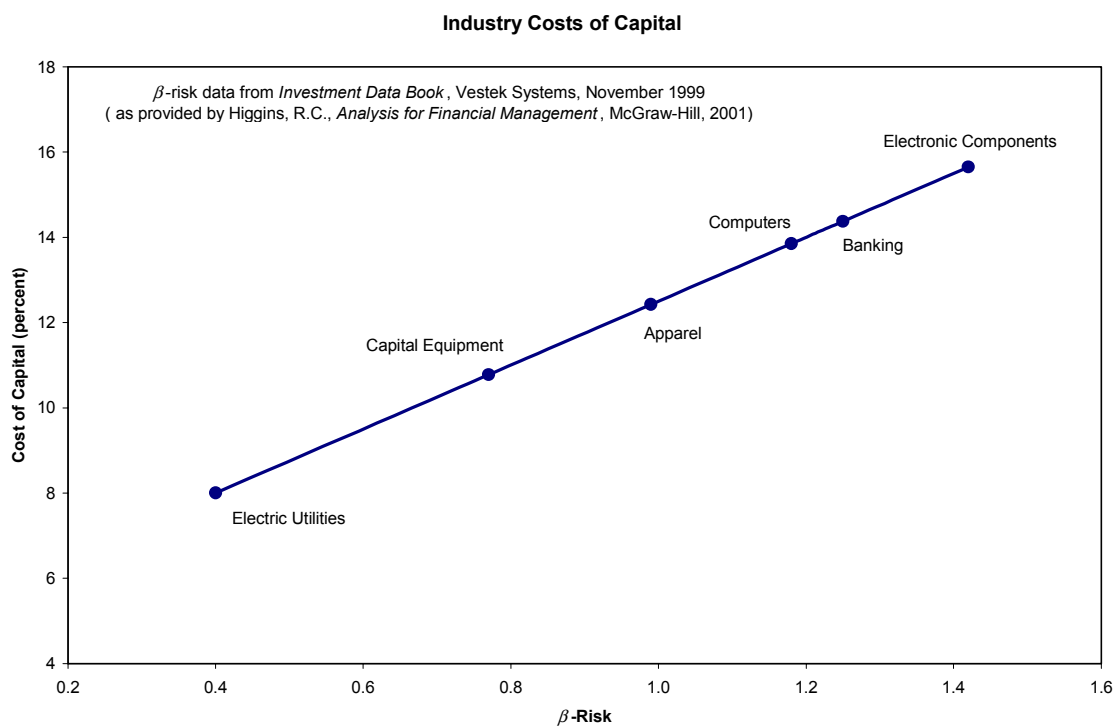


Figure 11. Costs of Capital for Various Industries.

Texas TGV Return on Investment

Release of the Texas TGV Preliminary Offering Circular through S.G. Warburg Securities in November 1993 included the ridership and revenue projections listed in Table 6 (i.e., Charles River Associates' 1993 ridership projections). The schedule of anticipated revenues from this prospectus, together with the revenue projections submitted to the THSRA in Texas TGV's original franchise application (see Table 4), provide two basic scenarios on which to calculate the project's return on investment, where:

- All Texas TGV revenues were expressed in constant (real) 1991 dollars,
- Inflation is assumed to be 3-4 percent, and
- Cash flow analyses are performed assuming the year of release as the base year:
 - January 11, 1991, franchise application cash flows are evaluated in Current Year 1991, and
 - November 29, 1993, offering circular cash flows are evaluated in Current Year 1994 (end-of-year 1993 is assumed to equal beginning-of-year 1994).

Table 6. Ridership and Revenue Forecasts from Texas TGV’s Preliminary Offering Circular (COC = 12%).

Year	Ridership (millions)	Revenue (\$ millions)
2000	4.7	190.4
2001	9.7	402.9
2002	10.7	445.9
2003	12.3	527.3
2004	12.7	545.8
2005	13.0	560.9
2006	13.3	572.4
2007	13.5	583.9
2008	13.8	595.4
2009	14.1	606.9
2010	14.4	618.4
2011	14.6	629.9
2012	14.9	641.4
2013	15.2	652.9
2014	15.5	664.4
2015	15.7	675.9

Source: Texas TGV Preliminary Offering Circular, 1993 (20).

In 1992, Morrison Knudsen had testified in Washington D.C. that public funding would indeed be necessary, despite Bill Agee’s claim to the THSRA one year earlier to the contrary (16). On December 29, 1993, Gil Carmichael, former FRA administrator and senior vice president of the company, explained in the Letter to the Editor section of the *Wall Street Journal* that “the private sector can provide as much as 75% of the money, if the public sector will furnish 25%” (16). Likewise, Texas TGV’s 1993 securities offering assumed that 25 percent of the estimated total cost of \$8.4 billion would be supported through public funds (20). This prospectus stated that the “company estimates that a mix of funds raised from potential sources, as set out in the scenario below, would enable it to fund the estimated total cost of the Project:”

Notes offered hereby	\$0.2
Equity	1.5
Debt	4.6
Public sector transportation programs	<u>2.1</u>
Total	\$8.4”

Enough information was made available in the prospectus to evaluate Texas TGV’s final financial plan by the method shown in Table 7. Based on the Current Year 1994 capital cost of \$8.4 billion, and converting constant 1991 revenues in Table 6 to inflated (nominal) dollars, 1994 present value calculations were made over the project life for a range of potential rates of return, ranging from 4.1 to 15.5 percent. Table 7 shows the results of this method using a particular case that assumes a required rate of return of 12 percent. The values presented in this table are most meaningful by remembering that:

- Revenues begin in Year 2000 and are projected through Year 2015, and are adjusted for the effects of inflation since the discount rates used in NPV calculations (for comparison to the COC) include an inflation premium;

- Each year's revenues are discounted using a 12 percent rate of return in order to determine the viability of the project assuming a threshold rate (COC) also equal to 12 percent;
- Year 1994 begins with a present value balance of -\$8.4 billion, and is gradually reduced by annual revenues; and
- Cumulative NPV adds the 1994 value of all earlier years to the next year in order to identify the year in which the project might break even (NPV = 0).

The analysis in Table 7 shows that the NPV remains negative throughout a 21-year investment period, indicating that a sufficient return could not be earned by the Texas TGV project at a cost of capital of 12 percent. Also, as shown by the cumulative NPV in Year 2015, these calculations indicate that the project would only become feasible to a private investor – assuming a 21-year investment period and a COC of 12 percent – if the public sector were to finance \$5.268 billion (63 percent) of the project cost. These results did not include annual operating costs for the system since, as the prospectus explained, the “operating costs for the System will depend primarily on the volume of passenger traffic using the System.” However, basic operating and maintenance costs were estimated at \$176 million per year in Texas TGV's franchise application – excluding the cost of additional trainsets after Year 2006. The addition of these annual costs would, therefore, reduce the rate of return and increase the amount of public funding needed to attract investors.

Table 7. Present Value of Revenues from the Texas TGV Offering Circular (COC = 12%).

Year	Revenue [1991 \$] (\$ millions)	Inflation Index Year	Inflation Factor	Discount Index Year	Discount Factor	Present Value of Revenues [nominal \$] (\$ millions)	Cumulative Project NPV [nominal \$] (\$ millions)
1991	-	0	1.00	-	-	-	-
1992	-	1	1.03	-	-	-	-
1993	-	2	1.06	-	-	-	-
1994	-	3	1.09	0	1.00	0	(8400)
1995	-	4	1.13	1	0.87	0	(8400)
1996	-	5	1.16	2	0.75	0	(8400)
1997	-	6	1.19	3	0.65	0	(8400)
1998	-	7	1.23	4	0.56	0	(8400)
1999	-	8	1.27	5	0.49	0	(8400)
2000	190	9	1.30	6	0.42	126	(8274)
2001	403	10	1.34	7	0.36	245	(8029)
2002	446	11	1.38	8	0.32	249	(7780)
2003	527	12	1.43	9	0.27	271	(7509)
2004	546	13	1.47	10	0.24	258	(7251)
2005	561	14	1.51	11	0.20	244	(7007)
2006	572	15	1.56	12	0.18	229	(6778)
2007	584	16	1.60	13	0.15	215	(6563)
2008	595	17	1.65	14	0.13	201	(6362)
2009	607	18	1.70	15	0.12	189	(6173)
2010	618	19	1.75	16	0.10	177	(5997)
2011	630	20	1.81	17	0.09	166	(5831)
2012	641	21	1.86	18	0.07	155	(5676)
2013	653	22	1.92	19	0.06	145	(5531)
2014	664	23	1.97	20	0.06	136	(5395)
2015	676	24	2.03	21	0.05	127	(5268)

Table 8 summarizes the percent of public funding for the \$8.4 billion project cost that would be needed to achieve rates of return of 4.1, 8.0, 12.0, and 15.5 percent. As this table shows, even if an 8-percent rate of return were acceptable to investors, \$3.358 billion (40 percent) in public funding would have been needed to produce this return rather than the \$2.1 billion espoused by Texas TGV. A more detailed account of these findings is shown by the cumulative NPVs presented in Figure 12, which illustrates the shortcomings of the Texas TGV project for potential equity investors. While annual revenues begin to reduce the \$8.4 billion debt, only if rate-of-return expectations were reduced to approximately 4 percent would the consortium not have needed external support. Also, Figure 13 shows how an extension of the offering circular's projected Year 2015 revenues to the end of a 50-year period (1994 through 2044) would do little to increase the NPV if the project were to produce, what Texas TGV had initially expected to be, over a 15 percent rate of return without relying on public funding. An attractive rate such as 15 percent would have required revenues beyond Year 2015 to continually increase due to the reduced present value of revenues earned far into the future.

Table 8. Required Public Funding for Assumed Cost of Capital (Offering Circular).

Cost of Capital (percent)	Net Present Value (\$ millions)	Required Public Funding (percent)
15.5	(6266)	74.6
12.0	(5268)	62.7
8.0	(3358)	40.0
4.1	(28)	0.3

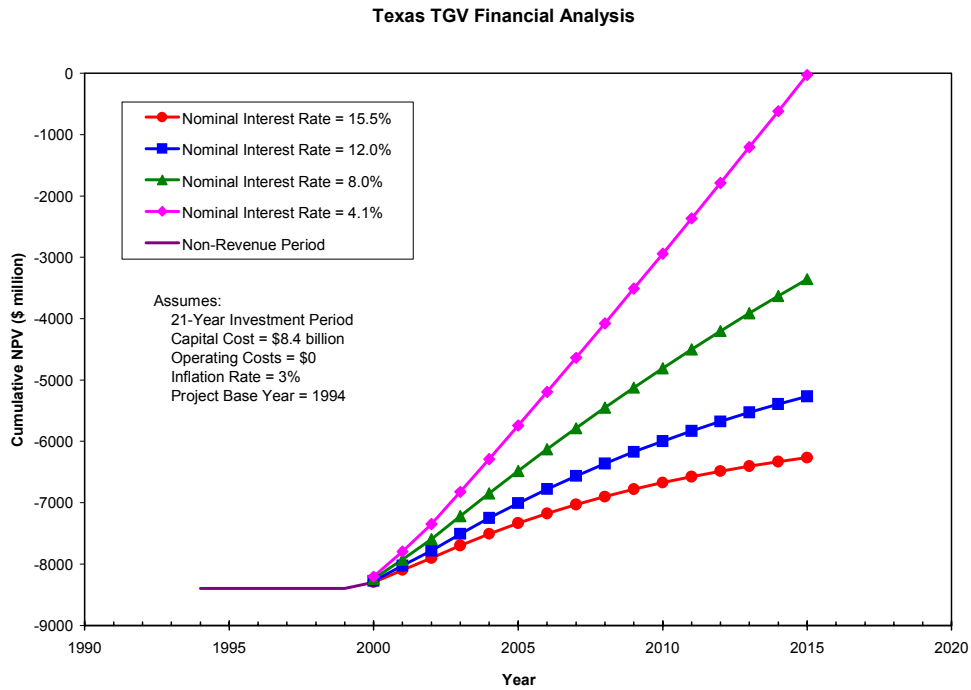


Figure 12. Present Value Calculations Based on Revenues from Texas TGV’s Offering Circular.

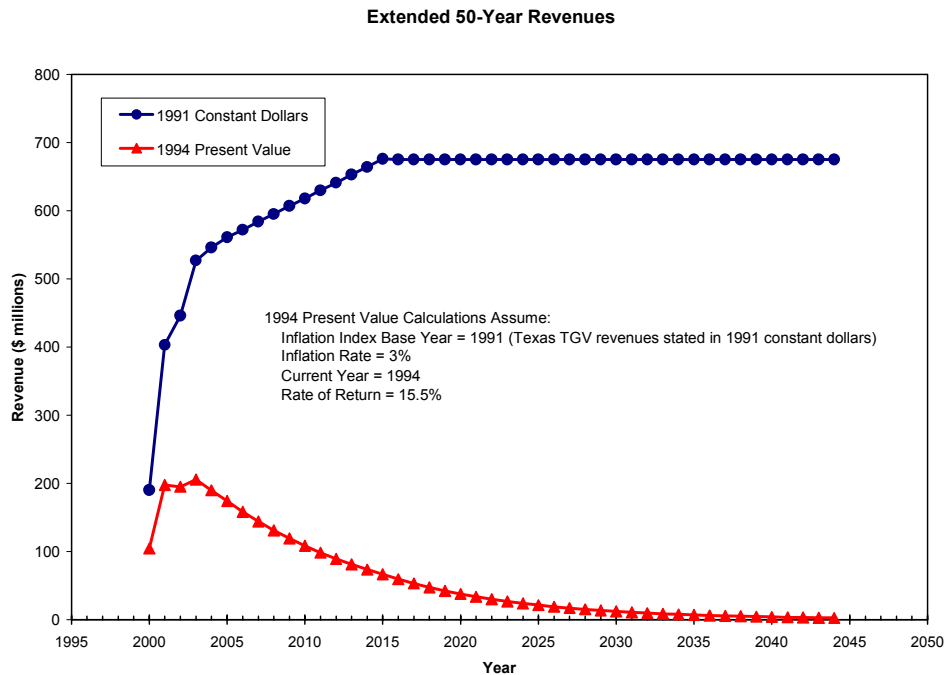


Figure 13. Present Value of Annual Cash Flows Assuming Constant Ridership Beyond 2015.

Of course, this first set of results is based on the revenue projections from Texas TGV’s 1993 Offering Circular and the more conservative projections of the independent ridership study. A similar evaluation was performed to identify the conditions and set of assumptions under which Texas TGV’s 1991 franchise application claimed to offer a 15-16 percent rate of return.

Important observations on the financing plan presented in 1991 include:

- A 22-year annuity of \$27.7 billion added to the Year 2018 cash flow that represented ongoing cash flows through the balance of Texas TGV’s 50-year franchise,
- The absence of financing costs in the statement of cash flows that served as the basis for calculating rate of return, and of course
- Cash flows based on ridership projections that averaged 3.6 million riders per year more than the 1993 independent ridership study, despite the fact that the 1993 study included Houston-San Antonio/Austin traffic while the franchise application did not.

Table 9 lists the annual operating cash flows and capital requirements that Texas TGV projected in its financing plan (from Volume III, pages 9-3, 9-4). The essential components of the financing plan include total cash inflows from operating and other revenues (less operating costs), and total cash outflows from capital expenditures. These cash flows are both listed in Table 9, which excluded financing costs for the project at Texas TGV’s discretion. Calculated project cash flows in Table 9 represent the mathematical sum of cash inflows and cash outflows, whereas project cash flows listed in the franchise application are the cash flows actually reported in Texas TGV’s financing plan. Table 9 also shows that these calculated and reported project cash flows are identical for all years except Year 2018, in which the consortium had embedded a 22-year annuity valued at \$27.7 billion in Year 2018 dollars. The only mention of this annuity

occurred on the last page of the financing plan, where Texas TGV described that “combining these cash flows and adding a 22-year annuity to the 2018 cash flow number to represent ongoing cash flows through the balance of the 50 year franchise allow the project’s internal rate of return to be calculated;” this rate of return was reported to be 16 percent.

Table 9. Description of Cash Flows in the Texas TGV Franchise Application.

Year	Operating Cash Flow [Nominal \$] (\$ millions)	Capital Requirement [Nominal \$] (\$ millions)	Calculated Project Cash Flow [Nominal \$] (\$ millions)	Project Cash Flow Listed in Franchise Application [Nominal \$] (\$ millions)	Difference in Calculated and Reported Cash Flows [Nominal \$] (\$ millions)
1991	0.0	(8.2)	(8.2)	(8.2)	0
1992	0.0	(22.4)	(22.4)	(22.4)	0
1993	0.0	(37.7)	(37.7)	(37.7)	0
1994	0.0	(91.2)	(91.2)	(91.2)	0
1995	10.7	(704.4)	(693.8)	(693.8)	0
1996	31.4	(1689.1)	(1657.7)	(1657.7)	0
1997	17.4	(1897.7)	(1880.3)	(1880.3)	0
1998	(13.7)	(751.1)	(764.9)	(764.9)	0
1999	156.6	(8.5)	148.1	148.1	0
2000	520.4	(18.2)	502.2	502.2	0
2001	664.9	(7.2)	657.7	657.7	0
2002	741.9	(3.8)	738.0	738.0	0
2003	816.1	(3.7)	812.4	812.4	0
2004	890.2	(3.7)	886.5	886.5	0
2005	970.4	(4.0)	966.4	966.4	0
2006	1057.4	(270.9)	786.5	786.5	0
2007	1137.2	(66.4)	1070.8	1070.8	0
2008	1238.5	(70.0)	1168.5	1168.5	0
2009	1348.2	(11.0)	1337.2	1337.2	0
2010	1466.9	(14.5)	1452.3	1452.3	0
2011	1575.6	(332.7)	1242.9	1242.9	0
2012	1674.7	(84.0)	1590.6	1590.6	0
2013	1798.6	(92.6)	1706.1	1706.1	0
2014	1931.4	(96.5)	1835.0	1835.0	0
2015	2073.6	(394.4)	1679.2	1679.2	0
2016	2205.5	(110.0)	2095.6	2095.6	0
2017	2367.7	(30.7)	2337.0	2337.0	0
2018	2541.4	(32.2)	2509.2	30214.3	27705
Rate of Return Stated in Franchise Application				16%	

Texas TGV’s 16 percent rate of return was verified by using the same method of calculating present value that was applied to the data in Table 7. Figure 14 shows the effect of discounting each cash flow (Table 9) by 15.78 percent on the cumulative present value, and illustrates how the large annuity in Year 2018 yields a NPV = 0 in that year. Without this annuity the cumulative present value would continue to plateau in a NPV range considerably less than zero. On the other hand, Figure 14 also shows that the NPV of Texas TGV’s annual cash flows would equal zero in Year 2018 without the annuity when discounted at a rate of 13.1 percent; thus illustrating how the barely mentioned annuity increased the rate of return by almost three percent

when added to the last year of the cash flow schedule. In order to understand the basis of the 22 -year annuity, its value was expanded into an equivalent annual worth for Years 2019-2040 using the following equation:

$$A_{2019-2040} = P_{2018} \frac{i(1+i)^N}{(1+i)^N - 1}$$

Where,

- $A_{2019-2040}$ = Equivalent annual value in years 2019-2040
- P_{2018} = Annuity in Year 2018 (\$27.705 billion)
- i = Discount rate (15.78%)
- N = Number of years of annuity (22 years)

By applying the annuity equation above, Texas TGV’s financial plan indicated that a nominal value of \$4.372 billion was assumed between Years 2019-2040. This result was used to extend the nominal cash flow values in Table 9 into a 50-year schedule, as shown in Figure 15 that reveals a dramatic increase in the overall cash flow trend and a 74 percent increase from Year 2018 to Year 2019. The nominal 50-year cash flows were then converted to 1991 current dollars in order to evaluate what Texas TGV was essentially projecting as ridership trends in Years 2019-2040 – assuming that the series of cash flows projected in 1991 dollars would continue to be closely correlated to ridership.

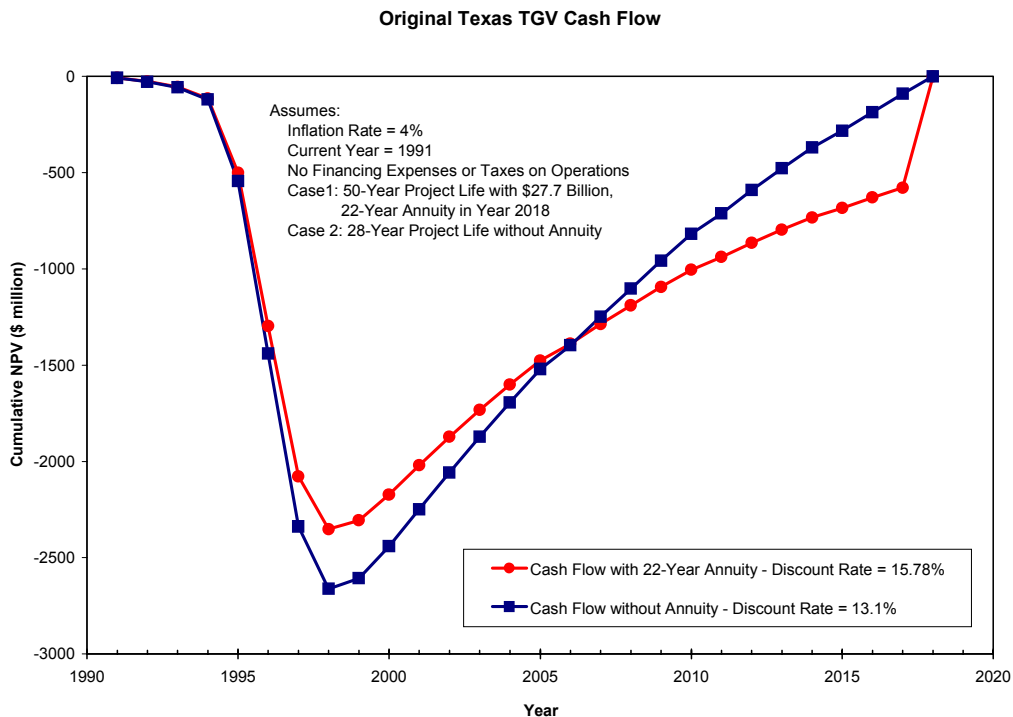


Figure 14. Present Value Calculations Based on Cash Flows from Texas TGV’s Franchise Application.

Figure 15 reveals an overall discontinuity in the current-dollar cash flow trend and a 68 percent increase from Year 2018 to Year 2019, inferring that a significant increase in revenues and, therefore, ridership would have been required. In general, the basis for a dramatic rise in expected cash flow in Year 2019 might be attributable to: 1) the assumption that Houston-San Antonio/Austin high-speed rail service would begin, or 2) some other unexplained assumption. Even though Texas TGV only included revenues from ridership in the Houston-DFW and San Antonio/Austin-DFW corridors in their application, the ridership study upon which these revenues were based had also calculated projections for the Houston-San Antonio/Austin corridor. Since ridership in the Houston-San Antonio/Austin corridor would have only provided a 25 percent increase to that projected for the other two corridors in Year 2018, it seems unlikely that the addition of the southern route would have created a 68 percent increase in cash flow. Furthermore, Texas TGV's 16-percent rate of return in the financing plan was accompanied by the declaration that "no public grants or credit support are contemplated to finance these project cash flows," suggesting that a significant cash outflow would have been incurred by the consortium prior to Year 2018 for the construction of Phase 4. Therefore, basing the large value of the 22-year annuity on anticipated traffic in the Houston-San Antonio/Austin corridor seems invalid, so its derivation remains unexplained.

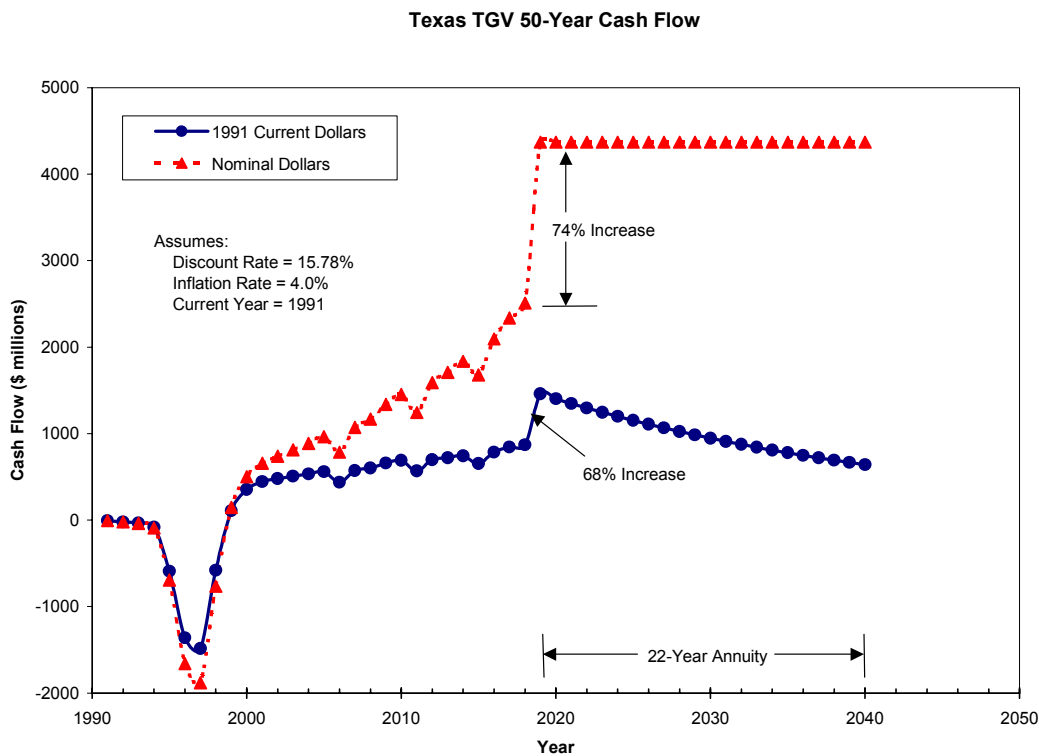


Figure 15. Texas TGV Annual Cash Flows with Equivalent 22-Year Annuity.

Positioning to Avoid Risk

A May 4, 1994, meeting of the HSRA focused on public-private rail partnerships, during which Gil Carmichael acted as spokesman for Morrison Knudsen and Bill Agee on the Texas TGV project. Carmichael continued to assert that 25 percent public financing would move the project forward (29). Eager to see the Texas TGV become a success, he pointed to the collective wisdom of participants in a similar high-speed rail project that was being promoted in Florida at the time, and noted that “the High Speed Rail Authority in Florida paid its dues, the High Speed Rail Authority in Texas and even the high speed project here in California back in the early 80s, is part of our dues that we’ve paid.” The point being made to attendees was that the Texas TGV consortium wanted to build the project, but past experiences had proven that financial risks needed to be shared. Specifically, the attendees were told, “we now know that there must be a partnership between the private sector and the State of Texas, and particularly the Texas DOT.”

In a separate session of the 1994 meeting, Bob Ryan, director of the Texas TGV project for Morrison Knudsen, indicated that the project’s demise would also result from a lack of commitment by its private partners, whom Morrison Knudsen believed should assume their share of the responsibility for its funding. He explained, “Without the sharing of responsibility for funding with the industrial partners, Morrison Knudsen found necessary to revise their view of the project. They are unable to continue to singly undertake the risks for the project and to carry the project forward” (29). However, Ng’s study of the shareholder arrangements in Texas TGV’s 1993 Preliminary Offering Circular provides more detail about these risks than was presented to the HSRA.

As Appendix A notes, the THSRA first required Texas TGV to demonstrate equity financing commitments of \$170 million (\$60 million by consortium members and \$110 million by outside investors) by December 31, 1992, and then extended this deadline to December 31, 1993. According to the November circular, the consortium had planned to offer up to \$200 million in 3 percent bonds due in Year 2000 and backed by a \$225 million letter of credit from the Canadian Imperial Bank of Commerce (20). As Ng points out, the preliminary offering circular stipulated that Morrison Knudsen would provide the bank with a counter guarantee of \$75 million plus accrued interest that, if Morrison Knudsen was required to pay, would entitle the company to ownership of a series of preferred stock having liquidation preferences over all other stockholders. The circular also gave Morrison Knudsen, as guarantor, authority over annual operating budgets and complete control over the distribution of assets upon liquidation (20).

Despite the fact that the November 1993 offering was only for the issuance of bonds covering \$200 million of the \$8.4 billion high-speed rail project, Morrison Knudsen apparently required a significant share of assets to come from its industrial partners while retaining rights to all such assets in the event of liquidation proceedings. Most likely, all participants took action to avoid risk as the December 1993 deadline approached – first Morrison Knudsen, by requiring protective stockholder clauses as the ultimate guarantor of the bonds; then its industrial partners, by avoiding the situation of becoming stockholders with no liquidation rights; and finally Morrison Knudsen again, by preferring not to carry all of the financial burden or its obvious risks. Based on the financial analyses of, what appears to have been, rather optimistic cash flow projections and the poor investment potential that they would seem to have provided, there is sufficient evidence to explain why there was a great deal of interest in building and equipping the

high-speed rail system but little interest in backing the bonds that were required to pay for these activities. In fact, Texas TGV's president indicated in April 1994 that the consortium would like to transfer ownership of the franchise to another entity and then continue working on the project. The THSRA deemed this strategy as an unviable option, and by the summer of 1994 Texas TGV had abandoned efforts to bring in new shareholders and had written off its \$14 million investment in the high-speed rail project as a loss (16).

CHAPTER 4 – EVALUATING FUTURE HIGH-SPEED RAIL PROPOSALS

The analysis of previous efforts to bring high-speed rail to Texas indicates that the public sector is faced with several challenges in discerning between valid and invalid assumptions, feasible and unfeasible projects, and biased and unbiased decision-making processes. A review of the process that led to the Texas TGV franchise also illustrates how the pursuit of high-speed rail thus far has been affected by a mandate for privately financed rail ventures; that is, the state has shown considerable tolerance for the omission of details and for optimistic claims on the part of franchise applicants due to the absence of public-sector financial risk.

The assessment of Texas TGV’s 1991 franchise suggests that the consortium would have had little opportunity to generate revenues that would reward investors sufficiently even if 25 percent of the project were financed using public funds. Therefore, in this particular case, the Legislature’s insistence on a privately financed venture most likely saved the public considerable expense. Despite the protection against public risk and an eventual prevailing of the free market, the state may wish to reexamine the “laissez-faire” approach to future high-speed rail proposals in order to: 1) avoid becoming a facilitator of unfeasible business ventures, and 2) determine whether the project can be relied upon to meet the public’s needs. While the private sector will certainly be needed to advance high-speed rail proposals to any considerable length, the state should begin to develop concept-stage screening techniques that assess a project’s value to both financial investors and the public. For example, the state should not only be able to gauge the degree of accuracy in ridership and revenue projections, but should also be able to predict the degree to which these projections would result in a project that is attractive to investors.

The Cost of High-Speed Rail

At the time of Texas’ last high-speed rail proposals, the Transportation Research Board (TRB) had qualified its efforts in 1991 to estimate capital costs for high-speed rail by noting that there existed no experience with constructing and operating these systems in the U.S. (30). Even though, the TRB was able to prepare capital cost estimates for 200- 300- and 400-mile corridors, incorporating economies of scale into these assumed lengths. Table 10 lists TRB’s estimated capital costs for six train service speeds operating on a 200-mile high-speed rail corridor.

Table 10. Capital Cost of a 200-Mile High-Speed Rail Corridor.

Maximum/Average Train Speed (mph)	Capital Cost (\$ million/mile)	
	1991 Dollars	2004 Dollars
79 / <79	0.82	1.13
110 / <110	2.67	3.67
125 / 90-100	10.25	14.08
150 / 100-120	12.96	17.81
180-200 / 120-150	17.76	24.40
250 / 170-200 (Maglev)	32.07	44.06

Source: *In Pursuit of Speed: New Options for Intercity Passenger Transport*, TRB (30).

The costs in this table have also been inflated to Year 2004 dollars – assuming an average annual consumer price index (CPI) of 408.0 and 560.6 for Years 1991 and 2004, respectively – in order to contrast the potential for increased costs over time. Christiansen had noted the exponential relationship of capital cost to train speed almost three decades ago, and Figure 16 shows that the TRB estimates continue to reflect these constraints on technology (19). This log-log plot of speed/cost relationships illustrates how a change in maximum train speed by an order of magnitude can increase the cost per mile by two orders of magnitude (30).

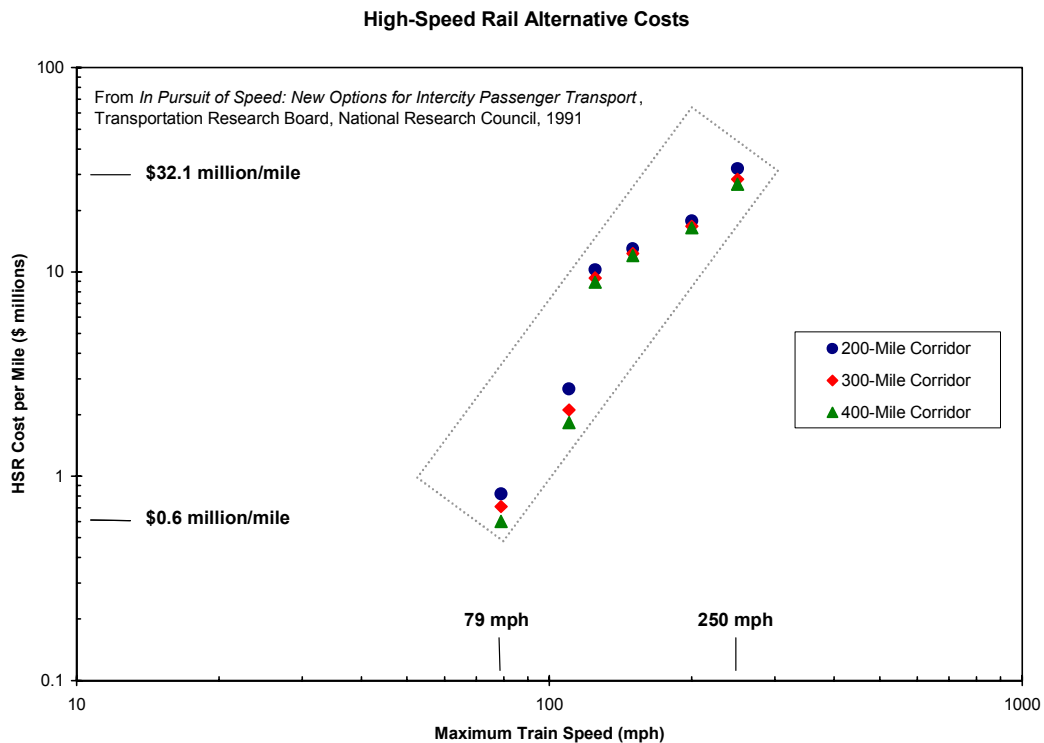


Figure 16. Relationship between Train Speed and Capital Cost.

The six train speeds listed in Table 10 assume the following:

- The 79-mph rail service assumes that no new land is purchased, and that an existing Class 3 track is upgraded in order to achieve the higher train speed. Service in excess of six round trips per day requires the construction of new sidings so that both freight and passenger trains can continue to use the system.
- Upgrading to 110-mph rail service requires further upgrading of track, improved grade crossing protection, new sidings, rehabilitation of urban terminals, and new rolling stock. Service in excess of 10 round trips per day would require additional improvements.
- Upgrading to 125-mph rail service requires the construction of a double track and electrification of the system. All grade crossings would be closed or grade separated, and additional right-of-way would be purchased to reduce track curvatures, which would in turn require the construction of new bridges. Trains could be scheduled at half-hour intervals and both freight and passenger trains could use the track.

- Upgrading to 150-mph rail service requires the construction of major bypass alignments to the 125-mph system and the elimination of freight service.
- Providing rail service at speeds greater than 180 mph on traditional rail requires the construction of a new rail line, except in urban areas.
- Maglev requires the construction of a new guideway between cities on dedicated right-of-way, and contains portions of single and double track (30).

Capital costs from each of the proposals for high-speed rail service in Texas are summarized in Table 11 so that the estimates presented to the state can be evaluated relative to those published by the TRB. The four proposals in this table anticipated the use of 180-200 mph rail technology, which the TRB estimated would cost approximately \$17.76 million per mile in 1991 current dollars. However, the ranges and averages for each corridor in the Texas Triangle (1991 current dollars) are as follows:

- Houston-DFW
 - Range = \$8.35-\$11.05 million/mile
 - Average = \$9.84 million/mile
- San Antonio/Austin-DFW
 - Range = \$7.70-\$9.50 million/mile
 - Average = \$8.40 million/mile
- Houston-San Antonio/Austin
 - Range = \$6.63-\$11.12 million/mile
 - Average = \$9.20 million/mile

Table 11. Capital Costs of High-Speed Rail Systems Proposed for Texas.

Project/Corridor/Design Speed	Name	Length (miles)	Capital Cost (\$ millions)	Unit Cost (\$ million/mi)	Unit Cost [1991\$] (\$ million/mi)
Texas FasTrac (1991\$) – 200 mph					
Hou-DFW	Line 1	306	3,382	11.052	11.052
SA/Austin-Waco	Line 2	194	1,844	9.504	9.504
Hou-SA/Austin	Line 3	160	1,578	9.860	9.860
Texas TGV (1991\$) – 200 mph					
Hou-DFW	Phase 1	256	2,502	9.774	9.774
SA-Navarro Jct.	Phase 2	215	1,718	7.993	7.993
DFW Airport-FW	Phase 3	21.4	0.138	6.435	6.435
Hou-SA/Austin	Phase 4	130	1,444	11.105	11.105
TTA Study (1988\$) – 200 mph					
Hou-DFW	Stage 1	279	2,023	7.250	8.349
Hou-SA/Austin	Stage 2	213	1,411	6.626	7.631
SA/Austin-DFW	Stage 3	126	0.958	7.697	8.864
German Study (1985\$) – 185 mph					
Hou-DFW		244	1,921	8.041	10.182

This comparison indicates that the state was presented with capital costs for 180-200 mph rail service that were approximately one half of the TRB’s own per-mile cost estimate, which could mean that: a) the TRB estimate was high, b) cost estimates in the proposals were low, or c) rail service speeds in each proposal were overstated. If the 1991 TRB estimates were in fact

realistic, then the cost estimates in each proposal were more in line with operating speeds of 125-mph rail service; and if ridership projections were based on overestimated train speeds, then this would have contributed to overly optimistic forecasts. Therefore, until a long-distance high-speed rail line is actually built that allows for historic cost data to be incorporated into plans for similar infrastructure in Texas, the state should be well justified in adopting concept-stage screening techniques based on their own assessments of cost.

Concept-Stage Feasibility Analysis of High-Speed Rail

The feasibility of high-speed rail projects has historically been developed by conducting a ridership study and then using the revenue associated with this ridership to prove the project’s attractiveness as a financial investment. Not only do these ridership studies require a great deal of time and money to perform, but their accuracy can also be rather difficult to evaluate. Figure 17 contrasts the Houston-DFW ridership projections of the Texas FasTrac and Texas TGV franchise applications to the apparent volume of Year 2002 air travel in this corridor (3 million passengers). The fairness of a comparison such as this is substantiated by Texas TGV’s claim that the high-speed rail system would offer its greatest appeal to air travelers. Figure 17 includes Texas TGV’s projection of 6.6 million passengers and Texas FasTrac’s projection of 5.3 million passengers (intercity plus commuter) for Year 2002, which is in considerable contrast to the total passenger travel by airlines in that year.

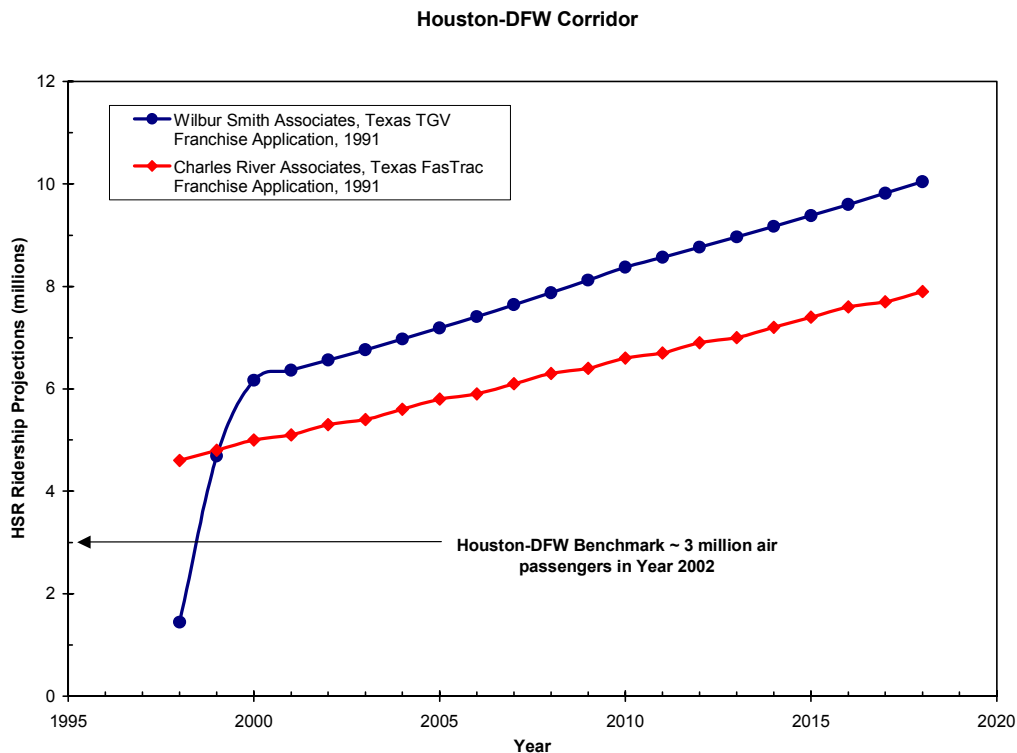


Figure 17. Texas TGV’s High-Speed Rail Ridership Projections for Houston-DFW.

Furthermore, the vast disparity between capital cost estimates for rail service by the TRB and those of previous proposals indicates that any future estimate presented to the state could be subject to similar error or uncertainty. Regardless of the conclusions that may be drawn from the speculative nature of data, the fact remains that rail studies usually require a sizable effort to prepare and then to review. Public-private financial partnerships only increase the demands of the review process since the state cannot truly know whether an equitable alliance has been formed unless it has determined:

- the validity of ridership, revenue, and cost estimates;
- the value of high-speed rail service to the state;
- a reasonable estimate of the private sector's rate of return; and
- the effects of public funding to project viability.

As an alternative to relying on the traditional method of assessing high-speed rail feasibility, the public sector may find it useful to identify on its own a set of criteria that would make a rail venture reasonably attractive to both the public and private sectors. In this regard, the concept-stage investigation would begin with a relatively quick and inexpensive effort to establish parameters such as:

- cost of investor capital for use as a threshold rate of return;
- expected average train speed and service times;
- cost per mile of available technology;
- transportation corridors to be served;
- competitive ticket pricing; and
- percentage of project cost that might be publicly funded.

Once the project parameters for a proposed high-speed rail corridor have been established, a simple analysis can be performed to determine the daily or annual volume of passenger travel that would be required to meet the selected criteria. The number of passengers required for project viability can then be compared to benchmark data (i.e., air travel, vehicle traffic, etc.) that is most representative of the segment of traffic that rail service hopes to capture. By using historic data as a benchmark, project viability can be assessed relative to proven transportation statistics rather quickly, allowing public officials to determine whether to begin pursuing a detailed analysis of a specific project in cooperation with the private sector.

Analysis of the Houston-DFW Corridor

The Houston-DFW corridor has been selected to demonstrate the usefulness of investment parameters and benchmark data in the evaluation of the high-speed rail technologies listed in Table 10. Texas FasTrac's Houston-DFW route (Figure 3) is used since it incorporates stops at Bryan/College Station and Waco into the corridor, similar to that of the Texas High Speed Rail

& Transportation Corporation’s Texas T-Bone network. In this example, a conceptual evaluation of the corridor is performed by assuming the following investment parameters:

- rate of return threshold = 9%, where a 3% inflation premium has been deducted from a 12% COC (Class I railroad COC = 12%) since the results of analysis are expressed in fixed-year terms,
- TRB cost data (1991 dollars),
- investment period = 20 years,
- Houston-DFW airfare = \$80.00, and
- corridor length = 253 miles (from Texas FasTrac franchise application).

A simple computer program was built to evaluate the effects that ticket price and public funding levels have on providing rail service at five of the six train speeds listed in Table 10. As a benchmark, Year 2002 air travel between Houston-DFW (3 million passengers) was used to gauge the feasibility of each technology by expressing the ridership required to achieve the investment criteria as a percent of Year 2002 air travel. Using a relatively modest 9 percent rate of return percent and 1991 technology prices, the feasibility of each technology was compared at public funding levels ranging from 0-50 percent, as shown in Figure 18. According to the results shown in this figure, Maglev technology would require a ridership of 2-3.7 times existing air travel in order for private investment to be considered – of course, this is without including operating and financing costs. On the other hand, a rail system operating at speeds of 150 mph or less appear to hold some promise as viable projects.

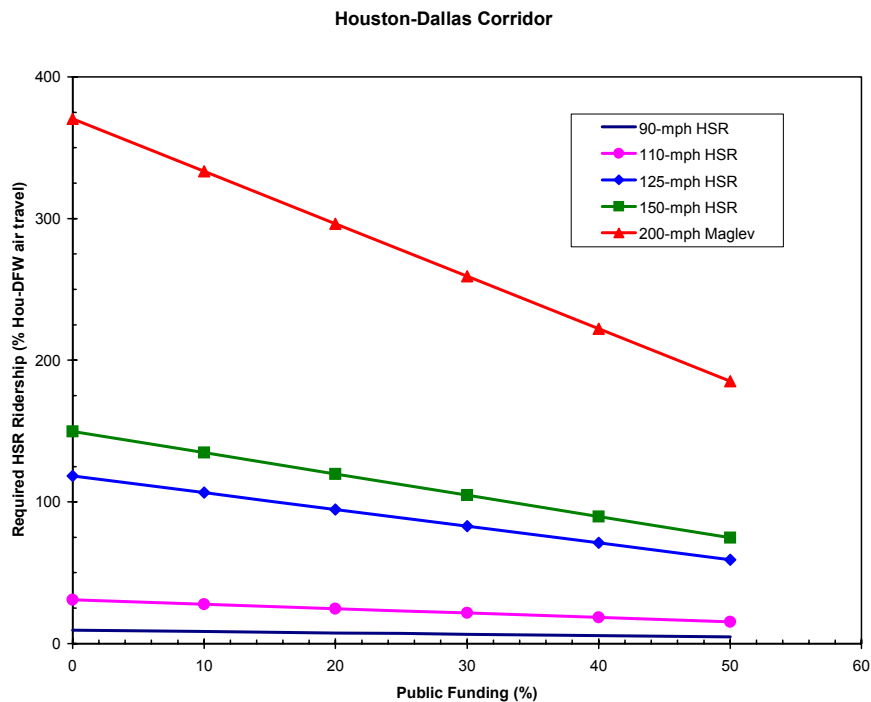


Figure 18. Comparison of High-Speed Rail Technology in the Houston-DFW Corridor.

The analysis shown in Figure 18 does not consider travel time or ticket price, which are both significant components of any rail marketing strategy. The high-speed rail proposals reviewed herein based ridership projections on ticket prices ranging from 50-90 percent of competing airfares. Therefore, the analysis presented in Figure 18 has been modified to reflect similar variations in ticket prices, as shown in Figures 19-23.

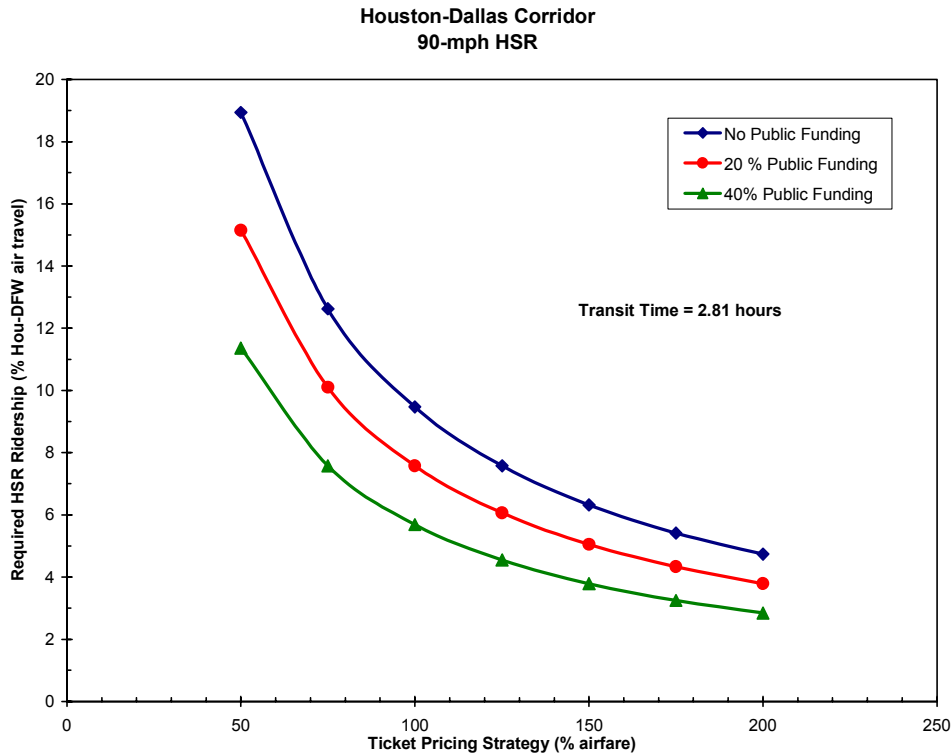


Figure 19. Required Ridership for 90-mph HSR in the Houston-DFW Corridor.

In Figure 19, the feasibility of using 90-mph technology is shown to need the equivalent of only 6-20 percent of existing air travel, depending on ticket price and amount of public funding. Operating trains at 90 mph over a 253-mile corridor would result in transit times of approximately 2 hours, 50 minutes between Houston and DFW, which would probably make this level of service unattractive to consumers without significantly discounting ticket prices. Unfortunately, discounting the ticket price reduces overall revenues and, thus, requires larger numbers of riders to maintain a 9 percent rate of return.

Figure 20 shows that the equivalent of up to 50 percent of existing air travel would be needed to make 110-mph technology attractive to investors if ticket prices are kept below the cost of airfare. Operating trains at this speed would result in transit times of approximately 2 hours, 20 minutes between Houston and DFW, roughly half an hour faster than the 90-mph technology. This level of service might be attractive to consumers if boarding times at train stations could be kept significantly lower than those at airports.

Figure 21 shows that the ridership required to earn a 9 percent rate of return using 125-mph technology could exceed the availability of potential customers, ranging from 70-200 percent of existing air travel. Although, a travel time of approximately 2 hours certainly increases the attractiveness of high-speed rail as an alternative mode of travel, and there could be hope for this technology if variables such as population growth, short boarding times, and the favorable location of train stations could significantly grow the customer base.

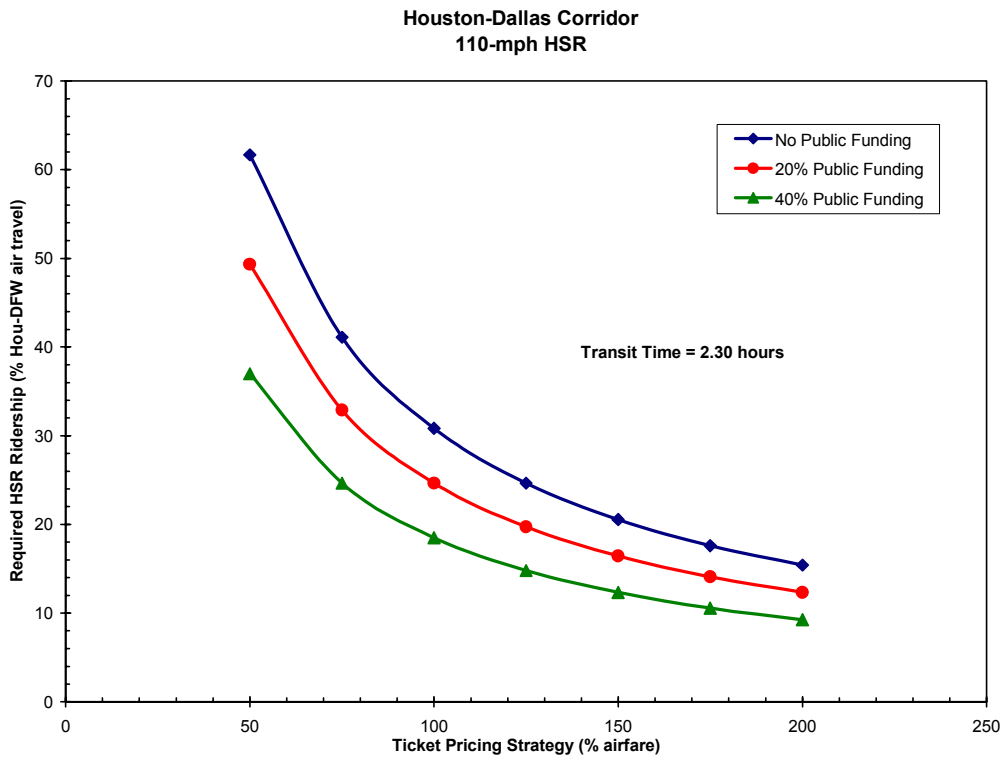


Figure 20. Required Ridership for 110-mph HSR in the Houston-DFW Corridor.

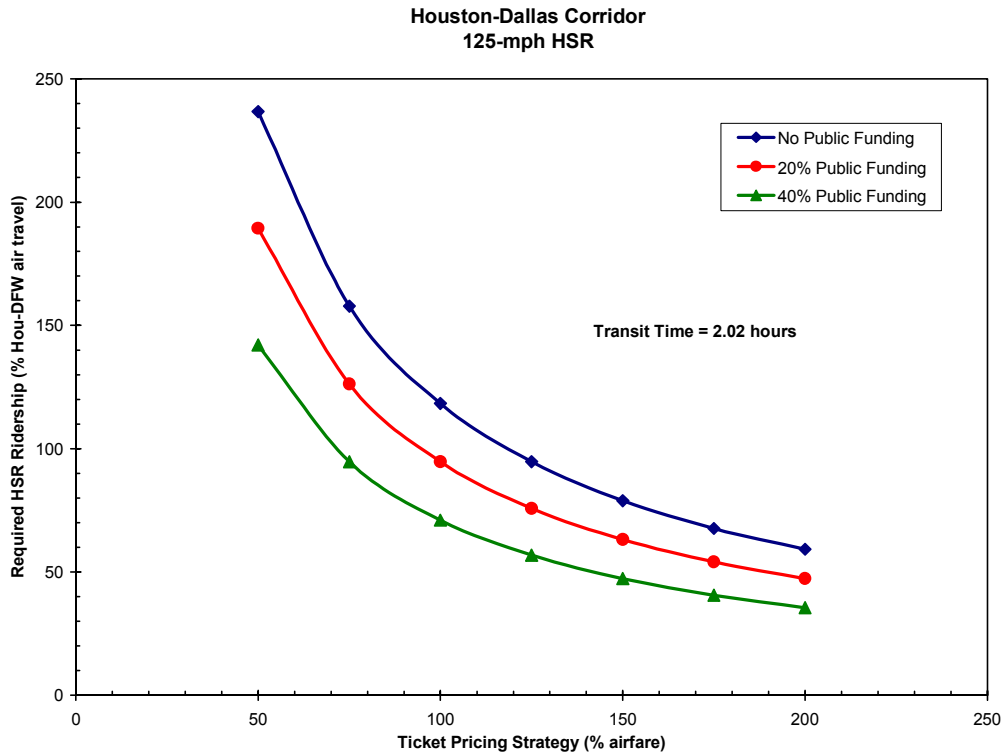


Figure 21. Required Ridership for 125-mph HSR in the Houston-DFW Corridor.

Figure 22 shows that the ridership required to earn a 9 percent rate of return using 150-mph technology begins to exceed hope, ranging from 100-300 percent of existing air travel. Since 300 percent of air travel, or approximately 9 million passengers per year, is greater than all existing air travel plus all likely automobile travel on I-45, the benefits associated with this technology might never offset its risks.

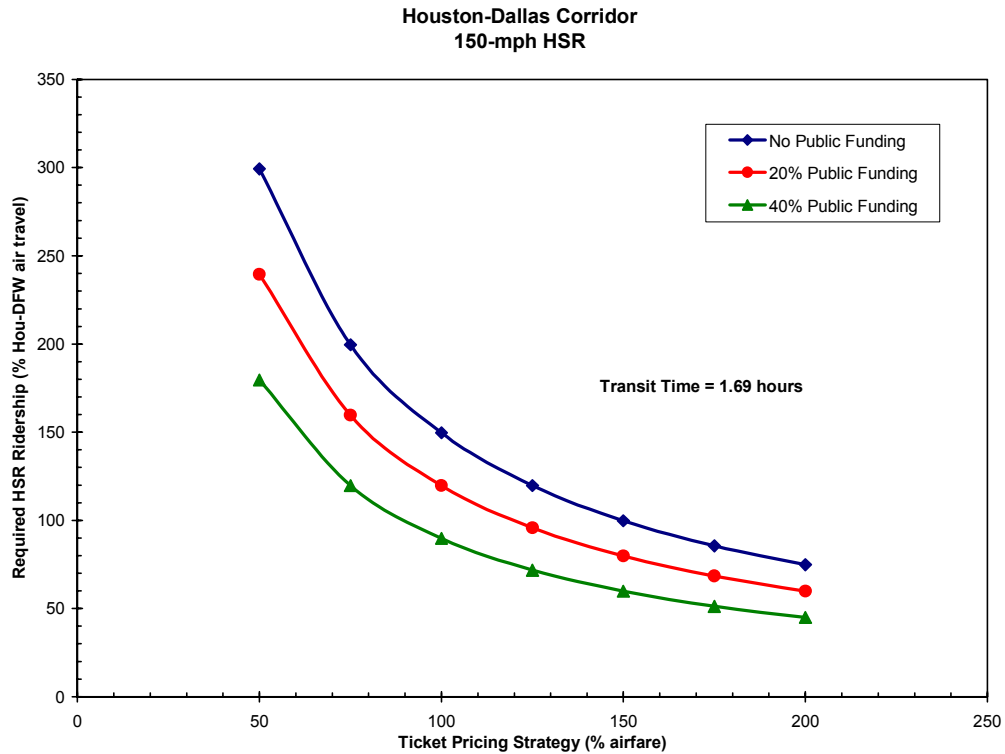


Figure 22. Required Ridership for 150-mph HSR in the Houston-DFW Corridor.

Finally, Figure 23 shows that ridership on a Maglev system could require the equivalent of about 250-700 percent of existing air travel, depending on the amount of public funding. Even if the public sector financed 40 percent of the \$8.11 billion project, ridership might need to equal about 250-300 percent of existing air travel in order for investors to earn a 9 percent rate of return. While a transit time of 1 hour, 15 minutes between Houston and DFW is very appealing, this technology would appear to come with great risk due to the uncertainty of which service at this speed could increase the customer base.

Overall, this analysis demonstrates how the state can quickly perform concept-level screening to assess the attractiveness of high-speed rail projects to investors, and under what conditions they would be feasible. For example, transportation officials might decide that 110-125 mph rail service has the best chance of competing with other modes on a time basis, relies upon plausible ridership volumes, and would earn investors a reasonable rate of return. If so, they could devote further investigations to obtaining more accurate costs and ridership projections; and could begin determining the environmental impact of right-of-way usage and train operations. This approach could also be refined further to incorporate additional information – such as boarding times at terminals, rail operating expenses, and project financing expenses – in order to provide more detail in the concept screening process and a better indication of whether to proceed with a detailed project investigation.

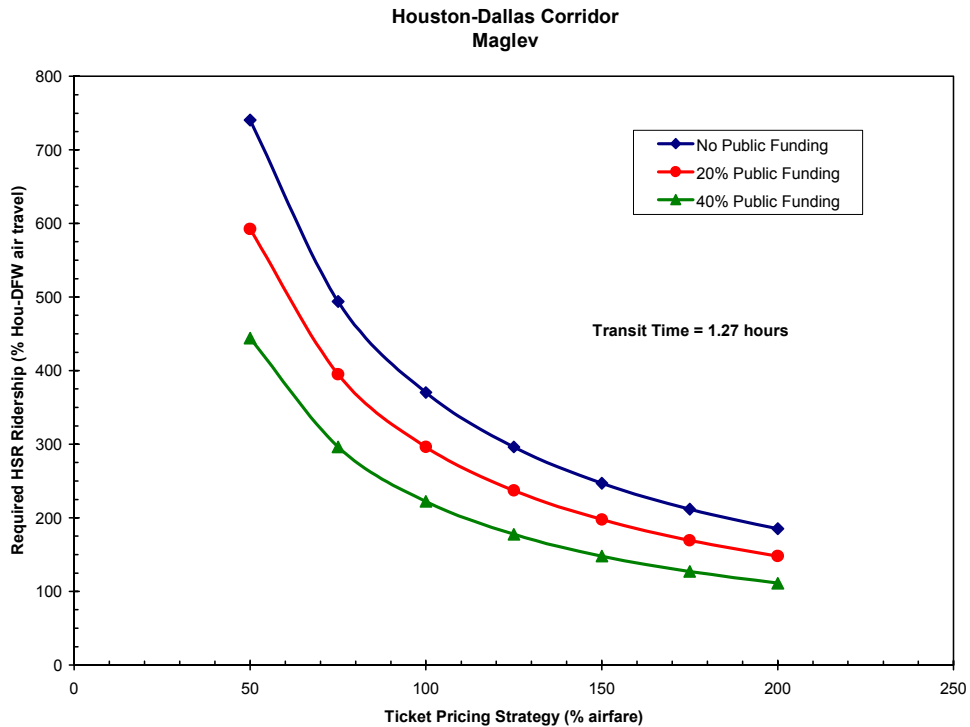


Figure 23. Required Ridership for Maglev in the Houston-DFW Corridor.

Public Financing of Rail Projects

Figures 19-23 considered the potential for public financing of a Houston-DFW high-speed rail corridor in order to show that multimodal projects may only be feasible with public support. The prohibition of expending public funds on rail projects could, therefore, eliminate a considerable number of rail projects from consideration as solutions to the state’s transportation problems; and continuing to promote those projects as private-only ventures could facilitate projects that places investor money at great risk (i.e., holders or guarantors of revenue bonds). On the other hand, there may be instances where the state stands to gain from certain quantifiable benefits of a rail project that would justify a degree of public financing, and would make the project attractive to private investors. Figure 24 shows how public-sector benefits and private-sector rate of return can be assessed simultaneously to identify a range of public funding scenarios that could lead to project feasibility in a public-private partnership. This type of analysis could extend the basic methodology used to prepare Figures 19-23 into a more detailed and transparent process that provides confidence among all participants in a rail venture.

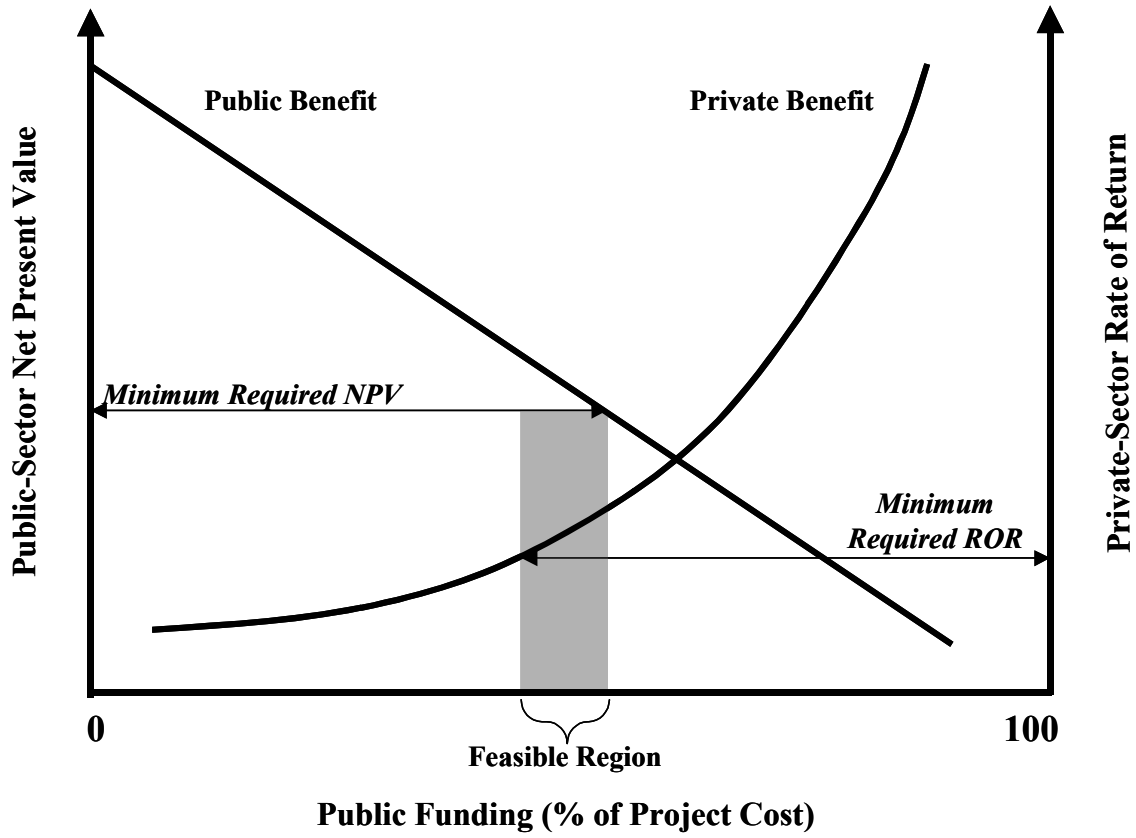


Figure 24. Recommended Approach to the Analysis of Public-Private Rail Partnerships.

CHAPTER 5 – CONCLUSIONS AND RECOMMENDATIONS

As the end of the Texas TGV franchise loomed near, the THSRA’s chairman advised that every aspect of the project – from funding and technology, to the actual route – would have to be re-evaluated from the start if high-speed rail was ever to be a success (16). And while this assessment will need to be performed based on Texas’ own transportation issues and regulatory requirements, the unfolding of events throughout the U.S. continues to place the state’s own difficulty in building a high-speed rail system in greater context. In southern California, the failed private venture to build a new high-speed rail line between Los Angeles and San Diego in 1983 was followed with a successful public-private partnership between the railroad industry and transportation agencies to create Metrolink, a 79-mph commuter rail system that operates on existing railroad trackage and now extends throughout six Los Angeles-area counties. Public officials in the late 1980s recognized that right-of-way was a diminishing resource and that the development of transportation infrastructure should focus on using existing facilities more efficiently (29).

The Florida High Speed Rail Transportation Commission (FHSRTC) had planned to award a high-speed rail franchise by 1991 – simultaneous to the Texas TGV project – for a Tampa-Orlando-Miami system (31). Realizing that passenger revenues would not cover both capital and operating costs, the High Speed Rail Transportation Act of 1984 had been written to grant real estate development rights and related revenues to the eventual franchisee. Revitalized efforts to bring high-speed rail to the state now include a much more liberal financing plan according to findings by the 2004 Florida High Speed Rail Authority (FHSRA) that both state and federal financial commitments are essential to the success of the project (32). In return for the government paying infrastructure costs for a Tampa-Orlando system, the private partner (Flour-Bombardier) is willing to assume construction cost overruns and obligations on revenue bonds that are used to finance rolling stock. In other words, efforts in Florida have progressed from a privately funded project with real estate and ridership revenue incentives to one in which the private sector’s commitment consists of guaranteed prices for construction/rolling stock and the assumption of some financial risk associated with operations. What is not clear from the schedule of “net annual costs to the state” in Appendix B is whether these cash flows are expressed as net *present* values. If not, applying a simple public discount rate of about 3.6 percent to this cash flow would suggest that the actual net present value to Florida is a net loss of \$374 million instead of a \$176 million gain; further demonstrating how the absence of details and appropriate terminology in high-speed rail reports leads to confusion in the assessment of their meaning.

Despite the Pennsylvania High Speed Intercity Rail Passenger Commission’s conclusion in 1988 that a \$10 billion Maglev system between Pittsburgh and Philadelphia was the most feasible high-speed technology and warranted a move toward financing, the Keystone Corridor to date remains a “designated high-speed corridor” in name only. The FRA reports that AMTRAK, as the line’s owner and operator, has invested over \$26 million in recent years for deferred maintenance on the Harrisburg-Philadelphia segment; described as an electrified and mostly grade separated line. The Pennsylvania Department of Transportation now hopes that the entire Pittsburgh-Philadelphia corridor will eventually achieve top train speeds of 110 mph rather than

the 250-mph Maglev speeds that were anticipated in 1988 – although Maglev technology continues to be pursued in other parts of the U.S.

The American Magline Group is a consortium of General Atomics, Hirschfeld Steel, Parsons Transportation Group, Solomon Smith Barney, URS Greiner, and Transrapid, which is dedicated to building and deploying Maglev systems in the U.S. (33). This group is working in partnership with the California-Nevada Super Speed Train Commission (CNSSTC) to promote the California-Nevada Interstate Maglev Project, which is proposed to extend 269 miles from Las Vegas, Nevada, to Anaheim, California. As part of this effort, the consortium testified before the House of Representatives Subcommittee on Railroads in 2001 that a 40-mile starter segment between Las Vegas and Primm, Nevada (just north of the Mojave Desert near Desert, California), would be the ideal “prototype Maglev train system operating in revenue service;” pointing out that the \$1.4 billion project could be financed by using the \$950 million in TEA-21 Maglev Deployment Program funds together with a one-third match (\$450 million) in local or private funds (33).

In 1994, Parsons Brinckerhoff’s project manager explained to attendees of the HSRA meeting that, “based on the forecasting ridership, operation of our system between California and Nevada could produce an annual cash flow of \$400 million” (29). If the demand for Maglev in the Las Vegas-Anaheim corridor can support \$100 fares, then these cash flows would require 4.0 million passengers annually, which is significantly more than the 1.33 million local air trips between Los Angeles and Las Vegas in 2002 (26). Even though, the federal government has shown an initial inclination for the Maglev project by awarding the CNSSTC a 1.5 million grant in May 2004 to prepare a programmatic environmental impact statement and begin pre-construction design, engineering, and public support activities. An additional \$650,000 has been given to the CNSSTC by cities and local agencies that would benefit from the project’s proposed route (34).

Conclusions

The research presented herein is an attempt to re-evaluate high-speed rail in Texas “from the start,” as the THSRA advised following the failed Texas TGV project. With the hope that the state’s past experience can be used to evaluate future high-speed rail ventures more efficiently, several observations have been outlined as follows:

Standard Guidelines for Ridership Studies

- The HSRA developed its Standard Guidelines for Revenue and Ridership Forecasting to give credibility to ridership studies following some rather significant public skepticism and criticism of early high-speed rail proposals. Even though, a substantial share of HSRA membership and board governance consists of representation from private firms that regularly perform high-speed rail feasibility studies for the public sector. Any such studies that rely on HSRA standards may risk being biased toward the development of high-speed rail since the HSRA itself was established to promote the construction and operation of high-speed ground transportation systems.

- The use of HSRA guidelines in the 1989 TTA study does not appear to have resulted in conservative ridership projections considering that Houston-DFW ridership was projected to be 3.06 million passengers in Year 1998. Charles River Associates in 1993 projected that Houston-DFW air travel in Year 1998 would be 2.27 million passengers; which suggests that, assuming this volume of air travel to be accurate, the high-speed rail system was expected to carry the equivalent of 134 percent of all existing airline traffic in the corridor.

The Texas High-Speed Rail Act

- Senate Bill 1190 defined and, therefore, required high-speed rail to be technologically capable of operating at speeds in excess of 150 mph. Apparently this was based on the results of the TTA study, which recommended to the state the use of Very High Speed rail technology in the range of 125-200 mph. However, the TTA study based the feasibility of high-speed rail in this speed range using a cost estimate of \$8.3 million/mile in 1991 dollars (\$7.2 million in 1988 dollars), while the 1991 TRB estimates found 125-mph, 150-mph, and 180-200-mph technologies to range from \$10.25–17.76 million/mile. Therefore, Senate Bill 1190 appears to have prevented a thorough investigation into the most cost effective high-speed rail technology while basing project expectations on perhaps unachievable economics.
- Senate Bill 1190 directed the THSRA to award a franchise if high-speed rail was found to be a public convenience and necessity – Senate Bill 1190 neither defined these essential criteria, nor did it prescribe the standard by which it was to be assessed. Although, the THSRA was created as a result of the TTA study finding that such a system was in fact a public need – that is, the study team recommended that the legislature recognize the importance of high-speed rail to the state, create a high-speed rail authority, and appropriate funding for the project. Consequently, the TTA study both predetermined the need for high-speed rail and led to legislation that required proof of this need prior to the award of a franchise; leaving the selection of a franchisee as the overriding administrative issue.

Texas' High-Speed Rail Proposals

- Equity investors in the Texas FasTrac consortium consisted of six separate corporations; an arrangement that most likely resulted in collective judgments regarding financial commitments and an adherence to fairly conservative expectations. On the other hand, equity investors in the Texas TGV consortium consisted of one major corporation (Morrison Knudsen) and a few private investors; perhaps enabling Bill Agee to more easily assert his strategy of underbidding on large projects in order to acquire work.
- Texas FasTrac's proposal included a route designed to include the greatest number of cities with the least amount of infrastructure, later to be duplicated by the final Texas TGV alignment and recent plans for the Texas T-Bone. Also, Texas FasTrac ridership projections were most explicit in noting that the Houston-San Antonio/Austin corridor would not be included in the initial high-speed rail system (see Figure 3), and were found by independent advisors (to the THSRA) to offer the most forthright ridership study. While the ridership projections in Texas TGV's franchise application also omitted

Houston-San Antonio/Austin traffic, the ensuing independent ridership study included this traffic – this second, independent, study still resulted in ridership projections that were on average 3.6 million annual passengers less than the original Texas TGV franchise application.

- Overall, the process that resulted in the award of a high-speed rail franchise appears to have been completely reliant upon the private sector for the development of conceptual proposals and subsequent feasibility analyses, and on their testimony in favor of high-speed rail; thus introducing unneeded bias into the transportation planning process.
- Large discrepancies were found between the ridership projections of the high-speed rail franchise applicants (up to 7.9 million passengers/year). Also, capital costs in all studies leading to the award of a franchise were estimated to be approximately \$9 million/mile (1991 dollars) for 180-200-mph technology, which was significantly lower than TRB's estimate of \$17.76 for the same technology. Therefore, there is evidence that classic promotional biases were included throughout each stage of developing the high-speed rail concept in Texas, with no apparent public mechanisms in place to safeguard against these tendencies.
- The financial analysis of Texas TGV's final cash flow schedule (the preliminary offering circular) indicates that the expected rate of return would fail to materialize even with public funding at 40 percent of project costs. On the other hand, the cash flow schedule included in Texas TGV's franchise application would have indeed resulted in an expected 16 percent return to investors, but this result was based on ridership projections that were higher than those in the preliminary offering circular by an average of 3.6 million passengers annually and on an unexplained \$28 billion annuity in Year 2018.

Recommendations

The findings in this research demonstrate considerable deficiencies in the means by which the feasibility of high-speed rail in Texas has been assessed. Furthermore, time and cost requirements of high-speed rail studies have thus far involved decision-making processes that do not favor state transportation planners. Therefore, future transportation studies that include high-speed rail as an infrastructure option may want to incorporate some or all of the following recommendations:

- Transportation planners can hasten the process of performing concept-stage feasibility analyses by assuming some easily supportable project parameters, such as the private-sector threshold rate of return, competitive ticket pricing, project life, and the cost of available technologies. A simple computer program can then be used to assess each available technology to determine the portion of existing corridor traffic that would need to use the high-speed rail system in order to meet the assumed criteria. This approach would allow transportation planners to deal primarily with transportation statistics, and would provide “up-front” answers to potential planning options.
- Initial analysis of the Houston-DFW corridor using this concept-stage screening process suggests that 110- to 125-mph rail technologies may in fact have potential as viable rail projects and warrant further investigation. However, realistically sustainable private rail ventures may require some level of public funding, which in turn requires that the state be able to perform its own cost-benefit analyses.

- Since the public funding of rail projects may be judged as acceptable in cases where the net present value is equal to or greater than zero, and since the private sector can only sustain rail operations at or above some threshold rate of return, the assessment of these standards can be performed simultaneously in order to identify levels of public funding that are attractive to both the public and private sectors.
- New high-speed rail policies might be more effective if they prescribe economic standards – such as minimum NPV, maximum required/available passenger ratio, and minimum private-sector rate of return – that prevent the waste of public funds while maintaining the flexibility to engage in viable partnerships with the private sector.
- High-speed rail consortiums may be better off having diversified equity participation in order to provide the necessary checks against any single entity making unreasonable promises or claims to the state; and the state may be best served by considering recent changes in leadership strategies within the companies of a franchise applicant.
- The state should have staff prepared to analyze the feasibility of rail projects from both the public and private sector perspectives, and should become an integral part of feasibility studies instead of outsourcing all responsibilities to the private sector.
- Even if no public funding is to be used, the state has a vested interest in evaluating private-sector feasibility so that it does not become a facilitator of high-speed rail projects that are doomed to fail, and so that transportation planners can determine if these projects can be relied on to meet the public's needs.

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APPENDIX A – CHRONOLOGY OF THE TEXAS HIGH-SPEED RAIL PROJECT

Three executive directors led the Texas High Speed Rail Authority during the course of its existence. With the resignation of Bob Neely in September 1992, Sam Goodhope served as acting director until Marc Burns was appointed permanent director in February 1993. Robey speculates that Burns, previously an attorney with the Attorney General's office, might have been selected in part based on the legal matters that would precipitate from Texas TGV's default under the terms of its franchise agreement (16). In any event, the state made it possible for Burns to prepare a final report on the THSRA and the history of the Texas TGV project, resulting in a detailed and insightful account of the failed attempt to bring high-speed rail to Texas. A chronology of important events in the history of this project is outlined below (10).

Award of a Franchise

- June 6, 1990 – THSRA Board of Directors established the procedure to hold evidentiary hearings (even though exempted by the Texas High-Speed Rail Act) in order to “support a decision on the need for and qualifications of a given HSR franchise applicant;” adopted administrative rules relating to franchise application procedures, which required letters of intent and a \$100,000 fee from applicants.
- August 24, 1990 – Proposals were solicited by notice published in the 1990 *Texas Register*.
- January 16, 1991 – Deadline for franchise applications and balance of the \$500,000 application fee. The Texas TGV and Texas FasTrac consortia met this application deadline, while the Texas Railroad Finance Corporation submitted application materials but failed to submit the required \$500,000 prior to the close of business. Applications included:
 - corporate information on consortium members;
 - proposed routes, right-of-way, and station locations for the HSR facility;
 - ridership estimates;
 - description of rail equipment and technology;
 - preliminary assessment of the environmental effects of HSR; and
 - estimates of capital and operating costs, and financial plans.
- January 31-February 18, 1991 – Advisors to the THSRA Board of Directors (L.S. Gallegos & Associates; Sverdrup Corp.; Texas Transportation Institute; Espey, Huston & Associates; JDG Associates; and Rauscher Pierce Refsnes Inc./The Hadley Group) prepared nine separate reports on the franchise applications. Notable observations included:
 - Neither applicant demonstrated financing plans consistent with the requirements of the Texas High-Speed Rail Act.
 - Both applicants failed to completely comply with requirements of the RFP concerning financing, environmental issues, ridership estimates, etc.
 - Neither applicant provided information sufficient to perform an in-depth analysis of the financing plans.
 - Both applicants proposed the use of public funds.

- While the Texas TGV application was superior to that of Texas FasTrac, neither application satisfied all of the requirements of the Texas High-Speed Rail Act.
- February 22, 1991 – Hearing Examiner granted Southwest Airlines intervenor status as an equal party in hearing proceedings.
- March 5, 1991 – Southwest Airlines sought to have the hearings postponed and THSRA rules rescinded by filing a temporary restraining order and a temporary injunction against THSRA, both of which were later denied but resulted in delays.
- March 25, 1991 – Hearings opened on the formal consideration of each franchise application.
- May 10, 1991 – Proposal for Decision was issued to all parties recommending that HSR was in the State’s public convenience and necessity, and that Texas TGV should be awarded the franchise.
- May 16, 1991 – Mr. E. Glenn Biggs, then with the competing Texas FasTrac consortium, announced at a press conference that the Texas TGV’s plan was financially unsound and that the project could not succeed as a strictly private venture; he also questioned how Texas TGV was going to raise \$170 million in equity financing (Phase I financing).
- May 28, 1991 – THSRA Board of Directors voted unanimously to award Texas TGV the HSR franchise, at which point Texas TGV submitted a \$250,000 initial franchise fee to THSRA. The May Order required that this award be supplemented with a Franchise Agreement to be executed by January 31, 1992. Other financial obligations incurred by Texas TGV in the Order included:
 - funding of all THSRA operations;
 - demonstration of:
 - initial capitalization of \$10 million by July 1, 1991,
 - equity financing commitment of \$170 million by December 31, 1992 – Phase I financing, as outlined in the Texas TGV franchise application, was to consist of equity financing (\$60 million from consortium members and \$110 million from outside investors) to cover the cost of environmental studies, ridership reports, preliminary design, right-of-way studies, rolling stock design, and federal certification;
 - financial commitments for balance of funding by January 31, 1994 – Phase II financing was to consist of a Texas TGV equity placement and debt financing guaranteed by commercial letters of credit, both of which were to be pledged prior to construction and letting of equipment contracts;
 - repayment of \$1 million loaned by the state to THSRA; and
 - posting of a \$2.5 million abandonment bond to cover all Texas TGV obligations and to insure completion of the HSR facility.
- August 1991 – Texas High-Speed Rail Act was amended to include provisions of the Administrative Procedures Act, which required any new orders other than negotiated consent agreements to be subject to contested-case procedures.
- August 26, 1991 – Despite opposition by a majority of THSRA Board members, THSRA was merged with the Texas Railroad Commission, resulting in:
 - operations conducted within standard state business practices,
 - operating funds moved into the state treasury, and
 - use of the Office of the Attorney General.

Preliminary Studies and Project Financing

- December 18, 1991 – THSRA Board of Directors approves a Memorandum of Understanding among THSRA, the Federal Railroad Administration (FRA), and the Texas TGV outlining:
 - co-lead agency status of THSRA;
 - requirement for an environmental impact statement (EIS); and
 - authorization for hiring a third-party consultant, Woodward-Clyde Consultants, at the Texas TGV's expense for the purpose of assisting in the preparation of the EIS.
- January 31, 1992 – Franchise Agreement was signed and within two weeks the Texas TGV provided funds to cover the remainder of THSRA's 1992 operating budget, the \$10 million initial capitalization, and the \$2.5 million abandonment bond. Significant milestones in the franchise agreement included:
 - initiation of the EIS within 60 days (March 31) – through which the necessary public involvement would provide the primary means of receiving public input;
 - funding and initiation of an independent ridership study within 60 days;
 - providing a procurement plan within 60 days that outlined the involvement of disadvantaged businesses in design, construction, and maintenance work; and
 - providing an acceptable Baseline Implementation Plan (BLIP) within 300 days to address unresolved issues relating to financing, engineering, construction, management, and operations.
- April 1, 1992 – Texas TGV began working on the EIS and ridership studies. Public scoping meetings were hosted May 12-June 25 by THSRA, Woodward-Clyde, and Texas TGV, but THSRA Executive Director Bob Neely did not attend. These meetings consisted of 39 scoping meetings held in 38 separate counties (two meetings in Falls County) with over 4,000 attendees. Also, an interagency scoping meeting was attended by the:
 - Railroad Commission,
 - National Research Laboratory Commission,
 - Water Development Board,
 - State Soil and Water Conservation Board,
 - Governor's Office,
 - Employment Commission,
 - Parks & Wildlife Department,
 - Public Utility Commission,
 - General Land Office,
 - Department of Agriculture,
 - Historical Commission,
 - Water Commission,
 - Department of Transportation,
 - Department of Health,
 - Air Control Board, and
 - Department of Housing and Community Affairs.

Performance Shortfalls

- July 1992 – The Comptroller’s Office issued The Texas Performance Review, which criticized the THSRA and the Board of Directors for excesses such as high travel costs for project conferences and lavish office furnishings, thus diminishing THSRA’s credibility.
- August 18, 1992 – THSRA Board of Directors requested a report on Texas TGV’s progress in obtaining the \$170 million equity financing commitment due December 31, 1992.
- September 1992 – THSRA Executive Director Neely resigned. Mr. Sam Goodhope, a participant in the drafting of the franchise agreement, was appointed Acting Director of THSRA.
- September 30, 1992 – THSRA received letter from Mr. E Glenn Biggs, now Chief Executive Officer of the Texas TGV, stating that the Texas TGV had always known that attempts to raise the Equity Financing Commitment would be premature without an investment grade ridership study, substantial progress on the EIS, and some degree of resolution of the Southwest Airlines litigation.
- October 1, 1992 – Texas TGV submitted a response to THSRA indicating that efforts to raise the \$60 million in capital from “Founders” was still in progress, and that a preliminary EIS and final ridership study would need to be completed in order to convince outside investors to commit the remaining \$110 million. Texas TGV suggested that unforeseen litigation by Southwest Airlines, in addition to delays in the EIS and ridership reports, would increase the difficulty in attracting outside investors.
- November 13, 1992 – THSRA chose not to rule on Texas TGV’s October 1 argument and instead extended the December 31, 1992 deadline for the Equity Financing Commitment to December 31, 1993.
- December 18, 1992 – THSRA Acting Executive Director Goodhope responded to cost overruns by stopping work on the EIS even though the ability to obtain the Equity Financing Commitment (now due December 31, 1993) was largely dependent upon a substantial completion of the EIS.
- March 25, 1993 – Texas TGV submitted the BLIP to THSRA. Although, the necessary revisions to Texas TGV’s financial plans were deemed insufficient and the report failed to establish specific dates for project scheduling milestones. The BLIP noted in its preamble the delays in completing the EIS and its importance in advancing the project further.
- September 1993 – Texas TGV proposed a new alignment, whereby the Houston-Dallas/Fort Worth corridor would be converted to a Houston-College Station-Waco corridor that would connect with the original San Antonio-Austin-Dallas corridor, thus reducing mileage and right-of-way requirements while providing service to more of Central Texas.
- November 29, 1993 – Texas TGV issued a securities offering consisting of convertible short-term equity notes that would convert to equity upon an initial public offering of Texas TGV stock. Details of this offering included:
 - \$200 million in convertible short-term equity notes backed by a \$225-million letter of credit from the Canadian Imperial Bank of Commerce,
 - \$75 million counter-guarantee of the letter of credit from Morrison Knudsen Corporation, and

- equity notes to be priced and sold on December 11, 1993.

Termination of the Franchise

- December 10, 1993 – Morrison-Knudsen withdrew the \$75 million counter-guarantee and the securities offering.
- December 17, 1993 – THSRA Board of Directors received notice from the Texas TGV that the deadline for obtaining equity financing commitments of \$170 million, which had been extended to December 31, 1993, was unlikely to be met. In anticipation that financial commitments would not be obtained, the Board of Directors began reviewing their options on how to proceed, which were later identified as:
 - terminate the franchise,
 - extend the franchise deadlines, or
 - amend the Franchise Agreement with a new order.
- January 1993 – Texas TGV terminated the baseline environmental studies and dismissed all related contractors.
- January 14, 1993 – THSRA Executive Director Marc H. Burns notified Texas TGV that the failure to meet the financing deadline constituted an “event of default under the Franchise Agreement.” Governor Ann Richards indicated in writing to San Antonio Mayor Nelson Wolff that she was opposed to the creation of a special study committee that would make recommendations on the project’s future following information-gathering from THSRA, Texas TGV, and the general public. Also, 14 legislators notified THSRA that the franchise should be terminated immediately.
- January 25, 1994 – Governor Ann Richards sent a letter to State Senator Jim Turner in agreement with legislators that Texas TGV’s franchise should be terminated.
- January 31, 1994 – Mr. David W. Rece, President and Chief Operating Officer of the Texas TGV, responded to THSRA’s January 14 notice by contending that the franchise was not in default. Also, Mr. Rece endorsed the idea of forming a special study committee, hoping that the committee would rationalize the expenditure of state funds. However, THSRA received a copy of Governor Richards’ January 14 letter to Mayor Wolff stating her opposition to a special committee – consequently, no such committee was formed.
- March 15, 1994 – THSRA Executive Director Burns notified Texas TGV that the failure to obtain the Equity Financing Commitment was an “event of default” under the franchise agreement.
- March 31, 1994 – Legal council to Texas TGV submitted letter to Executive Director Burns in response to the March 15 notice, stating that Texas TGV was attempting to sell its franchise interests to another group of prominent Texans prior to any termination proceedings.
- August 19, 1994 – A settlement on the termination of the Texas TGV franchise was presented to (and subsequently adopted by) the THSRA board following negotiations between Board Chairman Hershel Payne, Executive Director Burns, and Texas TGV.
- Spring 1995 – House Bill 2390 and Senate Bill 1428 abolished the THSRA, and the Texas High Speed Rail Act was repealed.

APPENDIX B – NET ANNUAL COST OF HIGH-SPEED RAIL IN FLORIDA

The data in Table B show the net annual costs of a high-speed rail system to the State of Florida, as listed in the Florida High Speed Rail Authority’s 2004 Report to the Governor and Legislature (32). This data can be found in Figure 4 of the report (Net Annual Cost to the State-Authority Adopted Option), page 12.

Table B. Net Annual Costs for the Florida High-Speed Rail System.

Year	Net Annual Cost (\$ millions)
2004	(76.20)
2005	(76.20)
2006	(76.20)
2007	(76.20)
2008	(76.20)
2009	(57.56)
2010	(40.22)
2011	(50.67)
2012	(48.81)
2013	(48.74)
2014	(44.81)
2015	(40.26)
2016	(39.92)
2017	(45.53)
2018	(29.45)
2019	(30.24)
2020	(23.88)
2021	(24.61)
2022	(18.47)
2023	(29.34)
2024	(19.89)
2025	(12.51)
2026	(15.57)
2027	(0.21)
2028	59.18
2029	54.92
2030	68.07
2031	76.64
2032	60.06
2033	84.68
2034	92.29
2035	101.27
2036	98.10
2037	116.31
2038	119.69
2039	246.53
Total	176.05