A HIGH-SPEED RAIL REVOLUTION IN THE US?
LESSONS FROM THE FRENCH AND THE TEXAS TGV

by

HELEN NG

B.S. Civil Engineering
A.B. International Relations
Stanford University
(1988)

Submitted to the Sloan School of Management
in Partial Fulfillment of
the Requirements of the Degree of
Master of Business Administration

at the
Massachusetts Institute of Technology
February 1995

© Massachusetts Institute of Technology (1995)

ALL RIGHTS RESERVED

Signature of Author

MIT Sloan School of Management
January 20, 1995

Certified by

Donald R. Lessard
Professor of International Management
Thesis Supervisor

Certified by

Joseph M. Sussman
JR East Professor,
Professor of Civil and Environmental Engineering
Thesis Advisor

Accepted by

Jeffrey A. Barks
Associate Dean, Master's and Bachelor's Programs

ARCHIVES
MASSACHUSETTS INSTITUTE
OF TECHNOLOGY

APR 03 1995
LIBRARIES
A HIGH-SPEED RAIL REVOLUTION IN THE US?
LESSONS FROM THE FRENCH AND THE TEXAS TGV

by

HELEN NG

Submitted to the Alfred P. Sloan School of Management
on January 20, 1995, in partial fulfillment
of the requirements of the Degree of
Master of Business Administration

ABSTRACT

High-speed rail in France has enjoyed over ten years of continued success, and yet efforts to establish high-speed rail corridors in the US have constantly faced a slew of setbacks. The purpose of this thesis is twofold: to understand the cultural and institutional reasons why high-speed rail has flourished in Europe but not in North America and to suggest lessons which may help the US to tailor high-speed rail development to its national framework. Specifically, this paper compares the processes behind the first trains à grande vitesse [TGV] line in France with the foiled efforts to adopt the same technology in Texas. While this study examines the history and market of the two countries, its primary focus is on the nations’ different approaches to public and private financing of high-speed rail.

The conclusion is that the institutional makeup of France is more conducive to the success of high-speed rail than that of the US. If the US is to successfully adopt TGV technology, it needs a greater public-private partnership in financing high-speed rail. Otherwise, the commercial economics of high-speed rail will rarely meet the requirements of the private sector.

Thesis Supervisor: Donald R. Lessard
Title: Professor of International Management

Thesis Reader: Joseph M. Sussman
Title: JR East Professor, Professor of Civil and Environmental Engineering
Foreword

My intent upon approaching this study of high-speed rail was to cross the disciplines of business and transportation. As a former civil engineer who has worked in the transportation field and as a student of management at the Massachusetts Institute of Technology [MIT], I had a great desire to examine what went wrong in the Texas high-speed rail case and to see what lessons could be learned for the future. I had my own preconceptions of why the Texas project failed, but my ideas evolved in an unforeseen manner as I delved further into the study and new insights presented themselves. These new insights would not have been possible without the information and assistance I received from various individuals who have helped me on this project.

In particular, I would like to thank Professor Joseph M. Sussman, JR East Professor and Professor of Civil and Environmental Engineering at MIT, for his extensive help and sharp intellect in guiding me through the evolution of the project since its inception. He not only generously provided me with helpful knowledge and sources of key information, he also was very quick to signal new doors and insights that I may have overlooked due to my own preconceived notions.

I would also like to thank Professor Donald R. Lessard, Professor of International Management, for sharing his depth of knowledge and experience in the realm of financing international infrastructure projects.

I would also like to give special mention to Mr. Daniel Roth, a graduate student at the MIT Center for Transportation for his expertise, assistance, and friendship. The fact that someone my age will put up with and enjoy my endless bantering on high-speed rail deserves personal recognition.

While the many colleagues and professionals with whom I interviewed are too numerous to list here, I would like to specially acknowledge the following people for sharing their time, experiences, and insights with me in discussing this study: Mr. Marc H. Burns, Executive
Director, Texas High Speed Rail Authority; Mr. Steven Polunsky, Director of Research and Planning, Texas High Speed Rail Authority; Mr. Glenn Biggs, Chairman and CEO, Texas TGV; Mr. James Cohen, Professor, City University of New York; Mr. James C. Gerber, Director of Finance and Vice President, Texas TGV; Mr. David W. Rece, President and COO, Texas TGV; Mr. Gil Carmichael, Senior Vice President, Morrison Knudsen; Mr. Pierre MacDonald, Vice Président, Projet TGV, Bombardier; Ms. Harriett L. Stanley, Principal, The Hadley Group; Mr. Daniel Brand, Vice President, Charles River Associates; Mr. Stewart C. Myers, Gordon Y. Billard Professor of Finance, Sloan School of Management, MIT; Mr. Jeremy Stein, JC Penney Professor of Finance, Sloan School of Management, MIT; and former Governor of Massachusetts Michael S. Dukakis, currently teaching at the Department of Political Science, Northeastern University.

Finally, I would like to give my greatest appreciation to my parents for all their love and support.

The author assumes all responsibility for the accuracy of data presented and for the opinions expressed herein.
Table of Contents

Abstract .................................................................................................................. 2
Foreword.................................................................................................................. 3
Table of Contents.................................................................................................. 5
List of Exhibits....................................................................................................... 7
I. Introduction ........................................................................................................ 8
II. Historic Overview ............................................................................................ 10
   A. Development of the French TGV-SE Line ............................................... 10
      1. The challenge ....................................................................................... 10
      2. Introducing the TGV-SE ..................................................................... 12
      3. Elegant solution ................................................................................... 14
      4. Results of the TGV-SE dare ................................................................. 18
   B. Development of the Texas High Speed Rail Project .............................. 22
      1. The germ of an idea ............................................................................. 22
      2. The choice between French and German technology ..................... 25
      3. Setbacks / One-year extension ........................................................... 29
      4. Missed deadline – Project on hold ..................................................... 29
      5. Latest developments – Franchise Revoked ....................................... 30
III. Comparison of Challenges ............................................................................. 31
   A. National Structure .................................................................................... 31
      1. Geography ........................................................................................... 32
      2. History .................................................................................................. 33
      3. Governmental structure ..................................................................... 33
   B. Political Enemies ....................................................................................... 36
      1. Southwest Airlines............................................................................... 36
      2. Local landowners ................................................................................ 38
   C. Marketing .................................................................................................... 39
      1. The French market – Creating a rail culture .................................... 39
      2. The US market – The need to first establish political support ......... 40
IV. The Financing Debacle – Public vs. Private ............................................... 43
   A. The French Advantage ......................................................................... 43
   B. Texas TGV Mishaps: Why Private Financing Failed ......................... 45
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Initial analysis</td>
<td>47</td>
</tr>
<tr>
<td>2.</td>
<td>Probing deeper: Internal Squabbling</td>
<td>49</td>
</tr>
<tr>
<td>3.</td>
<td>Commercial economic reality</td>
<td>53</td>
</tr>
<tr>
<td>V.</td>
<td>Lessons: Suggestions for a Tailored US Rail Revolution</td>
<td>59</td>
</tr>
<tr>
<td>A.</td>
<td>Economic Feasibility</td>
<td>60</td>
</tr>
<tr>
<td>B.</td>
<td>Commercial Feasibility</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Obtain public-sector backing</td>
<td>62</td>
</tr>
<tr>
<td>C.</td>
<td>Financing</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Do not finance a commercially unfeasible project</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Improve distribution of agency and contract risk</td>
<td>65</td>
</tr>
<tr>
<td>D.</td>
<td>Marketing</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Ally with potential enemies</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Make friends</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>Get local leadership / Go to where the &quot;people&quot; want the project</td>
<td>68</td>
</tr>
<tr>
<td>E.</td>
<td>Politics</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Control internal squabbling and unnecessary brinkmanship</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Give Authority or public agency a more active role</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Work with growing public support</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>Strive for a national policy/commitment</td>
<td>73</td>
</tr>
<tr>
<td>VI.</td>
<td>Conclusion</td>
<td>75</td>
</tr>
<tr>
<td>Appendices</td>
<td></td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Appendix A: Analysis of Convertible Equity Note Offer</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Appendix B: Excerpts from the Texas TGV Offering Circular</td>
<td>83</td>
</tr>
<tr>
<td>Bibliography</td>
<td></td>
<td>86</td>
</tr>
</tbody>
</table>
# List of Exhibits

<table>
<thead>
<tr>
<th>Exhibit</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. French Rail Network</td>
<td>13</td>
</tr>
<tr>
<td>2. Differential Investment Analysis for the TGV-SE Line</td>
<td>14</td>
</tr>
<tr>
<td>3. TGV-SE and Conventional Southeast Corridor Traffic</td>
<td>18</td>
</tr>
<tr>
<td>4. Operating Results of the TGV-SE</td>
<td>19</td>
</tr>
<tr>
<td>5. Financial Trends for the TGV-SE</td>
<td>19</td>
</tr>
<tr>
<td>6. French TGV Projects Planned to Year 2010</td>
<td>21</td>
</tr>
<tr>
<td>7. Proposed Texas TGV Alignments</td>
<td>23</td>
</tr>
<tr>
<td>8. Franchise Applicants for the Texas Project</td>
<td>26</td>
</tr>
<tr>
<td>9. Schematic of the Payoff Structure for the Convertible Equity Notes</td>
<td>48</td>
</tr>
<tr>
<td>10. Shareholder Hierarchy</td>
<td>50</td>
</tr>
<tr>
<td>11. Schematic of the Change in Relationships Based on Risk and Reward</td>
<td>52</td>
</tr>
<tr>
<td>12. Net Present Value of Texas TGV Project</td>
<td>57</td>
</tr>
<tr>
<td>13. Tiers of Feasibility</td>
<td>60</td>
</tr>
<tr>
<td>14. List of S&amp;P AA-Bonds Due in the Year 2000</td>
<td>79</td>
</tr>
<tr>
<td>15. Diagrammatic Summary of Convertible Equity Notes</td>
<td>81</td>
</tr>
</tbody>
</table>
I. Introduction

In an age of increasing congestion, pollution, and limited resources, the time has come for modernizing the US transportation infrastructure network to fit the needs of the 21st century. France has achieved a tour de force solution with its high-speed rail transportation system. In contrast, despite being an international economic leader, the US remains embarrassingly behind in its passenger-rail infrastructure.

The purpose of this thesis is twofold: to understand the cultural and institutional reasons why high-speed rail has flourished in Europe but not in North America and to suggest lessons which may help the US to tailor high-speed rail development to its national framework. Specifically, this paper compares the processes behind the first trains à grande vitesse [TCV] line in France with the foiled efforts adopt the same technology in Texas. While this study examines the history and market of the two countries, its primary focus is on the nations' different approaches to public and private financing of high-speed rail. Then the report examines to what extent the US can learn from the French and to what extent it needs to derive its own model. Finally, the report offers suggestions for effective implementation based on lessons learned and on an understanding of the US's particular market.

This study’s conclusion is that the US can primarily learn from the technology of the French, but it can not easily import the French process of implementation. Here the US needs to forge its own path. In analyzing the two cases, it becomes clear that the US faces higher structural hurdles than does France and that, these hurdles notwithstanding, Texas TGV Corporation also made a number of mistakes. Structurally, the economic (public economic) and commercial (private economic) feasibilities are more favorable for high-speed rail in France than in the US. In terms of public economics, France's geography, history, and governmental structure encourage public-sector demand for high-speed rail, whereas the opposite is true for the US. In terms of private economics, public-sector support in France and lack thereof in the US has made high-speed rail commercially profitable in Europe and unprofitable in North America. In
addition to the higher structural hurdles for the US, Texas TGV Corporation also made a number of crucial mistakes in financing, marketing, and politics.

The main lessons from the Texas TGV case involve first better assessing and increasing high-speed rail's economic and commercial feasibility, increasing commercial feasibility where possible, and then improving financing, marketing, and politics. Future projects need first to be economically and commercially feasible before they can be at all financially feasible. To encourage commercial feasibility, future attempts in the US should obtain public-sector backing rather than rely primarily on private-sector investments. Otherwise, the commercial economics of high-speed rail will rarely meet the requirements of the private sector. In financing, the investment package should be better designed to share contractual risks across interested parties. In marketing, future projects should strategically ally with potential enemies, strengthen ties with natural allies, and either obtain local leadership or go to where the "people" want the project. In politics, future projects should control internal political strife, give the state authority or agency a more active role, work with growing public support, and push for a national policy committing the US to high-speed rail developments. Texas TGV's oversights were not made in vain but will serve as useful lessons for future attempts at high-speed rail in the US.
II. Historic Overview

This section will recount the major events leading to the first high-speed rail line in France, and then it will describe the main events in the implementation process of the Texas TGV. In reviewing the historical facts, it is important to note that the implementation process for the French TGV-SE line was quite different from that of the Texas TGV, although the technology was essentially the same. This suggests that transferring technology from one country to the other is not so straightforward and that the process of successfully realizing high-speed rail will require country-specific considerations.

A. Development of the French TGV-SE Line

The development of the French TGV-SE line occurred in response to an evident need. Upon realizing that their existing rail network would soon reach saturation, the French proposed what I have termed an "elegant solution" with their introduction of high-speed rail. The TGV earned such success that the French government pushed to construct more high-speed rail projects in France. More recently, the French have begun to secure an international market by attempting to export their product to Korea, Spain, and the US.

1. The challenge

The French TGV was essentially a "tour de force" application of existing, time-tested technology to meet the challenges of a new transportation era. Society had become more mobile, and demand for travel was on the rise. This increase in travel demand resulted in two main challenges for passenger rail: a) an increase in foreseen bottlenecks; and b) a loss of potential passengers to the competing transport modes of airplane and car.
a. Increase in foreseen bottlenecks

In the late 1960's, it became clear that the popular southern Paris-Dijon-Lyon line in France would soon reach saturation. It was then France's busiest rail corridor and has retained that status to this day. With a maximum capacity of 250/trains/day on this double-track southeastern line, bottlenecks were foreseeable in the region just north of Dijon. The French National Railways – a semi-public entity also known as Société Nationale des Chemins de Fer Français [SNCF] – realized that the conventional lines would not be sufficient to meet the expected increase in passenger demand. At the same time, conventional lines carried both passenger and freight and were suffering from scheduling conflicts in mixing the two services.

b. Competition with airways and highways

The increasing use of airplanes and cars threatened to erode rail's current and potential market share. This was both an issue of capacity (as discussed above) and of making rail more an attractive mode of travel. To make rail competitive with air and highways, the SNCF needed to confront the inherent advantages of the plane and automobile – speed and comfort. The challenge then was to re-package rail travel into a faster, more convenient, more efficient, more comfortable, and less costly alternative for travelers.

The necessity of meeting these challenges were both financial and national concerns. The SNCF, notoriously plagued by debt, had been a persistent drain on the state for years and continued to be an overall money-loser until 1989. SNCF's problem was that it had become too big and bureaucratic and had poured government subsidies into unprofitable sectors:

Two-thirds of the taxpayers' money reimburses the railways for running uneconomic services and offering cheap fares to big families, the unemployed, grannies – just about anybody who is not an employed bachelor. The rest goes into the pension fund for 412,000 retired railway workers.¹

¹ "French Railways: The High Cost of Excellence," The Economist, June 18, 1983.
As a national concern, attaining greater market share for rail would mean amelioration of environmental problems as well as lowered dependence on foreign oil. For example, SNCF's main source of energy is electricity. Since France mainly uses nuclear power rather than fossil fuels to generate electricity, pushing more attention on rail would further decrease France's exposure to foreign oil prices. Hence, the time was appropriate for turning to rail to solve a complex set of interdependent problems.

2. Introducing the TGV-SE

To meet these challenges, in 1981 the SNCF created a novel approach to transportation by introducing the TGV-SE line – the first "train à grande vitesse" in the southeast corridor of France [See Exhibit 1]. In the decision process to implement high-speed rail, the SNCF faced two alignment alternatives:

a. build an entirely new passenger line 417 km long from Paris directly to Lyons; or
b. double the number of tracks to four along the 109 km St. Florentin-Dijon portion of the existing line (Paris-Dijon-Lyon) to accommodate the expected bottlenecks.

The latter option was seen as a cheaper capital investment commitment. However, because of evolving technology and the threat of competition from other modes, the net present value of revenue generated might be less than option (a), and the flexibility of conventional steel rail to meet future demands was seen as limited. So the SNCF chose the first option: to build a completely new rail line which was devoted solely to passenger transport and whose rolling stock was capable of reaching speeds of 300 kmh (188 mph) (The previous speed "plateau" in France was 200 kmh (125 mph) along the Paris-Toulouse line in 1967).²

Exhibit 1:
French Rail Network

Conventional and
TGV Paris-Lyons Line Layouts

3. **Elegant solution**

The direct contribution the French made to the transportation world was the introduction of the TGV as an elegant means of solving a complex problem. One of greatest lessons the French have offered is that with rail technology artfully applied, one could (as the SNCF did) maximize net present value, optimize operational throughput, reduce social costs, and resourcefully use existing technology.

✓ **Maximizes net present value**

Although the SNCF holds a monopoly on the French rail network, it is a semi-public corporation which needs to answer to the demands of the French government. Part of that demand was to make a profitable passenger line which would take the SNCF "out of the red." So the decision to create a new TGV-SE line was partly financially driven to maximize net present value alternatives. While the capital costs of building an entirely new TGV-SE line from Paris to Lyons would appear much higher than that of doubling the existing track line in the troubled section between St. Florentin and Dijon, further analysis showed this to be the better strategy.

Excluding civil engineering expenses, the costs of a new line would have required a FF 10,295 million larger investment than the patchwork solution to the bottleneck problem:

**Exhibit 2**

**Differential Investment Analysis for the TGV-SE Line**

[All figures shown in millions in 1986 values; $1=6FF]

<table>
<thead>
<tr>
<th>Option (a) Construct a new TGV-SE line (Paris-Lyons)</th>
<th>FF</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>New line</td>
<td>9531</td>
<td></td>
</tr>
<tr>
<td>Rolling stock</td>
<td>8239</td>
<td></td>
</tr>
<tr>
<td>Total expenditure</td>
<td>17770</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option (b) Double the existing rail tracks at bottleneck (St. Florentin- Dijon)</th>
<th>FF</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadruple line</td>
<td>3856</td>
<td></td>
</tr>
<tr>
<td>Conventional rolling stock</td>
<td>3619</td>
<td></td>
</tr>
<tr>
<td>Total expenditure</td>
<td>7475</td>
<td></td>
</tr>
</tbody>
</table>

**Investment differential:**

| FF 10295 |

---

3ibid., pg. 7.
Although the new TGV-SE line initially appears costlier than the short-term solution of doubling existing track lines, it required less expensive civil engineering works and its ridership revenues were expected to amortize the capital debt more quickly than the incremental approach. Doubling the capacity was economically unsound. It would have required extensive civil engineering work to excavate a long tunnel and costly property purchases along now-developed lands. Moreover, the existing track lines had been built to 19th century standards. Its layout had substantial twists and turns and were designed for trains which could climb only low gradients.

In contrast, the TGV-SE line would require cheaper, less extensive civil engineering work – there were no tunnels and the layout could be an essentially straight line. In addition, this "tour de force" approach was expected to be more efficient operationally (i.e., generate more throughput), attract passengers from the car and the plane, induce ridership, and provide more lucrative options as technology improved. In consideration of the overall impact of a new high-speed rail system, the SNCF in fact estimated that the TGV-SE could repay its debt in full within the first ten years.4

\[\checkmark\] Improves ridership

One attraction of the new TGV option was the increase in projected ridership. This was attributed to the shorter distance, the use of direct service, and faster speed. In contrast to the conventional Paris-Dijon-Lyon line, the TGV-SE line would cut the travel distance down from approximately 510 km (319 miles) to 417 km (261 miles), and the new line would bring travel time down from 3 hours 45 minutes to 2 hours.5 Since the TGV was capable of high-speed travel, and since the momentum would enable the TGV to climb grades as high as 3.5%, the SNCF was able to use a fairly straight layout for the TGV-SE route. For example, the TGV-SE alignment had only one curve tighter than a 2.5 mile radius, whereas the old line had twisting

---

4ibid., pg. 80.
5ibid., pg. 20.
curves of 0.5 mile radii. The steam locomotive, for which conventional rail was originally designed, had less power and required lines which followed valley curvatures to maintain a grade less than roughly 0.9% maximum. This resulted in a more circuitous route and demanded costlier civil engineering works of carving out tunnels and designing bridges to even out the grade. So with high-speed rail, the land profile is less of an inhibitive factor in track layout, and distances and civil engineering works can be reduced substantially.

Consequently, the new TGV-SE line would be capable of making more frequent trips since it would serve major cities directly, accommodate only passengers, and travel at faster speeds than traditional rolling stock had offered. For example, the SNCF's decision to accommodate only major cities in its itinerary would allow for schedule maximization. Rather than dividing the service up into express and local services, the major-cities-only approach would eliminate the need to slow down for local stops. This would allow the TGV to tap into its high-speed potential. In addition, the passengers-only approach would optimize scheduling possibilities. Had the TGV also carried freight, the speeds attained would have been much lower. The mix of freight and passenger would have forced the SNCF to compromise on speed and passenger ridership capabilities.

Finally, capable of hitting a then-record 300 kmh (188 mph) and designed to run at 260 kmh (163 mph) on level track, the TGV-SE had potential for higher ridership than conventional rail. As implied above, speed alone was not the cause of higher ridership. Rather its combination with a shorter distance and a more direct, passenger-only service allowed for maximization of passenger ridership.

√ Externalities

High-speed rail was also regarded as a socially beneficial solution in terms of the environment and "market share realignments." While it is obvious that high-speed rail provides an environmentally-friendly alternative to conventional modes of travel, it is not as obvious that

---

"market share realignments" is a public externality. The SNCF projected that the TGV would not only retain existing passengers but also capture travelers from the automobile and the plane and induce new riders [The TGV is very attractive for users up to a range of roughly 2 hours of travel and poses a direct alternative to planes traveling short distances in the 300-500 km (180-300 mile) range. Thereafter, rail must compete on the basis of fares]. Had this been the US market, this transfer of market share would have been regarded as economic competition particularly between train and plane. In France, the state owns the means of air travel as well as rail travel. Therefore, any realignment of market share from air to rail for France is merely a transfer of costs and revenues from one pocket to the other – but the owner of the pockets remains the same beneficiary [Granted the SNCF desired higher market share to pull its organization "out of the red." However, this was partly a financial question and partly a matter of making the organization more efficient]. Moreover, France has the ability to control the direction of this transfer not only by its improvements to rail but also by its ability to impose heavy gas taxes. In any case, since dependence on foreign oil is undesirable politically and environmentally for France, this "market share realignment" ultimately proves to be more a matter of increasing positive social externalities than of increasing market competition between travel modes.

√ Resourcefully uses existing technology

Finally, what made the TGV such an "elegant solution" was that the new trains and infrastructure were not exotic, high-technology. Although there was a tremendous amount of innovation in increasing speed capabilities, the French were essentially being ingenious with what they had. They retained "steel-wheel-on-steel-rail" design and used conventional profiles and dimensions. The benefits of this approach meant that the new TGV could use the existing rail network and stations in locations where the SNCF desired sharing portions of a rail trunk line. Financially, the SNCF could better estimate the overall costs of the project. For example, actual versus estimates of construction expenditures were off by a maximum of only 3.7%.\(^7\) Also,\(^\)  

\(^7\)op. cit. Roth, pg. 50.
using existing technology ensured a degree of time-tested safety. This would more easily enable implementation of high-speed rail than an equally valid, though exotic and untried technology [The implication here is that magnetic levitation is a viable alternative, but that some parties might consider its novelty too risky].

4. Results of the TGV-SE dare

The TGV-SE line was an overwhelming success. This became statistically clear by 1984. Although the TGV-SE line debuted in 1981, ridership increased from 1,249,000 the first year to 5,972,000 in 1982, to 8,962,000 in 1983, and to 13,325,000 passengers/year by 1984 [See Exhibit 3]. In 1984, the TGV-SE was showing operating profits for the first time. Revenues had more than offset the operating costs and the net interest and depreciation charges of its rolling stock and track line investments [See Exhibit 4]. It was further projected that the TGV-SE would pay for its capital costs in roughly ten years [See Exhibit 5]. Moreover, market share for air traffic dropped 26% and that for rail increased 150%.  

Exhibit 3:  
TGV-SE and Conventional Southeast Corridor Traffic  

(a) Number of revenue passengers (in thousands)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TGV traffic</td>
<td>–</td>
<td>1,249</td>
<td>5,972</td>
<td>8,962</td>
<td>13,325</td>
<td>14,734</td>
<td>15,231</td>
<td>16,540</td>
<td>17,297</td>
</tr>
<tr>
<td>Conventional traffic</td>
<td>12,236</td>
<td>11,482</td>
<td>8,365</td>
<td>6,709</td>
<td>5,032</td>
<td>4,453</td>
<td>4,209</td>
<td>4,014</td>
<td>4,023</td>
</tr>
<tr>
<td>Total traffic</td>
<td>12,236</td>
<td>12,731</td>
<td>14,337</td>
<td>15,671</td>
<td>18,357</td>
<td>19,187</td>
<td>19,422</td>
<td>20,554</td>
<td>21,320</td>
</tr>
<tr>
<td>Index 100:1980</td>
<td>100.0</td>
<td>104.0</td>
<td>117.2</td>
<td>128.1</td>
<td>140.0</td>
<td>156.8</td>
<td>158.7</td>
<td>168.0</td>
<td>174.2</td>
</tr>
</tbody>
</table>

(b) Number of revenue passenger-km (in millions)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TGV traffic</td>
<td>–</td>
<td>621</td>
<td>3,335</td>
<td>5,336</td>
<td>7,732</td>
<td>8,721</td>
<td>9,033</td>
<td>9,895</td>
<td>10,367</td>
</tr>
<tr>
<td>Conventional traffic</td>
<td>8,680</td>
<td>8,327</td>
<td>6,606</td>
<td>5,219</td>
<td>3,866</td>
<td>3,510</td>
<td>3,360</td>
<td>3,291</td>
<td>3,297</td>
</tr>
<tr>
<td>Total traffic</td>
<td>8,680</td>
<td>8,948</td>
<td>9,941</td>
<td>10,555</td>
<td>11,598</td>
<td>12,231</td>
<td>12,393</td>
<td>13,186</td>
<td>13,664</td>
</tr>
<tr>
<td>Index 100:1980</td>
<td>100.0</td>
<td>104.0</td>
<td>117.2</td>
<td>128.1</td>
<td>140.0</td>
<td>156.8</td>
<td>158.7</td>
<td>168.0</td>
<td>174.2</td>
</tr>
</tbody>
</table>

Source: op. cit., Roth, p. 76.

8op. cit. Roth, pp. 45, 76-79, 89.
Exhibit 4:
Operating Results of the TGV-SE

(Millions of 1989 FF)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger revenue</td>
<td>215</td>
<td>1,168</td>
<td>1,955</td>
<td>2,980</td>
<td>3,608</td>
<td>3,699</td>
<td>4,130</td>
<td>4,396</td>
</tr>
<tr>
<td>Total operating costs</td>
<td>120</td>
<td>513</td>
<td>879</td>
<td>1,039</td>
<td>1,285</td>
<td>1,363</td>
<td>1,630</td>
<td>1,757</td>
</tr>
<tr>
<td>Gross operating surplus</td>
<td>95</td>
<td>635</td>
<td>1,076</td>
<td>1,941</td>
<td>2,323</td>
<td>2,336</td>
<td>2,500</td>
<td>2,639</td>
</tr>
<tr>
<td>Rolling stock, interest,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and depreciation charges</td>
<td>119</td>
<td>177</td>
<td>288</td>
<td>395</td>
<td>446</td>
<td>478</td>
<td>497</td>
<td>516</td>
</tr>
<tr>
<td>Gross result</td>
<td>(24)</td>
<td>478</td>
<td>788</td>
<td>1,546</td>
<td>1,877</td>
<td>1,858</td>
<td>2,003</td>
<td>2,123</td>
</tr>
<tr>
<td>New line, interest,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and depreciation charges</td>
<td>120</td>
<td>720</td>
<td>842</td>
<td>1,145</td>
<td>950</td>
<td>856</td>
<td>632</td>
<td>636</td>
</tr>
<tr>
<td>Net result of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the TGV system</td>
<td>(144)</td>
<td>(242)</td>
<td>(54)</td>
<td>401</td>
<td>927</td>
<td>1,002</td>
<td>1,371</td>
<td>1,487</td>
</tr>
</tbody>
</table>

Source: op. cit., Roth, p. 78.

With the successful example of the "sud-est" line, the SNCF was encouraged to follow through on a second project by installing the TGV-Atlantique line in 1989, which served ridership from Paris to the southwest. The French government spurred on SNCF to aggressively pursue this project. At the time of project initiation, the SNCF was still too financially insecure to support the entire costs of constructing a new line. To encourage the SNCF, the government subsidized 30% of the infrastructure costs. This was in contrast to the TGV-SE project

Exhibit 5:
Financial Trends for the TGV-SE

Source: op. cit., Roth, p. 81.
Note: The most recent SNCF data indicates that the results will remain within the intervals

Page 19
which was both self-financed and covered by loans on the international financial market.

Buoyed by the successes of the TGV-SE project, in 1990 the French government along with the French rail industry and the SNCF announced the joint-funding of a five-year, FF 535 million program to research improvements in TGV operations and technology.

In 1991, the French government committed itself to a Master Plan which would expand TGV service throughout all of France [See Exhibit 6]. With 16 TGV projects in France planned for serviceability by the year 2010, and with three projects under construction as of this writing (TGV-Nord, Lyon Bypass, and Paris Interconnexion), France has invested great hopes and expectations in its innovation.

Finally, France hopes to take the lead internationally and to take advantage of an intercontinental network as the European Community evolves into a tighter economic unit. To date, it has extended its sphere of TGV influence abroad: It has sold operations to Spain (Madrid-Seville line) and to Korea (Seoul-Pusan line), and has stepped forward tentatively in the US ("Texas Triangle" having been the most advanced of the American projects).
Exhibit 6:  
French TGV Projects Planned to Year 2010

<table>
<thead>
<tr>
<th>Project</th>
<th>New Line</th>
<th>Cost (FF billion)</th>
<th>Cost* (US $ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(km)</td>
<td>Infrastructure</td>
<td>Trains</td>
</tr>
<tr>
<td>Est</td>
<td>480</td>
<td>22.00</td>
<td>6.30</td>
</tr>
<tr>
<td>Transallion</td>
<td>251</td>
<td>28.50</td>
<td>6.00</td>
</tr>
<tr>
<td>Rhin-Rhône</td>
<td>425</td>
<td>17.80</td>
<td>4.30</td>
</tr>
<tr>
<td>Provence</td>
<td>219</td>
<td>14.30</td>
<td>0.40</td>
</tr>
<tr>
<td>Côte d'Azur</td>
<td>132</td>
<td>8.80</td>
<td>1.70</td>
</tr>
<tr>
<td>Languedoc-Roussillon</td>
<td>290</td>
<td>14.80</td>
<td>3.70</td>
</tr>
<tr>
<td>Aquitaine</td>
<td>480</td>
<td>22.20</td>
<td>0.90</td>
</tr>
<tr>
<td>Normandie</td>
<td>169</td>
<td>10.10</td>
<td>1.50</td>
</tr>
<tr>
<td>Midi-Pyrénées</td>
<td>154</td>
<td>8.70</td>
<td>-</td>
</tr>
<tr>
<td>Limousin</td>
<td>174</td>
<td>5.30</td>
<td>1.40</td>
</tr>
<tr>
<td>Grands Sud</td>
<td>70</td>
<td>3.70</td>
<td>0.90</td>
</tr>
<tr>
<td>Bretagne</td>
<td>156</td>
<td>5.70</td>
<td>0.80</td>
</tr>
<tr>
<td>Picardie</td>
<td>165</td>
<td>6.30</td>
<td>-</td>
</tr>
<tr>
<td>Auvergne</td>
<td>130</td>
<td>4.60</td>
<td>1.30</td>
</tr>
<tr>
<td>Interconnexion Sud</td>
<td>49</td>
<td>3.10</td>
<td>0.20</td>
</tr>
<tr>
<td>Pays de la Loire</td>
<td>78</td>
<td>3.20</td>
<td>0.10</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3,442</td>
<td>180.10</td>
<td>28.50</td>
</tr>
</tbody>
</table>

Source: International Railway Journal, July 1991  
* US $1 = FF 6

B. Development of the Texas High-Speed Rail Project

"It's fitting that our country's first high speed rail be built in Texas - a state whose people have a pioneering spirit and demonstrated leadership."

- William Agee, Chairman and CEO, Morrison Knudsen

"The demonstration of confidence and investment in this single project is indicative of a rail renaissance in the country, and in the coming decades, we will see growing public reliance on rail travel...the Texas TGV will set the standards by which all other very high speed rail systems in this country will be judged"

- William Agee, Chairman and CEO, Morrison Knudsen

In contrast to the French, the US experienced a more topsy-turvy approach to high-speed rail transportation. Initially, Texas splashed headlines with credible promises of being the first, successful state in the country to implement a high-speed transportation system (i.e., speeds greater than 150 mph) with the aims of creating a triangle linking Dallas/Fort Worth, Austin, San Antonio and Houston [See Exhibit 7]. Texas seemed to pass more milestones in high-speed rail development than any other state to date [Florida had temporarily enjoyed the limelight of being the most favored high-speed rail/maglev project]. However, as the business community waited in eager anticipation of the day Texas would begin to dig dirt, inability to meet financing requirements became a crucial obstacle to the high-speed rail project and resulted in the official termination of the Texas TGV franchise on August 19, 1994.

1. The germ of an idea

The idea of a high-speed line linking Texas' major cities arose less out of the need to prevent foreseen bottlenecks, as was the case in the French TGV-SE line, but more out of a strategic campaign for market share by European transportation companies. The US was seen as a lucrative, untapped market for high-speed ground transportation. So when the idea of a Texas...
Exhibit 7: Proposed Texas TGV Alignments

Current proposed alignment

Original "Triangle" alignment proposed by Texas TGV in 1991

high-speed triangle was first initiated in 1985 by a West German consortium, the call to battle for
the American market was signaled.

Texas seemed an ideal market in which to place a foothold. Vis à vis civil engineering,
the land was essentially flat, vast and seemingly inexpensive – a perfect testing ground for high-
speed rail. Economically, Texas' rapidly rising population implied future clogs in the
transportation system and a need to update the state infrastructure for 21st century demands. By
1985, Texas' population had nearly doubled over the course of 25 years [Texas' population
jumped from 9,580,000 in 1960, to 11,199,000 in 1970, to 14,229,000 in 1980 – percentage rises of
14.5% and 27.1% respectively. In 1985, its population rose again to 16,273,000].

Politically, Texas was regarded as a high-profile state with powerful friends in Washington DC. For
example, Texas had 29 electoral votes in 1985, which made it the third most powerful state in the
nation. California was first with 47 votes and New York second with 36 votes [Electoral colleges
officially vote for the US vice-president and president. Candidates with the most popular votes
in a state win all of that state's electoral votes]. Hence, the opportunity to build perhaps the
first US high-speed rail project in Texas would gain coveted attention from Congress and the
American public.

From early feasibility studies by the Texas Turnpike Authority [TTA] and the German
consortium, the link between Dallas and Houston was determined to be the most crucial. It was
already heavily trafficked by airplanes and automobiles, and the future capacity of these modes
might be insufficient to meet demand. In addition to addressing potential bottlenecks, the
studies emphasized the social benefits associated with a "Texas Triangle" project – job creation,
fare revenues, environmental amelioration, and reduction of foreign oil dependence.

The study that clinched the attention of the Texas Legislature was the TTA study of
February 15, 1989, which recommended implementation of a high-speed rail system. It had

28.; State and Metropolitan Area Data Book 1991, (Washington DC: US Department of
examined magnetic levitation possibilities but concluded that "maglev" would be technologically premature for the near future. The TTA study argued that a high-speed rail system was not only feasible but would be a positive boost to the state economy. The study predicted that the project would be a lucrative job generator, with the creation of a minimum of 10,000 new jobs over 25 years as well as 9000 permanent jobs. Moreover, it estimated that the new jobs would induce spending by approximately $7 billion. As for state revenues, it was projected that $28 million would be generated in 1998 – the expected debut of the first leg of the "triangle" – and that annual revenues would increase to $52 million over a 25-year period.

Encouraged by the lucrative prospects of high-speed rail, Senate Bill 1190 was signed into law to create the Texas High Speed Rail Authority in the Spring of 1989. The Authority was a separate state agency overseen by a nine-member board [Members included representatives from the TTA, Texas Department of Transportation, Texas Railroad Commission, Houston METRO Board, Dallas Area Rapid Transit Board, Fort Worth Transportation Authority, and three members from the general public]. The Authority's main objective was to "determine whether high-speed rail in Texas is for the public convenience and necessity," and to award the best qualified applicant with the franchise "to construct, operate, finance, and maintain a high-speed rail facility..."\(^{14}\)

2. The choice between French and German technology

Following traditional American bidding procedures, two contenders vied for the Texas franchise – one representing French TGV technology and the other promoting its German Intercity Express [ICE] trains. The first applicant was the pro-French, Texas TGV Consortium. The pro-German contender, who also initiated the idea of the need for a Texas high-speed rail system, was Texas FasTrac [See Exhibit 8].\(^{15}\)

\(^{14}\)Chronology of Events in Development of High-Speed Rail in Texas. Texas High-Speed Rail Authority, May 1993, p.1.
\(^{15}\)The Texas TGV Consortium has also been called the Texas High Speed Rail Corporation, and Texas FasTrac has also been called the Texas High Speed Rail Joint Venture.
Exhibit 8: Franchise Applicants for the Texas Project

<table>
<thead>
<tr>
<th>FasTrac</th>
<th>Texas TGV</th>
</tr>
</thead>
<tbody>
<tr>
<td>• German ICE rolling stock</td>
<td>• French TGV rolling stock</td>
</tr>
<tr>
<td>• Private/Public financing</td>
<td>• &quot;100% private&quot; financing</td>
</tr>
<tr>
<td>• $6.7 billion bid</td>
<td>• $5.7 billion bid</td>
</tr>
<tr>
<td>Siemens</td>
<td>Morrison Knudsen</td>
</tr>
<tr>
<td>Asea Brown Boveri</td>
<td>Bombardier</td>
</tr>
<tr>
<td>Westinghouse</td>
<td>GEC/Alstom</td>
</tr>
</tbody>
</table>

Led by Morrison Knudsen as project manager and joined primarily by the suppliers GEC-Alstom and Bombardier (GEC's Canadian arm and North American licensee), the Texas TGV Consortium was the first to file its franchise application along with a $400,000 check to the Authority on January 16, 1991. Its proposal was for a four-phase "Texas Triangle" alignment which consisted of the following main characteristics:

**Texas TGV proposal (January 1991)**

- **Technology:** TGV
- **Speeds:** approximately 320 kmh (200 mph)
- **Total length:** 940 route km (590 route miles) of double track
- **Construction phases:**
  - #1: Construct line from Houston to downtown Dallas to D/FW Airport
  - #2: Construct line from San Antonio to the connection with the Houston-D/FW line at Navarro Junction
  - #3: Construct commuter rail connection between Ft. Worth and D/FW Airport
  - #4: Construct southern line to complete "triangle" by connecting San Marcos Junction (just north of San Antonio) to Hockley Junction (just north of Houston).
- **Total cost:** $5.7 billion (excludes phases #3 and #4)
- **Finance plan:** Issue mainly tax-exempt revenue bonds with a small proportion of high-risk equity [no explicit mention of 100% private financing].

The contender, Texas FasTrac, consisted primarily of German corporations – Siemens AG, AEG Westinghouse Transportation Systems, ASEA Brown Boveri – and three local Texas contractors – Brown & Root, HCB, and HB Zachry Co. FasTrac filed its application soon after the
pro-French consortium did. Its three-phase proposal for construction resembled a "wishbone" structure and could be summed up as follows:

**Texas FasTrac proposal:**

<table>
<thead>
<tr>
<th>√ Technology:</th>
<th>ICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>√ Speeds:</td>
<td>approximately 320 kmh (200 mph)</td>
</tr>
<tr>
<td>√ Total length:</td>
<td>[official data unavailable]</td>
</tr>
<tr>
<td>√ Construction phases:</td>
<td>Construct line from downtown Houston to downtown Ft Worth, with stops in suburban northwest Houston, Bryan/College Station, Waco, and downtown Dallas.</td>
</tr>
<tr>
<td>#2 Connect Austin and San Antonio to first line at Waco.</td>
<td></td>
</tr>
<tr>
<td>#3 Link Austin and San Antonio directly with Houston (reserved for future analysis)</td>
<td></td>
</tr>
<tr>
<td>√ Total cost:</td>
<td>$6.7 billion</td>
</tr>
<tr>
<td>√ Finance Plan:</td>
<td>Public-private approach. The private source would come mainly from bond issuances, while the public source would come principally in the form of a federal subsidy.</td>
</tr>
</tbody>
</table>

The pro-French group estimated a cost of $5.7 billion and proposed to finance the project by issuing mainly tax-exempt revenue bonds and a small proportion of high-risk equity. In contrast, the pro-German group proposed that the project could be built for $6.7 billion using a public-private approach to finance. The private sector would mainly issue bonds, while the public sector would help finance the project through federal subsidies. In addition, FasTrac suggested that the Authority should issue revenue bonds to fund right-of-way and infrastructure acquisitions. Security for the Authority's borrowings would be limited to FasTrac's lease payments for the franchise, and bondholders would have no state government recourse in case of a default. Hence, the initial proposal by Texas TGV required indirect public subsidies and that of FasTrac more active public subsidies [It is important to clarify a semantic detail, in that the term "public subsidy" leaves room for wide interpretation. It could be as subtle as the tax-exempt portion of a bond, or as explicit as an all-out subsidy].

---

16"French, German Trains Proposed for Texas," *Railway Age*, February 1991
17This value is an underestimate of the total cost, since it only accounts for part of the total construction phases.
The Authority in fact embraced the notion of public-sector support. In the "Report of the Financial Advisors," the official advisors to the Authority explicitly stated that a joint public-private effort was necessary:

Applicants have independently determined that a project of this type and magnitude involves a combined public-private funding effort... Regardless of how the Applicant's plans are characterized, both recognize full well that the ultimate financing program may need to be a joint public-private effort. The Financial Advisors believe that this is, in fact, the case.\textsuperscript{18}

Yet in reality, neither financing proposal was feasible. Although the Authority itself proclaimed that some form of public-sector support was necessary, the Texas High-Speed Rail Act of 1989 explicitly forbade use of state revenues for financing high-speed rail:

The HSR Act and other applicable laws provide that state general revenue funds may be spent by the Authority for planning but not for financing, acquisition, construction, maintenance or operation of any high-speed rail facility.\textsuperscript{19}

This does not necessarily preclude using any other form of public moneys for rail infrastructure, but the application of "public" is again open to interpretation. Obtaining federal funds was highly unlikely without any complementary state support. So basically the franchise applicants were facing a circular problem with no clear-cut solution. Moreover at the time of the bid competition, there was a cap on the number of tax-exempt bonds that Texas could issue for any private-activity purposes, and even the maximum amount of tax-exempt bonds would not have been enough to finance the bulk of the "triangle" project [The quota amounted to $50 million per year for the entire state].

Shortly before the Authority's deadline to award the franchise, Morrison Knudsen Chairman and CEO William Agee, in a surprise move, declared that the project could be entirely funded by private investors. Although this may have sounded at odds with the Authority's


analysis of the financial picture, the state agency nevertheless awarded the 50-year franchise to the Texas TGV Consortium on May 28, 1991.

The Authority concluded "as a matter of law that Texas TGV is the best qualified to finance, construct, operate, and maintain a high-speed rail facility and the award of the franchise is for the public convenience and necessity."\textsuperscript{20} In addition to submitting an initial $250,000 check to cover the franchise fee, the Texas TGV partners were responsible for funding the Authority's operations, contributing a minimum $10 million in near-term equity before July 1991, obtaining $170 million by the end of 1992, and posting a $2.5 million abandonment bond that would be forfeitable if the system would not be constructed.

3. **Setbacks / One-year extension**

Texas TGV suffered a series of setbacks which prevented it from fulfilling the December 31, 1992 deadline for raising $170 million. The main reasons for the setbacks included delays in the Environmental Impact Statement report and the requirement of a new ridership study. The new study involved a change in the alignment from the original proposed triangle to a "wishbone" structure. In addition, absence of legislative and White House support as well as active opposition by Southwest Airlines and agricultural interests severely impeded progress that first year for the Texas TGV project.

Unable to meet the 1992 deadline for the above reasons, Texas TGV was granted a one-year extension.

4. **Missed deadline – Project on hold**

On December 31, 1993, Texas TGV failed to meet its deadline of raising $170 million in equity capital. The official reason was that Texas TGV could not secure enough cash and that the

\textsuperscript{20}Order Awarding High-Speed Rail Franchise, Texas High-Speed Rail Authority, Document # 91-606-001, May 28, 1991, p. 2.
three main partners – Morrison Knudsen, GEC-Alsthom, and Bombardier – did not want to expose their shareholders to such an enormous project risk.

However, upon further research, the reasons for missing the 1993 deadline appear to run deeper. Actually, Texas TGV was able to raise $170 million in investment commitments. So there were unofficial reasons other than "lack of cash" for suspending the project. The study will analyze the obvious reasons confronting Texas TGV as well as speculate on possible internal politics which may have sealed Texas TGV's fate.

Although one leading Texas paper pronounced the project "dead," Morrison Knudsen emphasized that it intended to continue with the project. In a private interview with Senior Vice President of Morrison Knudsen, Gil Carmichael (formerly Administrator for the Federal Railroad Administration under President Bush), the official word in the Spring of 1994 was that all three partners were still behind the project.\footnote{Telephone interview on April 22, 1994.} However, it became clear that "100% private financing" was not realistic and that some form of private-public funding was necessary. Texas TGV suggested that a 70% private / 30% public balance was the most realistic approach, that transfer of the Authority's role to the Texas Department of Transportation, and that more support from the people of Texas were necessary before committing further to the project.

5. Latest developments – Franchise revoked

As of this writing, the future prospects of Texas TGV appear grim. On May 26, 1994, the Texas High Speed Rail Authority filed a formal request for termination of the franchise and franchise agreement.\footnote{Complaint, Texas High-Speed Rail Authority, May 26, 1994.} On August 19, 1994, the Authority officially revoked the franchise from the Texas TGV Corporation. Whether Texas TGV or variation thereof of another high-speed rail project can still be resurrected remains to be seen.
III. Comparison of Challenges

"L'état...c'est moi"
- Louis XIV

"The will of the people is the only legitimate foundation of any government."
- Thomas Jefferson
(First inaugural address, March 4, 1801)

"If the country does not enjoy the political advantages of administrative unity, neither is it hampered in the most petty details of industry by excessive centralization."
- Michel Chevalier
(Society, Manners, and Politics in the United States, 1835)

In comparing the challenges of implementing high-speed rail in France and the US, it is evident that the US faces much higher structural hurdles than France does. These structural hurdles involve the economic (public economic) and commercial (private economic) feasibilities of high-speed rail. Specifically, economic feasibility refers to the costs and benefits to the economy regardless of who appropriates them. Commercial feasibility refers only to the costs and benefits that are privately appropriable. Unless a project is economically or commercially feasible, the project will ultimately fail no matter how extensive the financial engineering.

This chapter takes a look at some of the overall, public economic challenges shaping demand and supply of high-speed rail. Although quantitatively assessing public economic feasibilities is beyond the scope of this thesis, this chapter takes a qualitative approach. By exploring the differences in national structure (geography, history, government), politics, and marketing, this chapter elucidates why demand for high-speed rail may be greater and more easily met in France than in the US. The next chapter will delve into more depth on financing and commercial feasibility.

A. National Structure

The differences in the French and American national structures set contrasting frameworks for implementing high-speed rail in the respective countries. This includes differences in geographic size, history, and governmental organization. France is the ideal size
for high-speed rail, whereas the US is too vast for as comprehensive an application of the technology. France also had destruction due to World War II [WWII] and a need to rebuild its infrastructure, whereas the US emerged with a relatively unscathed infrastructure. Finally, in the sense that the SNCF is a state-owned company, the TGV-SE was an idea initiated by the state and approved by the state. In contrast, Texas TGV was a project initiated by private industrialists and faced heavy opposition mainly from Southwest Airlines and farmers. This opposition in turn blocked Texas TGV’s access to public-sector support. Consequently, high-speed rail faced an uphill battle from the start in Texas. Although the TGV rolling stock was purely French technology, the means of realizing this project in America could not be purely French.

1. Geography

The physical size of France worked naturally in its favor for high-speed rail. With a total area of 547,030 square km (213,680 square miles), France’s size is ideal for the capabilities of high-speed rail. With an operating speed of roughly 320 kmh (200 mph), the TGV is best suited for maximum distances of 300-500 km (180-300 miles). For example, the distance traversed by rail from Paris to Lyon alone is 417 km (260 miles), whereas in Texas the distance from Dallas to Houston is approximately 380 km (237 miles). The TGV-SE line traverses over half of France, whereas the Dallas-to-Houston leg of the Texas line would have traversed only a small portion of the state of Texas, and an even smaller proportion of the US itself. So by sheer size alone, France has a greater chance of creating a national rail network than does the US [With 687,618 square km(268,601 square miles), Texas is slightly larger than the size of France. In contrast, the US is 9,372,610 square km (3,661,180 square miles)].

Similarly, in Japan, where the original idea of high-speed rail first took form in the Shinkansen (or “bullet train”), the territorial size is amenable to high-speed rail. With the existing Japanese rail network, one can literally travel from one end of the main island to the other on

---

high-speed rail in a matter of hours. Hence, high-speed rail as a national infrastructure project is more readily realized in France and Japan than in the US.

2. History

As a consequence of World War II, France had a greater need to rebuild its infrastructure than did the US. Devastated by the war, France made a commitment to update its antiquated rail network to help revive the country. Attention paid to high-speed rail was more of a natural consequence of this commitment. In contrast, the US suffered little damage to its ground transportation infrastructure during the war. There was no incentive to "rebuild" the rail network. In fact, greater dependence on the automobile and the plane emerged in the post-war period. This was partly due to the vast American landscape and partly due to the high rate of car ownership. Rather than strengthen and rebuild the rail system as Europe did in the post-war period, America invested more of its public money and attention in a highway and airway network. Rail services in the US began to decline as more focus was shifted to alternative modes of travel. Consequently, France has a much more sophisticated and modern rail network than does the US today.

3. Governmental structure

France also had an advantage with its governmental structure. Whereas the French worked with a unified voice of private and public interests, the Americans faced the challenge of disparate voices and interests.

In France, the SNCF is a semi-public entity. Its interests and agenda are tied with the state. For example, when the SNCF built the second high-speed rail line, the TGV-Atlantique, it was the French government itself which pushed the project by directly subsidizing 30% of the infrastructure costs. Where conflicts may arise with private landowners on rights-of-way issues, the SNCF and the government can act in unison. What the SNCF wants (pending government approval) is de facto the public interest, and under the "powers of eminent domain" (i.e., the
ability of government to seize land for the public good, the SNCF can directly exercise that power to push for its rail agenda. As another indicator of rail enjoying the national limelight, the chairmanship of the SNCF is considered to be a prestigious post in France. As proven by historical precedent, the chairmanship status is roughly one step removed from a ministry post.24

There is additional historic precedent to the SNCF's more privileged position in France. In the Charter of 1842, France initially attempted a public-private approach (2/3 private money, 1/3 public) to finance its rail network.25 However, due to immature financial markets and an unstable government (i.e., the 1848 revolution and the fall of the Second Republic), investors suffered high losses. Following this crisis, the rule of Napoleon III held a tighter reign on government and centralized the national rail network. Initially an attempt was made to cut down on private companies to six different franchises and to follow a national rail plan. Eventually these companies were fused into the SNCF in 1938. So even before WWII, France had set the path for a unified national voice behind its rail network.

In contrast, the Americans had to work with a disunited front. This is partly due to the more decentralized nature of the US. It is also due to the historical precedence of successful private industrialists who owned major railroad lines for a substantial period of time in the 19th to early 20th century. Although rail enjoyed favoritism with government in its early years, particularly in the development of the Transcontinental Railroad, it moved away from the limelight with the onset of anti-trust suits, WWII, and the rise of the automobile and plane. This loss of attention has eroded rail's support in government and has accentuated the traditional antagonism of private versus public interests in the US. As an inheritor of this legacy, Texas TGV faced three main challenges. These national challenges included the anti-rail mentality of the Reagan and Bush administrations, the cap on tax-exempt bonds, and Texas state law forbidding use of any state revenue funds for development of high-speed rail.

---

First of all, what made the Texas TGV project extremely difficult was the stance of the White House administrations. During the Reagan and Bush years, subsidies for air and highway modes were favored over passenger rail. Although support for high-speed ground transportation was gaining momentum in Congress, legislation to provide public financial support – such as ISTEA (Intermodal Surface Transportation Efficiency Act), the tax-exempt bond amendment to the Internal Revenue Code proposal, and the Gas Tax issue (a.k.a. Intercity Rail Passenger Capital Improvement Trust Fund) – all faced heavy struggles in Congress as well as unfulfilled budgetary support. Highway and aviation lobbyists in Congress proved an indomitable force. Whether this was the result of economic forces or political lobbying is open to debate. Consequently, this made obtaining any federal money (or causal sympathy) for high-speed rail nearly impossible.

In particular, the cap on tax-exempt bonds of 25% further confined the potential success of the Texas TGV project. To make matters more difficult, there also existed congressional law which effectively limited private capital inflow to $50 million per year for a company in Texas. The damage of placing a cap on tax-exempt bonds was that investors who would have taken advantage of a tax shelter would seek other opportunities for investing their money. Effectively, this law and the $50 million quota prevented Texas TGV from reaching out to a greater base of investment support. This stood in sharp contrast to airport construction which had no such cap on tax-exempt bonds, thereby reflecting the Administration's favoritism for non-rail projects [In 1993, the cap on tax-exempt bonds was lifted, and so high-speed rail projects now hold the same tax-exempt bond status as airport projects]

Finally, at the instigation of Southwest Airlines, even the state of Texas forbade use of its revenue funds for subsidizing the Texas TGV project. Since Texas TGV could not readily tap the state coffers, it also could not easily touch federal funds made available through ISTEA. Not only did the public sector's hands-off stance increase the cost of the project to be borne by private investors [i.e., it threw the cost of right-of-way property quarrels into the private-sector's hands], but also this non-involvement increased the risk of the project in the case of default.
In stark contrast to full French public-sector support of the TGV-SE line from Paris to Lyon, the Texas TGV was essentially on its own.

B. Political Enemies

In contrast to the united front supporting the TGV-SE project in France, Texas TGV encountered political mishaps throughout its attempt to implement high-speed rail in the US. Specific to the case were clashes with Southwest Airlines and with agricultural interest groups. In particular, since it had the most to lose, Southwest proved to be the bitterest of foes. It fought Texas TGV at all levels— from inciting local ranchers' fears to exercising its political contacts in Washington DC.

1. Southwest Airlines

As far back as when the Texas Turnpike Authority was conducting its feasibility studies, Southwest Airlines, which was headquartered in Texas and a business favorite among locals, was actively fighting the high-speed rail project. With roughly two-thirds of the total intercity airline market within Texas and with a reputation for offering the lowest fare, Southwest had much to lose [American and Delta Airlines dominated the interstate market but followed Southwest's lead for the intrastate lines]. Despite intensive fare wars in the late 1980's to early 1990's, Southwest emerged as the nation's only profitable airline most likely to survive into the next decade. The only four airlines predicted to stay healthy for the next ten years included American, United, Delta and Southwest Airlines, but only Southwest was making profits from quarter to quarter. Much of Southwest's success could be attributed to its core competence as the nation's successful short-haul carrier. Consequently, the introduction of high-speed rail would compete head-on with the source of Southwest's lucrative business—namely, the short-haul passenger transportation niche.

Despite two unsuccessful lawsuits in 1991 aimed to discredit the validity of the Texas High Speed Rail Authority, Southwest did win over some points to keep it a viable threat to the
Texas TGV project. Southwest managed to lobby the Texas legislation to forbid use of state revenues to support high-speed rail. It also extended its territorial fight to Congress to counter any other legislation which would aid high-speed rail financing. Key to Southwest's ability to exert influence in the White House was its connection to Boeing, which is based in Seattle, Washington. Southwest is a prime client of Boeing. Particularly with threats to Boeing's future of competition from the European Union's [EU's] Airbus Industrie and of US defense spending cuts, continued business relations with Southwest were extremely important. Adding another twist to the picture is the importance of Boeing to the US government. For example, in trying to save the world's largest manufacturer of airplanes, the Bush administration negotiated with the EU to limit subsidies to Airbus. More recently, President Clinton has authorized subsidies for Boeing to protect the industry from EU competition. Under this scenario and in support of Seattle's aerospace industry, congressional pressure helped kill a federal subsidy for Texas TGV, because it would have hurt a good Boeing customer, Southwest Airlines.

While Southwest's push to forbid use of state revenues for the project put high-speed rail at the mercy of a tilted public-private relationship, the separation of state interest from the project had another negative, though subtle, effect on the project. This goes back to the time of the franchise competition. Rather than let the state finance and conduct an independent ridership and revenue forecast, the Authority required that each franchise applicant conduct its own studies. FasTrac hired Charles River Associates as consultant, and Texas TGV used Wilbur Smith Associates for the task. However, this relationship presented a potential conflict of interest, since either candidate might be tempted to exaggerate its figures. For example, according to the "Report of the Financial Advisors" submitted to the Authority:

Texas TGV's ridership forecasts appear to be on the high side and that has a major impact on the viability of the revenues shown in their Projected Income and Cash Flow statements. (This problem is then compounded by potential underestimates of capital costs.) Texas FasTrac's ridership forecasts appear to be more credible and that gives the Financial Advisors comfort that the total
revenue estimates on their Statements of Income (Projected) are basically viable. 26

Nevertheless, not only did the Authority award Texas TGV the franchise in spite of its questionable ridership study and cost estimates, but also the Authority chose Charles River Associates (FasTrac's former consultant) after-the-fact to conduct a new ridership study. This ridership study was to be paid for by Texas TGV and was to be used as the basis for the actual project.

It is of importance to note that the French did not have to contend with a hostile airline interest. Again, since the French owned the domestic French airline, Air Inter, arguments about losing market share to high-speed rail was mainly an intellectual exercise. For example, in 1982, Air Inter estimated that it lost 28% of its Paris-Lyon traffic to the TGV. However, the relationship between the SNCF and Air Inter (and therefore the state) was quite intertwined: The SNCF was a main shareholder, with 24.97% ownership of Air Inter stock at the time. 27 Hence, the multi-modal transportation system in France meant redistributing market share from one pocket to the other, but ultimately the French state owned all the pockets.

2. Local landowners

Partly due to Southwest Airlines' active instigation, Texas landowners and farmers created a great outcry against the TGV. The fears included property-rights issues, noise pollution, and possible threats to livestock from the electro-magnetic fields generated by the electrified catenaries. According to Marc Burns, Executive Director of the Texas High Speed Rail Authority, Texas TGV ignored marketing concerns to the local people, once it was given the green light from the Authority for the franchise. 28 Hence it ran into unanticipated public

26bp. cit.: Report of the Financial Advisors..., p. 17
28Telephone interview on March 28, 1994
obstacles. To manage those challenges, for example, it promptly addressed farmers' fears by offering trips to France to ride on the TGV and to talk with French landowners and farmers.

Interestingly, the national structure of France gave its countrymen a more advantageous position in which to handle agricultural fears about land rights. Although the French offered its farmers handsome compensation packages for obtaining rights-of-way for the TGV, the state had the upper hand in the matter from the beginning to the end – it could have seized the land anyway via the powers of eminent domain. In contrast, the US position is one of private industrialists who first must contend on a case-by-case basis with various land-use purchases. Although the powers of eminent domain exist in the US and are within the Authority's jurisdiction, they are an absolute last resort and are much harder to implement than in France.

C. Marketing

In another key comparison between the French and Americans, this section examines the rail transportation markets of both countries and ascertains the extent to which each party adequately addressed the specific marketing needs of their home countries.

The main difference between the two countries' approaches is that of marketing to attract passengers and that of marketing to gain political support. The French did not have to worry as much about garnering political or investment support for the project. The Americans did. Marketing the TGV-SE in France was more a matter of selling an attractive product, whereas marketing the Texas TGV in the US would require establishing a support network and creating public awareness of rail's benefits.

1. The French market – Creating a rail culture

For the French, there was less of a need to sell the idea that high-speed rail was necessary and more of a need to make the activity of high-speed rail travel look attractive to the passenger. The concern for the SNCF at the time of the TGV-SE development was that the line be economically profitable. Although the SNCF is a semi-public corporation, it had been financially
strapped. It was in the best interests of the SNCF that the new TGV-SE line become a success and compete with other modes of travel. For it was hoped that the TGV would become the new "cash cow" and would deliver the corporation from its financial mess.

Since the loans for the TGV-SE were backed by the French government, the SNCF did not worry about generating support. Its greater concern was to make its product as attractive as possible. It consequently created a commercial policy with two customer-oriented principles:

There are two types of criteria which the "long-distance passenger rail product" must respond to:
- the attainment of a commercial speed goal for the system;
- concentration on the strong points of rail transportation: punctuality, comfort, space, communication and appreciation of the landscape.  

The SNCF pursued this policy, for example, by deliberating on the aesthetics and seating comfort of the TGV. Along with heavy advertisement and adjustment to passenger schedules to meet client habits, the SNCF carefully catered to existing clientele as well as strategically pulled in new passenger demand. The success of this approach is reflected in the fast rise in rail ridership from 1981 to 1984 [See Exhibit 3].

It is important to note that the success of and reason for France's marketing style lay not only in its government-backed advantage but also in rail's existing popularity in Europe. France did not have to start from ground zero to win over a clientele base. Rather, it had the advantage of applying incrementalism to attract its passengers.

2. The US market – The need to first establish political support

In contrast to the product-design, customer-focused approach to rail in France, Texas TGV never had a chance to reach this stage. First and foremost, it really had to win over the American people to support high-speed rail. This is because rail is a less popular mode of travel than in Europe and because the demand for high-speed rail in Texas did not initiate with the American people but from foreign industrialists. Due to the complications of implementing high-

---

29 op. cit.: Roth, p. 46-7.
speed rail in the US, and possibly due to strategic oversight, Texas TGV did not appear to have much success in winning grassroots support – the necessary first stage of marketing high-speed rail in the US.

Rail is not a major mode of travel for Americans. In the US, the car is considered a status-symbol, and the vast terrain, urban layout and lifestyle of this country have in the past been more amenable to the car than has been the case in France. In addition, federal attention placed on air travel (such as subsidies and tax-exempt bonds for airport construction) and lack thereof for rail has further eroded passenger rail as a popular means of travel. Consequently, high-speed rail advocates in the US face a low existing clientele base, and the marketing challenge is to entice Americans away from the convenience and status of the car and plane. With this stiff competition, garnering support for high-speed rail is tough. Possible ways of enticing ridership would be via heavy advertising and, more often these days, siding with environmentalists.

Texas TGV overlooked the power of this important marketing angle. According to David Rece, President and COO of Texas TGV, while Texas TGV did hire a public relations consultant, there was very little proactive marketing.\textsuperscript{30} For example, Texas TGV did not work actively with environmental groups; the stance was that high-speed rail already had their support. On the other hand, Texas TGV did have a speakers bureau and presented before various professional groups, such as Rotary Club. However, these engagements occurred upon invitation by the professional groups. Texas TGV also sent approximately 50 farmers to France to ride the French TGV so that farmers would have a more informed view of high-speed rail. Nevertheless, it is important to note that this marketing response was reactive (i.e. after farmers had expressed great apprehension) rather than proactive. Overall, Texas TGV's marketing efforts appear to be passive, and this style hurt Texas TGV's ability to generate a wide base of support.

To understand the importance of proactive marketing, one has to look at the original business angle. The thrust behind high-speed rail in Texas was essentially engineered by the

\textsuperscript{30}Telephone interview on June 1994.
Germans back in 1985, and not by the American people.\(^3\) Whereas the SNCF in France built the TGV-SE line in response to its own studies of foreseeable saturation in rail travel, the Texans did not initiate their own operational studies about possible congestion. Without grassroots initiatives, the Germans and the French could have been perceived by the Texans as foreigners imposing their giant technologies on American soil.

Hence, proactive marketing and appealing to the people are important factors in the US, but the importance was overlooked in the Texas TGV case. In fact, back in the days of franchise competition, both FasTrac and Texas TGV operated in European mode when trying to win the franchise award. Both spent time courting high officials, instead of the local people. This method may have worked in Europe where decisions for such infrastructure projects are made at the ministry levels. However, it is not always effective under American conditions.

To be fair, one could argue that the lack of proactive marketing was more a result of the process rather than of strategic neglect. As Mr. Rece noted, it is much easier to point out mistakes in retrospect. He argued that Texas TGV probably did the best it could given the circumstances and its perspective. Since the franchise award was based on competition, both FasTrac and Texas TGV were more concerned with seizing the winning bid from the Authority. Even after the award, Texas TGV was so busy keeping pace with franchise deadlines and appealing politically to the Texas Legislature, that active marketing to the people seemed less crucial.

---

\(^3\)Local efforts to promote high-speed rail in Texas had been initiated in the past. However, these unsuccessful attempts were sporadic and never gained much public attention.
IV. The Financing Debacle – Public vs. Private

The nature of the French national structure as well as the unified political support for high-speed rail made the TGV-SE rail commercially viable in France. In contrast, the Texas TGV project was commercially unfeasible due to the US national structure and lack of public-sector support. So although Chairman and CEO William Agee of Morrison Knudsen made a bold last-minute pitch to declare that “100% private financing” was a realistic possibility for Texas high-speed rail, it became clear over time that this extreme posed too much project and investment risk to the private investor and construction partners. Although faulty financing appeared to be the culprit at first glance, ultimately the lack of commercial viability (and arguably the lack of economic feasibility) of Texas TGV was the true breaking point. To have made the Texas TGV commercially viable would have at least required greater political and financial public sector involvement.

In the ensuing section, I will detail the methods of financing in the French case, turn to the American case, and then wrap up with a comparison of the approaches. I spend more time on the American case because pertinent complications surrounding the financing attempt may have contributed to the suspension of the Texas TGV case.

A. The French Advantage

Although the SNCF used private investors to finance the first TGV line, the French had the distinctive advantage of political support from a united agency. In the TGV-SE case, the project was financed by internally generated funds and by government-backed loans issued to private investors on the international market. The TGV-SE project used no direct government subsidies, and yet the financing package was able to cover approximately $1.5 billion in costs. The fact that this extraordinary sum was raised can be attributed to the French government’s backing of the loans.32

32The government’s backing of the loans is a form of subsidy, although an indirect one.
With government backing, the risks to the investor are minimized, and the project becomes commercially feasible. The possibility of default is nearly eliminated once the project is deemed to be in the national interest. This also alleviates the burden on the SNCF in that it does not have to offer a premium on the return to investors. That is, the SNCF can issue low-interest bonds rather than pay a higher return to attract otherwise wary investors.

Having generated a rate of return of 15%, the TGV-SE was such an economic success that the SNCF expected to pay back the principal on its loans less than 10 years after the start of full service. This high rate of return is attributable to both an intrinsically profitable venture as well as to the ability to offer lower-interest loans ["Financial results for 1987 on the TGV Southeast Line were $737.5 million in revenues, and $291 million in direct expenses, leaving an operating surplus of $446.5 million...The net surplus covers interest on the debt that funded the project, depreciation of the trains, future track renewal, and a contribution to French National Railways overhead costs."].

In addition, the SNCF has enjoyed the benefits of heavy public-sector support both strategically and in balancing its books. Strategically, the development of the TGV was deemed in the national interest, and consequently President François Mitterand considered subsidizing the SNCF's later TGV projects to be a top priority. This shared interest between the SNCF and the state resulted in the government pushing and subsidizing 30% of the next high-speed rail project, the TGV-Atlantique:

The problem is money. President Mitterand's government is set on holding down its budget deficit, so it cannot afford big subsidies. The rail board, the Societe Nationale des Chemins de Fer Francais (SNCF) is deep in debt. Despite receiving FFr 32 billion in state aid, it lost FFr 8 billion ($930m) in 1983 – as much as Peugeot took four years to lose.

This is not deterring either President Mitterand, his new transport minister, Mr. Jean Auroux, or the SNCF. The example of the Paris-Lyons link, which is making money two years after going into service, is enough to convince them

Therefore, by strict interpretation, the TGV-SE was effectively a government-subsidized project.

that the train a grande vitesse (TGV) is a profitable way of modernising France.\textsuperscript{34}

Furthermore, the financial health of the SNCF has been an ongoing concern of the state. For example, in January 1990, the state made a contract with the SNCF to effectively forgive FF 38 billion in debt. The French taxpayer would bear the burden of this "pardon," while this FF 38 billion accounting entry would be moved to a special "service annexe d'amortissement" and would be amortized mainly by the French government over the course of approximately 10 to 12 years [The state would pay off the debt by contributing FF 3.8 billion (1989 francs) per year, while the SNCF would pay FF 100 million].\textsuperscript{35} Although by the end of 1989, the SNCF had finally positioned its balance sheets "out of the red," this action by the French government demonstrated that high-speed rail was a committed interest of the state and would be nurtured in its development.

B. Texas TGV Mishaps: Why Private Financing Failed

In contrast to the French, every attempt at a high-speed ground transportation project in the US to date has failed. It appears at first glance that the failures were mainly due to financing problems. However, the financing complications were only indicative of a more structural problem. This implies that the mishaps which Texas TGV suffered were not necessarily isolated. Consequently, understanding the financing and commercial economics issues in the Texas TGV case will serve as critical lessons for future attempts at implementing other mega-infrastructure projects such as high-speed rail in the US.

As the December 1993 deadline for raising $170 million in equity was drawing near, the project cost for Texas TGV had jumped to $8.4 billion. Texas TGV now revealed in its prospectus for raising the equity that 25% of the project cost was expected to be covered by the public sector. However, none of the legislation at the time allowed for federal subsidy of the Texas project.

\textsuperscript{34}On a Rail and a Prayer," The Economist, September 1, 1984, p. 55.
Realistically, Texas TGV was operating in isolation. Within this setting, Texas TGV hoped to raise the capital for the project through the following four-phase finance plan:

**Texas TGV Finance Plan**

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Initial funding of development work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 2</td>
<td>Issuance of convertible equity notes</td>
</tr>
<tr>
<td>Phase 3</td>
<td>Initial public offering of Class A Common Stock</td>
</tr>
<tr>
<td>Phase 4</td>
<td>Debt and other financing</td>
</tr>
</tbody>
</table>

Texas TGV halted suddenly at Phase 2, citing failure to raise $170 million in equity due to lack of public-sector support. Yet private investors rushed to commit to the Wall Street-engineered convertible equity note offer. In actuality, Texas TGV just never cashed in on investor commitments. The question is why.

In looking at what went wrong in the Texas TGV case, this section takes a detective's approach. It first isolates the events of Phase 2 and concentrates on the group's failure to meet the December 31, 1993 deadline of raising $170 million in equity. From an initial analysis, plausible causes of failure include an excessively high $170 million equity requirement and an unattractive investment package. Probing deeper into the events of Phase 2, another hypothesis is that internal politicking broke apart the Texas TGV consortium. While there is evidence to this effect, this explanation may have been only symptomatic of a much more compelling reason. The paper then takes a step back and analyzes Texas TGV's financing strategy framed within the overall economic "big picture." It then becomes clear that the principle stumbling block for Texas TGV was that the project was commercially unfeasible. In the absence of public-sector support, the commercial economics of Texas TGV simply were not profitable enough to attract private investors for the full breadth of the project. Given the low returns to the private investor, private financing of the entire $8.4 billion project was inherently flawed.

---

*op.cit.: *Texas TGV Preliminary Offering Circular, p. 33.
1. Initial analysis

In isolating the events of Phase 2, if one were to turn only to the media and records of paper transactions, plausible explanations for the failure to raise the cash were that a) the $170 million was unreasonably too high to raise in a year and b) the investment package itself gave mixed messages of attractiveness. However, the majority of media reports projected a filtered version of the behind-the-scenes activities. Actually, Texas TGV did raise $170 million in investor commitments. So why did the project fall through anyway? Part of the reason is that internal politics among Texas TGV partners may have put the project on the line, and this section will spend some time reviewing this hypothesis.

a. $170 million excessively too high

The Authority’s requirements for raising $170 million in equity may have been unreasonable for the first year. According to James C. Gerber, former Director of Finance and Vice President of Texas TGV, the corporation’s expenses were very low the first year [From its "Statement of Operations," Texas TGV had total expenditure of approximately $4.1 million in 1992].\(^{37}\) Mr. Gerber claimed that $170 million was unnecessarily too high an amount to raise for the first year. Had communication with the Authority been more interactive, this demand may have been renegotiable.\(^{38}\)

However, this explanation appears weak. For it can be counter-argued that $170 million is only a small portion of the expected cost of the project. Securing that amount of money up-front only reinforces investor confidence that this project will not fail midway through construction. Of course, to play devil’s advocate, one could argue further that investor confidence should be won over by an adequate showing of public-sector support rather than "nominal" equity.

\(^{37}\)ibid.: p. F-5.
\(^{38}\)Telephone interview in April 1994.
b. Mixed messages of attractiveness

The investment package to raise the required $170 million in equity sent mixed messages of attractiveness. Depending on investors' expectations and understanding of finance, the complicated terms of the preliminary offering circular may have generated misleading interpretations.

As part of its plan to raise $170 million in equity, in December of 1993, Texas TGV Corporation offered $200 million worth of 3% convertible equity notes due in the year 2000. In general, convertible equity notes are analogous to bonds which change into a given number of stock shares (equity) at a specified point in time. In the Texas TGV case, investors would first be issued bonds at a 3% coupon rate. If at any time before the year 2000, should Texas TGV announce an initial public offering [IPO] of its stock, the notes would convert to stock shares. Immediately after the IPO, the investor would have the (put) option of selling the stock to the company at the IPO price.

Exhibit 9: Schematic of the Payoff Structure for the Convertible Equity Notes

Note: This schematic illustrates the payoff structure for the convertible equity notes if held to the IPO. As indicated, the payoff as a bond offers more attractive returns than a US treasury note. However, this payoff is capped when converted to stock.
Upon a close reading of the prospectus, it appears that the terms of the convertible equity notes yield a) fair to attractive returns as a bond (i.e., taken to maturity or to the IPO), but b) unattractive returns as a standard convertible and c) unattractive returns as a standard put option [See Exhibit 9]. Overall, the package is not a bad deal if regarded as a simple bond. However the unconventional use of the terms "convertible" or "put option" may have, on the one hand, thwarted cautious investors from seriously considering the package, and, on the other hand, may have attracted careless investors into thinking they had a better deal than was possible. For an indepth analysis of the convertible equity notes, see Appendix A.

2. Probing deeper: Internal squabbling

Yet despite the mixed odds of attracting investors for the reasons described above, Texas TGV still managed to obtain $200 million in commitments from investors for the convertible equity notes. In interpreting investor response, aside from the issue of mixed investment attraction, it appears that there was genuine interest in supporting Texas TGV despite the problems with Southwest Airlines and the lack of public-sector support. As a first impression, this appears to be a green light for the project. Nevertheless, the project came to a halt in December 1993, when Morrison Knudsen formally withdrew its commitment to back the project [GEC Alsthom and Bombardier had similarly withdrawn commitment at separate times earlier that year]. The official reason was that the partners were unable to "raise enough cash" and that they did not want to expose their shareholders to carry the risk of the project. However, Texas TGV was literally hours from closing in on the $200 million commitments. So investment potential was there – it was just never "cashed." Yet the partners withdrew their backing in the last minute. The question then is why.

The rationale for pulling out can be only left open to speculation. One possible explanation is that the required $170 million is only a drop in the bucket for the total cost of the project. The ability to obtain investment commitments for that small percent (though large in
absolute terms) did not necessarily translate to success of the project. Perhaps the partners had serious last-minute doubts about obtaining future investors and decided to pull out.

Another plausible explanation is that there was some internal power struggle going on – and I will delve into this issue at some length. First of all, GEC Alsthom had quietly withdrawn its commitment to financially back the project in September of 1993. Nevertheless, its name remained as shareholder on the preliminary offering circular of November 29, 1993. The general description of capital stock ownership amongst the major partners is shown in Exhibit 10.

Exhibit 10: Shareholder Hierarchy

- **Series A Preferred Stock** (21,500,000 shares designated)
  Morrison Knudsen 11,500,000 shares held

- **Series B Preferred Stock** (26,000,000 shares designated)
  GEC Alsthom 1,304,619 shares held
  Bombardier 1,304,619 shares held

- **Class A Common Stock** (68,480,002 issued and outstanding)
  Morrison Knudsen
  Mannai Investments Inc (Texas subsidiary)
  C&B (a Texas venture)
  GEC Alsthom
  Bombardier

- **Class B Common Stock** (no shares issued and outstanding)

Of importance to note is that holding Series A Preferred Stock offered the same rights as Series B Preferred Stock: "The Series A Preferred Stock ranks *pari passu* with the Series B Preferred Stock, without preference of priority among the shares of each series." In the case of liquidation of Texas TGV, both holders of Series A and Series B Preferred Stock had priority in receiving a "liquidating distribution of $1.00 per share before any distribution of assets is made to holders of Class A Common Stock or Class B Common Stock." Hence according to the "Description of Capital Stock" written in the preliminary offering circular, Morrison Knudsen, GEC Alsthom, and Bombardier had equal rights and privileges.

---

40 *Texas TGV Preliminary Offering Circular*, p. 22.  
41 Ibid., p. 23.
So what may have altered the relationship? GEC Alsthom already had one foot out the door as of November 1993. What could have made Bombardier follow suit? Perhaps a sudden change of terms may have disgruntled the partners? Whatever did indeed happen occurred behind the scenes. However, a plausible explanation is the "Counter-Guarantee and MKC Subscription Agreement." First mentioned on page 15 of the preliminary offering circular on November 29, 1993, and finally given detailed explanation of its consequences on page 45, the Counter-Guarantee appears to have thrown the balance of power in Morrison Knudsen's [MKC's] favor:

Pursuant to a subscription agreement (the "MKC Subscription Agreement") dated as of November 29, 1993, the Company has agreed to issue to MKC, at MKC's option, shares of either Class A Common Stock or a series of preferred stock of the Company with a liquidation preference and voting rights as described below, if MKC should be required to make payments under the Counter-Guarantee on behalf of the Company.42

Under the agreement, Morrison Knudsen was to guarantee to the Canadian bank repayment of a maximum of $75 million for the letter of credit and interest accrued on the equity notes [The bank was responsible for backing the letter of credit on the convertibles by $225 million]. If Morrison Knudsen were required to make payments under the Counter-Guarantee, then it was entitled ownership of a new series of preferred stock called the Series X Preferred Stock, to which Morrison Knudsen would be allowed 1000 shares. The Series X Preferred Stock would give its owner liquidation preference over all other forms of stock as well as greater power in the company:

The new Series X Preferred Stock will have a liquidation preference, prior to any payment on any other capital stock of the Company...The Series X Preferred Stock will have the same voting rights as Series A Preferred Stock and Series B Preferred Stock and, in addition, approval of 100% of the holders of Series X Preferred Stock will be required in order to dissolve the Company or distribute any of its assets upon liquidation...

42bid. p. 45.
...MKC, as a Counter-Guarantor, must approve the Company's annual operating budget and quarterly updates thereof and must approve any expenditures in excess of such budget.\textsuperscript{43}

Given that this Counter-Guarantee statement was submitted on November 29, 1993, only a month away from the target deadline for the $170 million, and given that the above information was buried on page 45 of the circular, the circumstances lead one to believe that an internal power struggle was in the works. Upon viewing this potential change in power relationships as the deadline drew near perhaps GEC Alsthom and Bombardier may have more vocally withdrawn their financial backing of the project [See Exhibit 11]. This would then have forced Morrison Knudsen to rescind its backing, since its lonely position would indeed subject its shareholders to project risk.

\textbf{Exhibit 11:}
\textbf{Schematic of the Change in Relationships Based on Risk and Reward}

\textbf{Pre-Counter Guarantee}

\textbf{Post-Counter Guarantee}

\textbf{Note:} The greater the returns and risks, the greater the incentive the interested party has to wield power over the rest of the players. This schematic illustrates the distribution of risks and rewards to all players relative to the Texas TGV project's inherent payoff structure. Prior to the counter-guarantee, Morrison-Knudsen had the most to gain from Texas TGV, since the true risks and returns of the project would have been absorbed by the Canadian bank and future private investors. However, with the counter-guarantee, Morrison-Knudsen may have gained power in the short term (i.e., liquidation rights over GEC-Alsthom and Bombardier) but ultimately had to bear the true risks of the project as well as a potentially low return.

\textsuperscript{43}\textsuperscript{bid., p.45.}
3. **Commercial economic reality**

While possible behind-the-scenes squabbling may have accelerated the project's demise, it is the paper's stance that 100% private financing of the $8.4 billion project was inherently flawed. In taking a step back to review the events at the end of 1993 in context, it becomes clear that in the absence of public-sector support, the project became prohibitively expensive and the commercial economics of Texas TGV simply were not profitable enough to attract private investors for the full breadth of the project.

a. **Lack of public-sector support**

Without tangible public-sector support, Texas TGV faced a dual dilemma: the costs of the project would rise, and the associated risks would fall on the shoulders of the investor and the borrower (Texas TGV). This is primarily because project risk and right-of-way concerns are not shared by the state but by the private parties.

The primary damage resulting from the lack of public-sector support is that the project becomes more expense. The private sector must contend with the high litigation and "market-value" costs associated with rights-of-way issues. Private industrialists must now handle the political headache as well as offer economic incentives to landowners to allow the TGV to pass through their territories. According to the preliminary offering circular, the new alignment would require approximately 9500 acres of right-of-way. Approximately 20% of the route would use existing railroad rights-of-way in urban areas. The remainder would be mainly on new, non-urban rights-of-way. In fact, the new "wishbone" alignment may have been created partly in response to the escalated rights-of-way costs of the original alignment. In the "Texas Triangle" alignment, Texas TGV estimated the high-speed rail corridor would involve approximately 14,000 acres of property. Using a $5000/acre average, the right-of-way and land costs would equal approximately $70 million. This does not include allowances for improvement, relocation

---

44ibid., p. 30.
assistance and property management]. Texas TGV's only reliable vehicle of power was its monetary clout. Since the final rights-of-way costs were inversely proportional to government participation, Texas' lack of public-sector support placed an unfair burden on Texas TGV's pockets.

Whereas the French government had the initial and final say in rights-of-way disputes, Texas TGV Corporation was responsible for securing rights-of-way first through private transactions. According to Mark Burns, Executive Director of the Texas High Speed Rail Authority, if those private transactions were to fail, then the Authority would be entitled to use eminent domain proceedings. In practice, the Texas TGV case never advanced this far. However, primary reliance on the private party to negotiate rights-of-way matters suggests that acquisition of land for high-speed rail in the US could be costlier than necessary.

The other damage resulting from lack of public-sector support is the shift in risk to the private sector. In general, this would mean that Texas TGV's cost of debt would increase since it would have to pay a higher return to private investors – who demand at least corresponding market rate returns – than to the government.

As Texas TGV further investigated its financial sources, it recognized this dilemma. Realizing the need for public-sector support, Texas TGV proposed a new financing arrangement which was submitted in the convertible equity note circular of November 29, 1993, and which offered the following mix of potential financial sources to fund the expected total project cost:  

\[
\begin{align*}
\text{Notes offered hereby} & \quad \$ 0.2 \\
\text{Equity} & \quad 1.5 \\
\text{Debt} & \quad 4.6 \\
\text{Public sector transportation programs} & \quad 2.1 \\
\hline
\text{Total} & \quad \$ 8.4
\end{align*}
\]

[Figures shown as nominal dollars in billions]

\[^{45}\text{op. cit.: Report of the Financial Advisors...}, p. 15.}\n\[^{46}\text{op. cit.: Texas TGV Preliminary Offering Circular, p. 34.}\]
For the first time since the bid, Texas TGV mentioned the need for public-sector backing. This was a late adjustment to the "100% private financing" strategy declared by Morrison Knudsen during the franchise application days. It was hoped that public-sector funding would be raised in 1996 and "would consist of a combination of taxable and tax-free public market debt issues and funds from other sources, which are currently expected to consist almost entirely of public sector transportation programs such as those governed by the Intermodal Surface Transportation Efficiency Act of 1991." Nevertheless, the 25% proportion of public-sector backing remained only a potential rather than a concrete source of funding. In other words, public-sector backing was essentially nil.

Isolated away from public-sector participation, the Texas TGV project would have been regarded as a highly risky joint-venture given the uncertain market and time-to-payoff. Without the blessings of the state to offset the risk of default, the lenders must rely on the borrowing party to back the loan. Theoretically, Texas TGV would have had to offer a higher rate of return for the higher risk carried by the private investor. This would have made the financing method for the Texas TGV extremely expensive than had cheaper, government-backed bonds been used.

In the case of the $200 million convertible equity note, Texas TGV was able to offer a bond which carried risk similar to that of a US Treasury note, although the actual risk of the project was far from being risk-free. This was because the $200 million was within the asset value range of the loan's backers – the Texas TGV partners and the Canadian Imperial Bank of Commerce. Particularly with the guarantee by the Canadian bank and ultimately with the counter-guarantee by Morrison-Knudsen, the investors could afford to rely on return of their investment money in case of project default and accept a correspondingly lower payback. However, as will be discussed below, this scheme could only work for limited amounts of money, but would not be able to survive financing the entire project. For ultimately, in the absence of public-sector support, the risks and associated costs were too high to be borne by the private sector alone.

\[\text{47ibid., p. 34.}\]
b. **Limits of private financing**

The ultimate reason why Texas TGV failed is that the commercial economics of the project could not be borne by the private sector alone. 100% private financing of the $8.4 billion project was inherently flawed given the payoff structure of the project and the expected risks and returns of the private sector. A basic net present value analysis illustrates that the payoff to the private investor is too uncertain and too long a wait to be attractive [See Exhibit 12].

In Exhibit 12, the net present value analysis shows that the TCV project yields a negative value from 1994 to 2015. The ridership revenue is taken from an independent ridership study conducted by Charles River Associates for Texas TGV Corporation.\(^{48}\) The revenue stream begins in the year 2000, when the first leg of the Texas corridor was expected to be open [Full revenue service over the entire corridor was expected to begin in 2003].\(^{49}\) The data reflects the scenario which Texas TGV considered most closely corresponded to the system it expected to construct, in which Texas TGV hypothetically would have fully integrated passenger connections at the Dallas-Fort Worth Airport with American Airlines [See Appendix B]. Using the $8.4 billion project cost as a benchmark, the time to break even is beyond 20 years. Although this net present value analysis is conservative in that the ridership figures were calculated during a recessionary period, it is unconservative in that the $8.4 billion benchmark only included capital costs but no operational expense [Values for operating expenses were not available]. The number of years to break even would actually be greater had operating expenses been included. Obviously, no private investor would wait so long for the project to yield a positive net present value.

Given Texas TGV’s economics and institutional constraints, no private investment community would be willing to bear the full brunt of the project risk, and no amount of Wall Street finance wizardry would be able to justify investing in the project over its entire life span.

---

\(^{48}\) Although the revenues were recorded in constant 1991 dollars, the analysis in Exhibit 12 adjusts the revenue figures to nominal dollars, using 3% as the approximate US inflation rate for the period.

\(^{49}\) Op. cit.: *Texas TGV Preliminary Offering Circular*, p. 32
### Exhibit 12:
**Net Present Value of Texas TGV Project**

(All dollar figures in millions)

<table>
<thead>
<tr>
<th>Inflation rate:</th>
<th>3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal interest rate (1994):</td>
<td>15.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indexed year for Inflation (base = 1991)</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue (1991 real $)</td>
<td>$190</td>
<td>$403</td>
<td>$446</td>
<td>$527</td>
<td>$546</td>
<td>$561</td>
<td>$572</td>
<td>$584</td>
<td>$595</td>
<td>$607</td>
<td>$618</td>
<td>$630</td>
<td>$641</td>
<td>$653</td>
<td>$664</td>
<td>$676</td>
</tr>
<tr>
<td>x Inflation factor, 3%</td>
<td>1.30</td>
<td>1.34</td>
<td>1.38</td>
<td>1.43</td>
<td>1.47</td>
<td>1.51</td>
<td>1.56</td>
<td>1.60</td>
<td>1.65</td>
<td>1.70</td>
<td>1.75</td>
<td>1.81</td>
<td>1.86</td>
<td>1.92</td>
<td>1.97</td>
<td>2.03</td>
</tr>
<tr>
<td>Revenue (nominal $)</td>
<td>$248</td>
<td>$541</td>
<td>$617</td>
<td>$752</td>
<td>$802</td>
<td>$848</td>
<td>$892</td>
<td>$937</td>
<td>$984</td>
<td>$1,033</td>
<td>$1,084</td>
<td>$1,138</td>
<td>$1,193</td>
<td>$1,251</td>
<td>$1,311</td>
<td>$1,374</td>
</tr>
<tr>
<td>Discount factor</td>
<td>0.42</td>
<td>0.36</td>
<td>0.32</td>
<td>0.27</td>
<td>0.24</td>
<td>0.20</td>
<td>0.18</td>
<td>0.15</td>
<td>0.13</td>
<td>0.12</td>
<td>0.10</td>
<td>0.09</td>
<td>0.07</td>
<td>0.06</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Present value (nominal $)</td>
<td>$105</td>
<td>$197</td>
<td>$195</td>
<td>$206</td>
<td>$190</td>
<td>$174</td>
<td>$158</td>
<td>$144</td>
<td>$131</td>
<td>$119</td>
<td>$108</td>
<td>$98</td>
<td>$89</td>
<td>$73</td>
<td>$67</td>
<td></td>
</tr>
<tr>
<td>Σ present value (nominal $)</td>
<td>$2,125</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less capital costs (nominal $)</td>
<td>($8,400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPV</td>
<td>($4,265)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

1) The long-term interest rate for government bonds, rf, was approximately 7.5% in 1984.

Assuming a β of 1 for simplicity (this is unconservative), the cost nominal cost of capital, ra is:

\[
ra = rf + \beta (rm - rf)
\]

where:
- rf = risk-free rate
- \( \beta = 1 \)
- rm = market rate

\[
ra = 7.5\% + 1(8\%) = 15.5\%
\]

2) The ridership revenues come from the Texas TGV Preliminary Offering Circular, p. 32. [See Appendix B]

3) The NPV would be slightly higher if one takes into account the tax benefits from depreciation and the terminal value. In the end, however, the NPV would still be highly negative.
Although investors quickly rushed to invest in the $200 million of convertible equity note, the amount would have been only a small drop in the $8.4 billion bucket. Applying the same financing methodology to the remainder of the project would not have made economic sense.

Based on the net present value results, one might argue that market efficiency has proven that high-speed rail is not a worthwhile venture. However, this would be a premature statement. A third equation to the supply and demand balance is missing – namely, social externalities. If the social benefits of high-speed rail (pollution abatement, job creation, congestion relief, reduction in foreign oil dependence, and etc.) were given a quantifiable return value in dollar terms, then the “revenues” would have been much higher and the break-even time shorter. However, these social externalities belong to the domain of the public sector rather than the Adam Smith world of the private, business sector. Had there been a stronger public sector presence, not only the revenues, inclusive of social externalities, would have increased but also the cost of the project would have fallen due to cheaper right-of-way and debt payments.

Of course, in sum total, the reasons for halting the Texas TGV project may have touched upon all the features this study mentions – unique national structure, lack of political support, battles with Southwest Airlines and agricultural fears, a complex investment package, and possibly internal squabbling. However, the driving force behind Texas TGV’s demise was the overall economics (public and commercial) of the project and the accompanying lack of public-sector support. For the project did not yield enough tangible, monetary payoffs to justify 100% private financing. Given that high-speed rail is effectively a public infrastructure, it appears only fair that the public sector bear its fair share of the financing burden – that is, if the infrastructure is indeed deemed a worthwhile venture for the public. Introducing greater public sector involvement in the US, however, would require a shift in institutional ideology away from its competitive market spirit. Although Texas TGV officially terminated its franchise in August 19, 1994, subsequent federal legislation – the High-Speed Rail Development Act of 1994 – appeared in its stead, signaling greater interest in high-speed ground transportation. Whether high-speed rail ever does come to fruition in the US remains to be seen.
V. Lessons: Suggestions for a Tailored US Rail Revolution

As this study suggests, while there is much to be learned from the French approach to high-speed rail, the actual implementation of high-speed ground transportation in the US requires its own model. The French have essentially given the US inspiration about the technical feasibility and overall benefits of high-speed rail. The French have given the world the lesson that high-speed rail has presented an elegant solution to the infrastructure problems of our era. In particular, with the TGV-SE, they have proven that high-speed rail can generate profits, improve operational efficiency, create positive social externalities, and resourcefully use existing technology.

While the physical result of high-speed rail may be a desired goal of the US, the means of implementing such a system will have to follow its own accent. This is primarily because the national structure of the US – geographically, historically, and politically – sets a completely different backdrop from that of France. Such national differences raise the hurdles for economic and commercial feasibility of high-speed rail much higher in the US than in France.

From the Texas TGV experience, it became clear early on that importing a European product was not simply a matter of transferring technologies across the Atlantic. Rather, the Texas case required a solid understanding of the American culture and market. Texas TGV made many mistakes in overlooking this very issue. While these oversights were a natural consequence of being a first-mover in the field, it is with hope that the mistakes made will serve as useful lessons for future attempts at high-speed ground transportation in the US.

The main lessons to draw from the Texas TGV case are to first better assess high-speed rail's economic and commercial feasibility, to increase the commercial viability where possible, and then to improve actions in financing, marketing, and politics. These lessons are discussed more as general business "rules of thumb." This only emphasizes the fact that the Texas TGV case was a bold first-attempt at a new market and that past actions, be they bad or good, serve as learning tools for future attempts at implementing high-speed rail in the US.
A. Economic Feasibility

Future attempts at high-speed rail should better assess the economic feasibility of a project for a targeted corridor. This should be the first tier of analysis [See Exhibit 13]. Economic (or public economic) feasibility involves measuring the costs and benefits to the entire economy regardless of who appropriates them. This includes not only the monetary costs and benefits to the private sector but also the value of the positive and negative social externalities.

Exhibit 13: Tiers of Feasibility

1. **Economic (public economic):** includes all costs and benefits to the economy regardless of who appropriates them

2. **Commercial (private economic):** includes only those costs and benefits that are privately appropriable

3. **Financial:** includes only those costs and benefits that can be contracted for amongst various parties

In the case of France, it could be argued that high-speed rail was economically feasible, because the combined benefits to the private and public sector outweighed the cost. For example, positive social externalities such as pollution abatement, lowered reliance on foreign oil, and relaxation of air and highway congestion outweighed the costs of installing high-speed rail (i.e., right-of-way claims, capital costs, and etc.).
This equation is different for the US. To date, the value of the same social benefits appear not to outweigh the costs of high-speed rail in the US. On the one hand, this could be because the US has not included the social externalities factor into the economics equation. Perhaps the US has not adequately asked itself how it would like shape or preserve the American urban landscape for future generations and has not properly assessed the future costs and benefits. On the other hand, this could be because the US is a less centralized nation than France, and implementing high-speed rail might impose tremendous litigation costs (right-of-way suits) and political strife. Specific to Texas, one needs to question the economic benefits of rail given Texas' dispersed population and its stronger car and plane culture.

While it is beyond the scope of this paper to quantify the value of these social externalities, it is important at least to qualitatively assess whether high-speed rail is economically feasible in the US in general and, more specifically, in the proposed corridor itself.

B. Commercial Feasibility

If high-speed rail is indeed economically feasible, future projects need to better assess the second tier of viability — commercial feasibility. Commercial (private economic) feasibility involves measuring only the costs and benefits that are privately appropriable. In addition, commercial feasibility can be improved by increasing public-sector support to shift the project risk away from the private sector. For without adequate return to the private sector, no amount of financial wizardry, micro-management, or causal sympathy will allow the project to succeed. Otherwise, private investors will choose to put their money in other alternatives which offer market-competitive returns.

This was the major lesson learned in the Texas TGV case. As a 100% privately financed project, private investors would have borne the entire risk of the project but would have ultimately received less than market-rate returns over the life of the project. This skewed risk-return relationship is both inherent to high-speed rail itself and to Texas-specific conditions. For example, the longer the time required to construct and finally operate the line, the higher the risk.
For high-speed rail, whereas the risk on operating expenses is low and potential return high (the time to break even on operating expenses is approximately 4 years), the risk on capital costs is high and the returns low (the time to break even on capital costs is approximately 10 years). Hence, the high risks and low returns on capital investments usually make high-speed rail commercially unattractive. In the Texas TGV case, the commercial picture is even more pessimistic. This is because the return is questionable given that Texas TGV would be a new market entrant and ridership revenues would be difficult to accurately assess.

It is evident that the structural economics of the US market creates a high barrier to entry for high-speed rail. However, these barriers are not permanent. Future projects can increase the commercial feasibility of high-speed rail by obtaining greater public-sector support. Otherwise, implementing high-speed rail may be next to impossible and no amount of financial engineering or public relations will ever make high-speed rail reality.

1. **Obtain public-sector backing**

The necessity of public-sector backing was shown both in the French case and more acutely in the Texas TGV case. The ease with which the French were able to implement high-speed rail is much indebted to the unified public-sector blessing of the TGV-SE project. At the other extreme, Texas' reliance on mainly private money and its failure to continue with Texas TGV proves that the economics of such a major infrastructure require public-sector backing if the project is indeed deemed to be within the public interest.

Granted it is theoretically possible that private investors could fund the entire Texas project [Texas TGV did raise $200 million. Realistically, whether private investors would be willing to put their money down for much more is highly unlikely]. However, non-participation of the public-sector effectively makes the project costlier and riskier to investors. The argument is that the public-sector must share some responsibility. After all, transportation is part of the public domain. There are positive social externalities such as job generation, travel convenience, environmental amelioration, and pollution abatement which simply do not fit into a
mathematical cost-benefit equation. To place this responsibility on the private investor may be unfair. There is no price associated with such positive social externalities, and so the private investor will not necessarily reap his or her just return.

Similarly, the project is extremely expensive without public-sector involvement, because rights-of-way conflicts would otherwise fall on private investors' shoulders. In the Texas TGV case, the initial confrontation is private landowner versus private investor. If the rail project were backed by the state, then channels for dispute would be one of private versus the collective good. With active state involvement on property-rights issues, the chances for legal success and cost minimization would be much higher than where private property owners confront private investors head-on.

In addition, increased public-sector backing is necessary due to the existing structure of subsidies to the air and highway modes. In order to compete with the car and plane and create a more level playing field, subsidies to these alternative modes need to be shifted to high-speed rail. The shifting of subsidies in the US, however, would be difficult to implement due to its consensus-building political structure. This contrasts with the French case, in which the government controls the cost of gas and therefore can readily shift the commercial profitability in favor of one transportation mode over the other.

The other argument for public-sector involvement is risk-reduction. Without government backing, financial investment packages approach "junk-bond" status, or at least become very risky joint-ventures. For a mega-infrastructure project which is traditionally considered a public good, the lack of public-sector support would signal a sign of no confidence in the project. As a result, the borrower might have to resort to complex, though not always effective, means of attracting investors and other financial institutions to participate in the project.

Hence, public-sector backing in the form of federal and state aid is absolutely necessary from a realistic viewpoint. As Texas TGV learned the hard way, a mega-project becomes incredibly risky as well as legally and financially cumbersome without that public partner.
C. Financing

While financing has been blamed as one of the greatest stumbling blocks for implementing high-speed rail in America, the reasons for project failure are primarily economic. Financial feasibility is usually not the problem. The US financial market is large enough to accommodate the cost of large projects such as the $8.4 billion Texas TGV. For, finance is only a tool which can contract costs and benefits between parties. If the project is uneconomical from a public and private perspective, then the economics are to blame – not the financing.

From the Texas TGV case, two financing lessons can be drawn. At the structural level, projects which are not economically feasible should not be financed. At the contractual level, the distribution of agency and contract risks needs to be improved.

1. Do not finance a commercially unfeasible project

The key mistake Texas TGV made was jumping to the financing phases without having first established commercial viability. Although the US framework made public-sector support of high-speed rail difficult, Morrison Knudsen’s declaration of 100% private financing effectively killed the project’s commercial viability. For now, the return to the private sector would never justify the risk of the project.

In the absence of commercial feasibility, financial engineering can only succeed to a certain point but will not last for the entire life of the project. Taken in isolation, Texas TGV’s convertible equity note offer to raise $200 million was in itself a decent investment package depending on investors’ perceptions and expectations. The letter-of-credit by the Canadian Imperial Bank of Commerce and the counter-guarantee by Morrison Knudsen effectively created a package with low investment risk and market-competitive returns. This explains why investors so readily committed to the offer. However, the convertibles’ risks and returns did not correctly reflect the commercial risks and returns of the project. So in the long run, whether the
consortium partners ultimately pulled out of the project because of political backbiting or poor financing was secondary. The primary reason was that the project was economically unjustified.

2. Improve distribution of agency and contract risks

As a means of effectively intertwining public-sector support, the investment package should be better designed to distribute agency and contract risks. In other words, the very design of the investment package can redistribute the weight of the risk from one party to the other, and it can be used as an incentive system for both the public and private sectors to produce a more efficient and mutually successful outcome.

Examples of shared agency risk arrangements include build-transfer-operate [BTO], build-operate-transfer [BOT], leasing, and split investments in which the states takes responsibility for the capital costs and the private sector the operating costs. In such a manner, the public would carry the risks and rewards appropriate for its interests, and the private sector would no longer subsidize the state. These examples stand in contrast to Texas TGV in which the corporation's partners, the Canadian bank, and the private investors would have borne the weight of the entire project.

In addition, contracts, if appropriately designed, have the power to both distribute risks and to incent participating sides to provide the most accurate assessment of project cost. It is worth mentioning the San Jose Lagoon Bridge project as a creative example of shared contractual risks. The bridge is located in San Juan, Puerto Rico, and was open to traffic in November 1994. In addition to a BTO arrangement, the concession arrangement offered an innovative solution to spreading contractual risk with its "termination option." The agreement required that the Puerto Rico Highway and Transportation Authority conduct an independent traffic forecast [The Authority used Vollmer Associates as consultants]. These traffic forecasts were then given to the concessionaire for use in obtaining financing for the project. "The termination option allows the concessionaire to have the right to terminate the agreement at its sole discretion and be compensated for costs incurred up to the point, in the event that the traffic using the facility does
not reach those forecasts contained in the traffic and revenue report."50 In such manner, risk was shared by both public and private sectors.

In contrast, the two consortium rivals in the Texas high-speed rail case – FasTrac and Texas TGV – were responsible for their own independent ridership studies. This flawed incentive structure left the door wide open for the bidders to distort their revenue forecasts and their financing needs.

D. Marketing

A major blunder by Texas TGV is that it forgot who it was and to whom it was trying to cater. Whereas the French in the TGV-SE project were acting on their own soil in reaction to an acknowledged need that an improved rail system was necessary, Texas TGV was mainly a foreign consortium trying to market its own product to Texans. Texas TGV overlooked the fact that it was a stranger about to impose its will of building a major piece of infrastructure in territory where it had yet to win over the local people. Texas TGV as well as FasTrac imported its European approach to the market by appealing to high state officials, but neither group emphasized establishing grassroots support. This was a major error, which brought on "unnecessary" enemies. In retrospect, Texas TGV could have better created a marketing campaign by allying with potential enemies, strengthening natural friendships, and either going to regions where demand for high-speed rail was strong or finding local leadership to flag the project from the onset.

1. Ally with potential enemies

A common business strategy is to identify potential opponents and to try to win them over before one even goes to battle. High-speed rail projects in the US have the unique challenge of trying to win over disparate voices. Texas TGV could have possibly avoided the headaches

---

with Southwest Airlines and the local landowners by approaching these groups up front and by either creating alliances or assuaging fears. For example, Texas TGV could have made an agreement with Southwest Airlines by offering it a partnership or co-ownership in the high-speed rail project. This would have served as a means of shifting some of the losses from the air market to the rail market without particular net harm to Southwest Airlines. Early alliances may also have served as a pre-emptive strike against Southwest's main competitors. Such a pact between Southwest and Texas TGV may have hindered Delta and American Airlines from realizing any hope of further gains in the Texas intrastate air travel. Case in point: For the new "wishbone" alignment, Texas TGV considered providing full on-line, connecting service to Dallas-Fort Worth International Airport for passengers of Delta or American Airlines, or both. This potential alliance more than pleased Delta and American. For such an arrangement threatened to knock its main rival, Southwest, out of the market.

In fact, one can turn to Europe as an example of a combined alliance with rail and air. In Germany, Lufthansa was suffering flight delays due to the heavy airport congestion. The idea of intercity rail service was a welcome idea. In fact, officials have expressed a desire to replace all Lufthansa flights on the Frankfurt-Bonn-Cologne-Dusseldorf route with Airport Express trains. The airline has even gone one step further and has initiated a joint subsidiary with the German Federal Railway. This shift in resources would then save the airline money because it would shift the constrained number of allocated airport takeoffs and landings from short-haul to long-haul. Of course, the US has a different national structure than Germany, and Southwest Airlines is mainly a private short-haul carrier whose dedicated flight paths holds a competitive advantage over the hub-and-spoke system of Delta and American Airlines. However, the point is here to illustrate that an alliance of these two competing modes of travel is possible and sometimes desirable.

Finally, from historical precedent alone, Texas TGV should have foreseen agricultural fears. The French TGV-SE project, for example, incurred much interaction between French officials and farmers over land use, environmental problems, and animal health effects. So from
a marketing angle and lessons from the French, Texas TGV should have assuaged fears proactively and won over Texas landowners before the project ever got as far as it did.

2. Make friends

At the other end of the marketing spectrum, one should not take potential allies for granted. At the outset, Texas TGV should have more actively solidified its base of potential supporters at political, financial, and grassroots levels. Environmentalists, for example, would be natural allies and are increasingly having a more powerful voice in Congress. Texas TGV's mild interaction with environmentalist groups perhaps limited the potential power of this relationship at state and federal political levels. Moreover, the green movement is essentially a grassroots voice. This suggests that active marketing of the benefits of high-speed rail to environmentalist groups would open channels of possible support to a broad population.

3. Get local leadership / Go to where the "people" want the project

The other lesson to be learned here is either to find a local "anchor" for a proposed project or to go where the people themselves have declared a need. In the Texas TGV case, very few of the original major leaders directly involved in the project were local Texans. Again, this is the idea of a foreign or non-Texan business group coming in to assert its business interests. Without a single local representative taking the lead role in advocating the project, the high-speed rail proposal gave the impression that Texas TGV was not concerned with the people it claimed to serve. In contrast, Texas TGV's bitterest foe, Southwest Airlines, was founded by a local Texan and is headquartered in Texas. To illustrate the point further, back in the 1960's, Southwest Airlines secured the air version of the "Texas Triangle" niche from its competitors – Braniff and Texas International – by appealing to the local people through its high-profile marketing campaign advertising Southwest as the airline company "who loves you."

Eventually Texas TGV did bring in local leadership. Nearly six months after the franchise award, the corporation hired Glenn Biggs in December 1991 to become the new
chairman and CEO of Texas TGV. Mr. Biggs, a prominent San Antonio banker and community leader, formerly headed FasTrac. According to Texas TGV insiders, Mr. Biggs' presence made a positive difference in the project and his involvement helped "improve the Texas face."

Although Texas TGV eventually found a local voice with strong political influence, the lesson to be passed on to future rail projects is that one should have local leadership from the outset. Not only would a local leader have given more credibility to Texans, but a local leader also would have been more familiar with the political "who's who" of Texas and may have been the most trustworthy liaison to act as go-between for potential enemies (Southwest Airlines and agricultural groups) and friends (environmentalists).

Alternatively, future rail projects should go to where the people themselves have claimed a need and a desire for high-speed rail. Under such circumstances, the grassroots support is already there, and the marketing responsibilities are less of a critical factor in deciding the fate of the project. With the peoples' support, costs of marketing go down and the political lobbying at the state and federal levels already will have had a strong voice. For example, in the Texas TGV case, the university towns of Waco, Bryan and College Station were originally not on the "triangle." However, Waco in particular lobbied and petitioned to be included on the alignment. This positive support says in itself a lot about the powers of free, grassroots marketing.

E. Politics

While the partners at Texas TGV may have had friends in high places scattered in Washington DC and the state of Texas, the political dynamics in the US are such that a few powerful friends are not enough to pull together political support on a project. From an objective point of view, one can see that the Texas TGV case did not adequately address certain key political power relationships during the course of the project's development. The three main power relationships which required further attention and which will be important for future contracts include internal power politics, the power of the Authority or public agency, and the power of the people.
1. Control internal squabbling and unnecessary brinkmanship

The power politics involved between the Texas TGV consortium and the public are enough of a struggle. Therefore, it is important for internal politics and unnecessary brinkmanship not to get out of control and threaten the purpose of the project. While this may be common sense, two specific incidents in the Texas TGV case illustrate that companies often overlook that internal power politics can seriously jeopardize collective interests for short-term gains.

The first incident was with respect to the private financing idea. Morrison Knudsen's last minute declaration of "100% private-financing" in 1989, just before the decision to award the "Texas Triangle" franchise, was a short-term gain with ultimately negative consequences for the project. Specifically, the last minute "100% private-financing" initiative may have won over an Authority wary of haggling with the state and federal government for reluctant public money. However, in the long run, this promise proved impossible to carry through. Perhaps FasTrac's proposal was more realistic. Perhaps the Authority and Texas TGV should have more carefully indicated how 100% private-financing was feasible. This is a gray area and leaves room only for speculation. However, it is clear that grandiose talk without much substance can hurt the long-run viability of a project.

The second incident is regarding the counter-guarantee in the preliminary offering circular. The circumstances and wording of the circular suggest a push for ownership control by Morrison Knudsen. It is therefore possible that unnecessary brinkmanship within the organization had negative consequences that extended beyond the group. For example, the partnership pull-outs ended up in formal suspension of the project. Although Texas TGV did have over $170 million in investor commitments for the convertibles, the project still missed the December 31, 1993 deadline requiring the corporation to raise that amount of money. So if the study's theory is correct that internal politics contributed to the demise of the convertible-equity
offer, then the point is even stronger to place greater control on inside politics and establish a unified front to the outside community.

2. Give Authority or public agency a more active role

Powers to and communication with the Authority or public agency should be increased for the success of future high-speed rail attempts in the US. In the Texas case, there appears to be a difference of value with regards to the public-private partnership between the Authority and Texas TGV. Although the mega-infrastructure project is obviously within the public interest, the Texas TGV Corporation appears to have been initially wary of public-sector involvement. This "unease" may have led to communication problems and to a cut-off of vital public support.

For example, Ms. Harriett Stanley, Principal of the Hadley Group, who served as Financial Advisor to the Authority, stated that Texas TGV did not allow the Authority or the Financial Advisor to participate in business investor presentations, nor did Texas TGV provide them with the preliminary offering circular before going public. She further stated that the Authority "held all the cards" for the public sector and that Texas TGV did not seem to acknowledge this aspect of the Authority's necessity.51

On the other hand, the stance by Texas TGV is that the Authority should have been associated with the state Department of Transportation [DOT] both for political muscle and more direct efficiency. For example, a similar high-speed project in Florida for the Miami-Orlando-Tampa corridor was also placed on hold; it was finally resurrected after the high-speed ground transportation program was transferred to the Florida DOT. According to Morrison Knudsen Senior Vice President Gil Carmichael, a key solution to getting the Texas TGV project back on its feet is "reengineering" this organizational structure: "All of us involved in the Texas TGV made the same error that was made in Florida...The Texas High Speed Rail Authority should not be a

51Telephone interview on June 14, 1994.
stand-alone agency, but part of the Department of Transportation. If the Texas DOT adopted the Authority, the project could be under way in this decade.\textsuperscript{52}

Nevertheless, although the relationships of the Authority to the state and to the franchisee offered the Authority limited political muscle, it is clear in the Texas TGV case that the Authority had not effectively used whatever limited power it had.

The Authority made a grave error by not stepping in and insisting upon a public/private approach to financing. Ironically, FasTrac and Southwest Airlines together forewarned that privately funding the project was realistically impossible and that, ultimately, parts of the project would fall back on the public's shoulders. Also ironic is that the Authority emphasized in writing that a shared approach to financing was the most realistic solution. With this policy established, it seems odd that the Authority could so easily have been won over by Morrison Knudsen's last-minute proclamation of "100% private financing." One cannot neglect the fact that the 1989 Texas High Speed Rail Act forbade use of state revenues for funding this project. So to be fair, "private financing" may have seemed extremely tempting to the Authority. Nevertheless, for future projects, the Authority or state agency should have a much clearer and realistic financial idea or study of its own. Otherwise, if left to the franchise applicants, the bidding opponents are only encouraged to offer the spiciest although often unrealistic package.

3. Work with growing public support

As Americans are becoming more aware about the benefits of high-speed ground transportation and about environmental concerns, future passenger rail proposals will have an available body of grassroots support which will help to lighten political battles.

Much of Texas TGV's political difficulty was due to a lack of awareness by the public on the benefits of high-speed rail. Granted Texas TGV could have better addressed its responsibility to market and make aware of high-speed rail to the people. However, the attempt per se of

\textsuperscript{52}Vantuono, William C., "Despite Setbacks, High Speed Rail Moves Ahead," \textit{Railway Age}, April 1994, pg. 65.
implementing Texas TGV should be duly credited with stimulating the growth of public support for high-speed rail. Previous to Texas TGV, only a small minority in Texas had heard about TGVs and "bullet trains." Today, thanks to media attention placed on Texas TGV, the majority has become more informed. This awareness alone has fostered growing support. In addition, the strengthening green movement has become a political ally of Texas TGV and may prove to be the most powerful political friend for future rail projects in the US.

4. **Strive for a national policy/ commitment**

Finally, in taking a cue from the French and in evaluating Texas TGV's obstacles, it is clear that a national commitment to high-speed rail is necessary in order to secure meaningful public-sector support. Not only does financial and project risk become nearly insurmountable without national commitment, but also powerful industrial groups such as Southwest Airlines and Boeing may bitterly fight high-speed rail interests for purposes of private-sector gain at the expense of the public sector's long-term welfare.

Via private correspondence with the Michael S. Dukakis, the former Governor of Massachusetts has commented:

> I don't see how we are going to seriously develop and expand high speed rail in this country without a coherent national policy to do so. In the Northeast corridor, for example, it was a combination of state leadership and strong pressure from Congress that finally got us moving on the project. And I hope that under the Clinton administration there will be a more aggressive approach to these efforts. But if the matter is left entirely to the states, I think it is highly unlikely that we will begin to develop the kind of high speed rail passenger service that we will increasingly require not just here in the Northeast but all across the country.\(^5\)

In garnering public-sector support for improving the Northeast Corridor, the former governor cited the bitter battle to access money from the Highway Trust Fund, a struggle which may not have been won without the influence of former Speaker of the House, the late-Tip O'Neill.

\(^5\)Letter from former Governor Michael S. Dukakis, currently with the Department of Political Science, Northeastern University, June 27, 1994.
As has been evidenced by past history, the blessings of the nation-state are extremely important for the future success of major infrastructure projects. Particular to the US, such a commitment to high-speed rail may be even more vital in order to unify a nation of disparate voices and private interests.
VI. Conclusion

The French have given us an "elegant solution" in the TGV and have proven that high-speed rail is technically feasible as well as economically and environmentally a positive answer to 21st century needs. Although the transfer of technology from France to the US is straightforward, the process of implementing the TGV in the US is not as straightforward. Due to differences in geography, history, and socio-political make-up, the US needs to find its own model of implementation and strike a balance amongst disparate coalitions of voices and interests. From lessons learned in the TGV-SE and Texas TGV cases, future attempts at implementing high-speed rail in the US will require first reassessing the economic and commercial feasibility of high-speed rail, improving its commercial viability by increasing public-sector support, and taking a completely different perspective on financing, marketing, and politics.

Although the Texas TGV project was formally terminated on August 19, 1994, it should be given tremendous credit for its bold attempt and for paving the way for future projects. The old adage that progress is a combination of two-steps forward, one-step backward holds so true in the Texas TGV case. Its mistakes can serve as valuable learning tools tailored for the US market. If a high-speed rail revolution is to ever take place here in the US, then the lessons from not only the French but also the Texas TGV case will be pertinent contributors to the success of future high-speed rail attempts.
Appendices
Appendix A: Analysis of Convertible Equity Notes

The following is an analysis of the convertible equity note offer by Texas TGV Corporation in December of 1993. The objective of the offer was to raise $200 million worth of 3% convertible equity notes due in the year 2000. Basically, investors would first be issued bonds at a 3% coupon rate. If at any time before the year 2000, should Texas TGV announce an initial public offering [IPO] of its stock, the notes would convert to stock shares. Immediately after the IPO, the investor would have the (put) option of selling the stock to the company at the IPO price.

The argument is that the package was not a bad deal if regarded simply as a bond, but the terms of the investment package gave mixed messages of attractiveness. It may have attracted careless investors while thwarting cautious investors from seriously considering the offer. Basically, the terms of the convertible equity notes yield a) fair to attractive returns as a bond (i.e., taken to maturity or to the IPO), but b) unattractive returns as a standard convertible and c) unattractive returns as a standard put option. Below is a detailed analysis of the yields on the convertible equity notes.

a. Fair to attractive returns as a bond (i.e., taken to maturity or to the IPO)

If regarded simply as a bond, the investment package was pretty attractive for two main reasons: the letter of credit by the Canadian Imperial Bank of Commerce and the yield-to-maturity which were competitive with market rates.

Without the letter of credit, the investment package would have stood out as a risky joint-venture nearing junk-bond status. Had this been the case, the expected returns on the bond would have been too low to attract most investors. However, the Canadian bank guaranteed the notes for up to $225 million. With the bank's senior unsecured obligations rated AA- by Standard & Poor's Corporation and Aa3 by Moody's Investors Services, Inc., the Texas TGV offering essentially became a double-A rated bond. This meant that the risk of holding the bond was severely reduced to the private investors. The double-A status would give investors confidence
that their money would most probably be returned in case of project default. In this manner, the letter of credit increased the attractiveness of the investment package.

The yields-to-maturity of the bond also were competitive with market rates, ranging from fair returns if the bond were taken to maturity and attractive returns if taken to the IPO. If held to maturity in the year 2000, the bond would have offered a return equal to a 7-year treasury note + .0.9 to 1.0% [A 7-year maturity is used to reflect the time from the date of the offering in December of 1993 to its maturity in December of 2000]:

The yield on the Notes to maturity or to optional or mandatory redemption is expected to be 90 to 100 basis points over the yield to maturity, calculated as of the date the Notes are priced (the "Pricing Date"), of the US Treasury security having a maturity closest to the stated maturity of the Notes.\(^5\)

In December of 1993, the yield on a 7-year US treasury note ranged from 5.20 to 5.34%.\(^5\) Adding the 90 to 100 basis points, the yield on the Texas TGV bond would have been 6.10% to 6.34%. At the time of the offering, other compatible bonds which were rated AA- by Standard and Poor's and which were due to expire in the year 2000 offered yields-to-maturity ranging from 5.71 to 6.39% [See Exhibit 14].\(^6\) Since the yield on the Texas TGV note held to maturity falls within the current market range, its return would have been fair.

The other scenario for this "bond" is if it were held to the IPO [Technically speaking, the bond is at the point of converting to stock. However, to simplify matters, I will simply refer to the security at this stage as a bond]. In this case, the return is more attractive than the market's yield of compatible bonds evaluated by Standard & Poor's:

\(^5\)op.cit.: Texas TGV Preliminary Offering Circular, p.5.
\(^6\)This excludes the two outliers – Oklahoma Gas & Electric with a yield of 8.30% and Sara Lee with a yield of 8.44%. A plausible explanation for Sara Lee's unusually high yield is that the company is currently experiencing financial troubles and that Standard & Poor's has not yet adjusted its bond rating.
Exhibit 14:
List of S&P AA- Bonds Due in the Year 2010

<table>
<thead>
<tr>
<th>Company</th>
<th>Year underwritten</th>
<th>Yield to maturity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associates Corp of N.A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. Nts ns</td>
<td>1993</td>
<td>6.09</td>
</tr>
<tr>
<td>Sr. Nts 5 1/4s</td>
<td>1993</td>
<td>5.99</td>
</tr>
<tr>
<td>Sr. Nts(94) 91/8s</td>
<td>1990</td>
<td>6.11</td>
</tr>
<tr>
<td>Sr. Nts 6s</td>
<td>1993</td>
<td>5.86</td>
</tr>
<tr>
<td>Bankers Tr. NY Corp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub Deb 9 1/2s</td>
<td>1990</td>
<td>6.05</td>
</tr>
<tr>
<td>Berkley (W.R.) Corp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nts. 6.31s</td>
<td>1993</td>
<td>6.09</td>
</tr>
<tr>
<td>Consolidated Edison N.Y.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deb '92 A 7 3/8s</td>
<td>1992</td>
<td>5.95</td>
</tr>
<tr>
<td>Deb '92 C 7.60s</td>
<td>1992</td>
<td>5.74</td>
</tr>
<tr>
<td>Donnelley (RR) &amp; Sons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nts 9 1/8s</td>
<td>1990</td>
<td>6.09</td>
</tr>
<tr>
<td>Duke Power Co.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st &amp; Ref 7s</td>
<td>1992</td>
<td>5.74</td>
</tr>
<tr>
<td>1st &amp; RefB 7s</td>
<td>1992</td>
<td>5.71</td>
</tr>
<tr>
<td>Gannett Co.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nts 5.85s</td>
<td>1993</td>
<td>5.85</td>
</tr>
<tr>
<td>Mountain States Tel &amp; Tel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deb 5s</td>
<td>1960</td>
<td>5.88</td>
</tr>
<tr>
<td>Nts 9 1/2s</td>
<td>1990</td>
<td>6.14</td>
</tr>
<tr>
<td>New England Tel &amp; Tel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nts 5 3/4s</td>
<td>1993</td>
<td>6.32</td>
</tr>
<tr>
<td>Northwestern Bell Tel.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nts 9 1/2s 2000</td>
<td>1990</td>
<td>6.22</td>
</tr>
<tr>
<td>Norwest Rin'l</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. Nts 5 1/8s</td>
<td>1993</td>
<td>5.89</td>
</tr>
<tr>
<td>Oklahoma Gas &amp; Electric</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st 8 5/8s</td>
<td>1969</td>
<td>8.30</td>
</tr>
<tr>
<td>Pacific Northwest Bell Tel.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deb 4 1/2s</td>
<td>1963</td>
<td>5.89</td>
</tr>
<tr>
<td>Pacific Telephone &amp; Tel.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deb 4 5/8s</td>
<td>1965</td>
<td>5.76</td>
</tr>
<tr>
<td>Potomac Edison Co.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st 5 7/8s</td>
<td>1993</td>
<td>5.66</td>
</tr>
<tr>
<td>Republic N.Y. Corp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub Nts 9 1/2s</td>
<td>1990</td>
<td>5.99</td>
</tr>
<tr>
<td>Sub Nts 9 3/4s</td>
<td>1990</td>
<td>6.39</td>
</tr>
<tr>
<td>Sara Lee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF Deb 8 3/4s</td>
<td>1988</td>
<td>8.44</td>
</tr>
<tr>
<td>Southwest'n Elec Power</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st AA 5 1/4s</td>
<td>1993</td>
<td>5.72</td>
</tr>
</tbody>
</table>

Note: The bonds compiled above reflect all the AA- bonds due in the year 2000 which were listed by Standard and Poor's in December of 1993. This sample was selected as the basis for comparison on yields with the Texas TGV convertible equity note offering.

The yield on the Notes to conversion is expected to be 150 basis points over the yield to maturity, calculated as of the Pricing Date, of the US Treasury security having a maturity closest to the stated maturity of the Notes.  

Taking the riskiest-case scenario, where the IPO occurs at the latest point in time in the year 2000, the return would be equal to a 7-year US treasury note + 1.5%. This then gives a return ranging from 6.70 to 6.84%. This is higher than the range offered by compatible bonds on the market, making the notes quite attractive.

b. Unattractive returns as a standard convertible

Nevertheless, what may be misleading about the package are the mandatory conversion terms. The drawback was the limited return placed on conversion at the IPO:

The Notes are mandatorily convertible following the completion of an IPO (as defined herein) into such number of shares of the Class A Common Stock, $.01 par value, of the Company (the "Class A common Stock") as is equal in value to the Adjusted Principal Amount of the Notes.

As discussed above, the preliminary offering circular yielded a return equivalent to a 7-year US treasury rate + 1.5% [The "Adjusted Principal Amount" of the notes would therefore be equal to the initial investment outlay plus the yield from the US treasury security and the 150 basis point spread]. However, this placed a cap on returns upon conversion, limiting the potential return to at most a risk-free rate plus 1.5%.

This limit placed on conversion was an unusual practice and generally would be considered an unattractive feature. Convertibles at the time were fashionable in financial circles, and ordinarily, there was no designated limit in a convertible. Despite a low rate of return on "pre-equity" bonds, the expectation of great returns was saved for the upside when the bonds would convert to equity. For example, if a start-up company was expected to do well in the

57op. cit.: Texas TGV Preliminary Offering Circular, p. 5.
58A bond’s risk increases with time. This is because the longer a security is held, the more uncertainties are introduced into the market. Hence, using a 7-year US treasury security as the basis for comparison is conservative.
59op. cit.: Texas TGV Preliminary Offering Circular, p. 5.
future, the unlimited conversion from low-return debt to potentially high-return stock was the investor’s "carrot." In contrast, in the Texas TGV case, the cap upon conversion limited returns to the investor [See Exhibit 15]. Although the investor still could have made an attractive return of 150 basis points above a compatible US treasury security, this unusual feature of a cap may have discouraged investors looking for the expected upside of a standard convertible, and it may have passed unnoticed by careless investors.

**Exhibit 15**
**Diagrammatic Summary of Convertible Equity Notes**

<table>
<thead>
<tr>
<th>Texas TGV Convertible Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bond</strong> → <strong>Stock</strong></td>
</tr>
<tr>
<td>i = 3%</td>
</tr>
<tr>
<td>√low return</td>
</tr>
<tr>
<td>max return = 7-year treasury rate + 1.5%</td>
</tr>
<tr>
<td>√low potential return</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Convertible Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bond</strong> → <strong>Stock</strong></td>
</tr>
<tr>
<td>i = 3%</td>
</tr>
<tr>
<td>√low return</td>
</tr>
<tr>
<td>max return = unlimited $</td>
</tr>
<tr>
<td>√high potential return</td>
</tr>
</tbody>
</table>

c. Unattractive returns as a standard put option

The other misleading feature of the investment package was the (put) option to sell back the stock to Texas TGV Corporation. Normally, a standard put option is an agreement where an investor can sell back the stock to a company at a predetermined exercise price and within a certain time period. So if the stock price falls lower than the exercise price during this time period, the investor would have made a profit. That is, the investor could sell back the stock at a price higher than its market value. Conversely, if the stock price rises above the exercise price, then the investor makes no profit on the put option.
However, the opportunity for profit normally found in a standard put option is essentially nil in the Texas TGV case. According to the circular, the share sale option is described as follows:

Immediately following conversion of the Notes, Holders may require the Company to repurchase at the IPO Price all or a portion of the Class A Common Stock issued upon such conversion... A Holder exercising this option in full will receive cash equal to the Adjusted Principal Amount of its Notes.50

The unusual feature about this option is that investors can sell their shares immediately after the IPO, but at the IPO price. Normally, the put option gives the investor some time lag for the exercise date. In doing so, there is wide room for price fluctuations. In the Texas TGV scenario, with immediate action required after the IPO, there is little room for price changes and therefore little room for profit. Nevertheless, if the stock price were to jump up immediately after the IPO, the option to sell the stock would be meaningless since the investor would be better off holding on to the stock. If the stock price were to stay the same after the IPO, the put option would be also worth nothing, since there would be no profit to be made by selling or holding on to the stock. Finally, if the stock price were to fall down immediately after the IPO, theoretically the option to sell may have some value. However, the likelihood of a corporation offering an overvalued stock on the market is extremely low, unless it wanted to reward its early investors. After all, the corporation would lose money if the market buys the stock at a lower price than the corporation has offered. Hence, this put option really has little inherent worth to the investment package.

In sum, the convertible equity offering sent off mixed messages of attractiveness. Regarded simply as a bond, the investment package offered fair to attractive returns on its own merits. However, the unconventional twist to the standard practice of "convertibles" or "options" may have camouflaged the true terms of the package from wary and naive investors.

\textsuperscript{50}ibid.
Appendix B:
Excerpts from the Texas TGV Offering Circular

RIDERSHIP AND REVENUE FORECASTS

During the past four years, several studies have been made of the ridership and revenue potential of high-speed rail service within the Texas Triangle, one of which was used by the Company's predecessor to form the basis for the forecasts in its application for the Franchise. Most recently, the Authority selected Charles River Associates Incorporated ("CRA") of Boston, Massachusetts to prepare the Independent Ridership Study, a detailed study of the potential for the Company's planned high-speed rail service in Texas. The Independent Ridership Study was completed in September 1993, and forms the basis for the Company's expectations about the future of the travel market in Texas and the prospects for various types of service the Company may offer. CRA has prepared a summary of the study, which is included as Appendix A to this Offering Circular, and the following discussion should be read in conjunction with that summary. See also "Financial and Statistical Information".

The Independent Ridership Study addressed a series of possible service plans and route variations in order to assist the Company in determining an optimal system configuration. CRA reviewed five possible service scenarios, which differed in terms of route alignment, whether access would be provided to long-haul travel departures from DFW Airport, and the extent to which service would be provided to various smaller cities located between the major cities in the System. Forecasts for underlying auto and air travel between each of the destinations in the proposed System were held constant across all five of the scenarios. CRA did, however, run specific sensitivity tests around the median forecast for each scenario, varying such items as fares on competing airlines and the underlying growth assumptions for the Texas travel market.

Of the five scenarios studied by CRA, the Company believes that the third scenario ("Scenario 3") most closely corresponds to the System configuration the Company expects to construct. Scenario 3 contemplates a route following the Company's announced alignment, with stations at DFW Airport, Waco and Bryan/College Station, as well as at Dallas, Fort Worth, Houston, Austin and San Antonio. In addition, Scenario 3 forecasts the effect of a fully integrated passenger connection at DFW Airport with American Airlines. No such arrangement has yet been sought. Using this configuration, CRA forecast the ridership and revenue data shown in the table below, assuming implementation of full revenue service by 2000. The Company expects initial revenue service on the System to commence in the year 2000, with full revenue service implemented by 2003. Ridership data are expressed in millions of one-way passenger trips per year, and revenue data are expressed in millions of constant 1991 dollars.

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridership</td>
<td>4.7</td>
<td>9.7</td>
<td>10.7</td>
<td>12.3</td>
<td>12.7</td>
<td>13.0</td>
<td>13.3</td>
<td>13.5</td>
</tr>
<tr>
<td>Revenue</td>
<td>$190.4</td>
<td>$402.9</td>
<td>$445.9</td>
<td>$527.3</td>
<td>$545.8</td>
<td>$560.9</td>
<td>$572.4</td>
<td>$583.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridership</td>
<td>13.8</td>
<td>14.1</td>
<td>14.4</td>
<td>14.6</td>
<td>14.9</td>
<td>15.2</td>
<td>15.5</td>
<td>15.7</td>
</tr>
<tr>
<td>Revenue</td>
<td>$595.4</td>
<td>$606.9</td>
<td>$618.4</td>
<td>$629.9</td>
<td>$641.4</td>
<td>$652.9</td>
<td>$664.4</td>
<td>$675.9</td>
</tr>
</tbody>
</table>

In preparing the Independent Ridership Study, CRA limited its revenue forecasts exclusively to revenues generated from ticket sales, based on assumed pricing levels and projected demographic and socioeconomic characteristics of the proposed service area. In particular, the Independent Ridership Study assumed that the Company's average ticket prices would equal the average price of competing air travel, and that the Company would not add capacity to accommodate forecast increases in the travel population while airline competitors would add capacity. These assumptions may not reflect actual pricing and capacity actions by the Company and its competitors, and the Company's addition of capacity or ability to price differentiate its service could yield additional revenues. The Independent Ridership Study also does not include any forecast of other revenues, such as parking charges, ancillary to travel on the System. Finally, the demographic and socioeconomic data used in the Independent Ridership Study are derived from a recessionary period in Texas.
The forecasts included in the Independent Ridership Study are based on numerous other assumptions, including the assumption that the System is operated in accordance with the Company's current timetable, and there can be no assurance that the Company will achieve the forecast levels of ridership and revenues.

COSTS OF PROJECT

The cost estimates that have been prepared for construction of the System have been based on estimates prepared by various engineering and cost experts, including SOFRERAL, GEC Alstom, Bombardier, MKC, Skidmore, Owings & Merrill and other specialty firms. Right-of-way purchase costs and property acquisition costs have been estimated by Universal Field Services, a company with expertise in identifying and obtaining rights-of-way for linear projects.

Construction and engineering management costs have been estimated as a percentage of total estimated construction costs, using rates common for construction projects of this size. State sales taxes have been computed at the Texas sales tax rate of 8% of the construction costs, excluding certain items not subject to the tax.

The Company generally plans to use competitively bid, fixed-price contracts for major construction-phase items. The Company does not intend to request bids for such contracts until a substantial portion of the engineering or the related item has been completed. Where economically advantageous to do so, the Company may make major materials purchases or secure pricing guarantees on selected project materials that will be provided to the construction contractors.

The following table shows the current cost estimates for the Project, expressed in millions of constant 1992 dollars:

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimated Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed facilities</td>
<td>$4,503</td>
</tr>
<tr>
<td>Trains</td>
<td>989</td>
</tr>
<tr>
<td>Property and property acquisition services</td>
<td>287</td>
</tr>
<tr>
<td>Environmental impact statement</td>
<td>7</td>
</tr>
<tr>
<td>Program management, engineering, construction management and start-up</td>
<td>737</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$6,523</strong></td>
</tr>
</tbody>
</table>

The Company estimates that, adjusted for the effects of inflation during the period over which such expenditures will be made, the total cost of the Project will be approximately $8.4 billion.

Operating costs for the System will depend primarily on the volume of passenger traffic using the System. The fixed costs of each trip in the Company's regular schedule will include the on-board train crew, traffic control, and energy required to power the trip. Variable costs per trip will fluctuate with the number of passengers, and will include commercial costs (such as on-board catering) and station staff requirements. Train maintenance will depend on the distance traveled and the hours in operation, while track maintenance costs will be principally dependent on the length of the installed line.

FINANCIAL PLAN

In order to arrange the full amount of financing necessary to support the development, construction and start-up of the System, the Company will be required to undertake a series of financings, which it currently expects will occur at various stages of the project as set out below:

- **Phase I**: Initial funding of development work
- **Phase II**: Issuance of the Notes
- **Phase III**: Initial public offering of Class A Common Stock
- **Phase IV**: Debt and other financing

Page 84
Phase I has been achieved through the contribution to the Company of approximately $30 million since 1989 by the Company’s shareholders. These funds have been used for initial design and engineering studies, preparation of the EIS, and general corporate development costs. Phase II is being addressed by the offering made hereby; the net proceeds of which are expected to be used for completion of the EIS, detailed design and engineering studies, pre-acquisition right-of-way costs and other corporate purposes. See “Use of Proceeds”. Depending on market conditions and the speed of development of the Project, Phase III may occur as early as 1996. Phase IV would begin concurrently with Phase III, and would consist of a combination of taxable and tax-free public market debt issues and funds from other sources, which are currently expected to consist almost entirely of public sector transportation programs such as those governed by the Intermodal Surface Transportation Efficiency Act of 1991.

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 (nominal dollars in billions):

<table>
<thead>
<tr>
<th>Notes offered hereby</th>
<th>$0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>1.5</td>
</tr>
<tr>
<td>Debt</td>
<td>4.6</td>
</tr>
<tr>
<td>Public sector transportation programs</td>
<td>2.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$8.4</strong></td>
</tr>
</tbody>
</table>

The total amount of financing required or that can be raised from each potential source, and the mix of public and private funding, will be determined by prevailing market conditions at the time of the offerings and future expectations of revenue potential. The actual amounts of financing or each type may vary substantially from the amounts shown above. In addition, the Company believes that it will face significant opposition to public sector participation in meeting any costs of the Project. See "Investment Considerations - Required Financing". Federal funds available to the Company may be limited by applicable Texas law and interpretations thereof.

**LEGAL PROCEEDINGS**

The Company is not currently a party to any legal proceedings other than as an intervenor party in certain suits brought by Southwest Airlines relating to the Franchise. Southwest Airlines has filed three separate lawsuits in Texas state court against the Authority contesting certain aspects of the Authority’s award of the Franchise to the Company. Two of such suits were dismissed by the trial court for lack of jurisdiction, which dismissals were affirmed by the intermediate appellate court. The appellate court has overruled a motion for rehearing in one case, and one such motion is still pending. The Texas Supreme Court has granted an extension of time to file a writ of error on the intermediate court action. The third suit was filed after execution of the Franchise Agreement and acknowledges in the pleadings that it was only brought in the event that the Awarding Order is not a final order. This issue was disposed of in the Authority’s favor in the first two suits. No action has been taken after the filing of such suit and none is anticipated in that its purpose was to protect an alleged procedural right that was disposed of in the other proceedings. Accordingly, the Company does not expect that any of these proceedings will have a material adverse effect on its ability to pursue completion of the Project.

**EMPLOYEES**

The Company employs ten full-time persons, all of whom are permanent employees, and one full-time temporary employee. The Company believes that its employee relations are good.
Bibliography

I Books and Academic Papers


II Articles

"Air Inter of France Expects Net Profits in 1982 to Reach FFr 73 M..." AGEFI, December 12, 1982.


"The Chairman of the French Railways, SNCF, Mr. Andre Chadeau, Estimates the Total Investment Cost of the TGV Atlantique High Speed Train Project at FFr 6BN." Le Figaro, May 7, 1982.

"The Chairman of the French Railways, SNCF, Mr. Andre Chadeau, Has Stated That If the State Wants to Inaugurate a High Speed Train TGV Service on the Atlantic Coast Route Then It Must Put up the Necessary Finance." Les Echos, February 11, 1982.


"Congress Weighs High Speed Funds..." Railway Age, September 1992, p.17.


"Florida: One Contender Left; Bid for High-Speed Rail Line." Railway Age, December 1989, p. 42.
Fohn, Joe, "Bullet Train vs. Ag Interests Addressed." San Antonio Express-News, December 5, 1991, p. 7E.


"French High-Speed Train Breaks World Speed Record..." PR Newswire, May 18, 1990.


"The French TGV High Speed Train Has Carried 8,600,000 Passengers in the First 16 Months and Should Generate an Operating Profit of FFr 424M in 1984." Le Figaro, February 9, 1983.

"The French Transport Ministry is Encountering Difficulties Determining the Track to be Taken by the TGV..." Le Figaro, March 4, 1984.


Lewis, Robert G. "Can We Afford Not to Build High Speed Lines?" *Railway Age*, May 1990, p. 98.


"M. Andre Chadeau, the President of the French Railway Network (SNCF), Has Said That He Will Consider Giving the Go-Ahead to the Development of a High Speed Train (TGV) Service From Paris to the Atlantic Coast with Government Aid." *Les Echos*, October 15, 1982.


"The Mention by President Francois Mitterrand of France that the SNCF is Considering the Construction of a TGV High Speed Train Line Between Faris and Eastern France Has Surprised Some SNCF Managers." *Le Monde*, April 6, 1984.

Miller, Luther S. "Still Playing Catch-Up; Demand for New Cars..." *Railway Age*, May 1989, p. 49.


"Southwest Airlines Fails to Block Consideration of High-Speed Rail System." *Airports*, March 19, 1991, p. 120.


III Documents


Chronology of Events in Development of High-Speed Rail in Texas. Texas High-Speed Rail Authority, May 1993.

Chronology of Southwest Airlines Co.'s Litigation Against the Texas High-Speed Rail Authority ("Authority"). Complementary copy from Texas High-Speed Rail Authority.


Financing Plan (Chapter 9). Texas TGV, 1991 (?)..


Modified Base Case: Operating Phase Results. Texas High-Speed Rail Authority, Exhibit JCG-Rebuttal-2.


Texas High-Speed Rail Act. Article 6674v.2. Texas Civil Statutes.

Miscellaneous letters:

September 30, 1992: from Mr. E. Glenn Biggs, Chairman and CEO, Texas High-Speed Rail Corporation, to Mr. Hershel Payne, Vice Chairman, Texas High-Speed Rail Authority.

January 5, 1994: from Mr. David W. Rece, President and COO, Texas TGV, to Mr. Hershel Payne, Chairman, Texas High-Speed Rail Authority.

January 14, 1994: from Mr. Marc H. Burns, Executive Director, Texas High-Speed Rail Authority, to Mr. E. Glenn Biggs, CEO, Texas TGV Corporation.

March 15, 1994: from Mr. Marc H. Burns, Executive Director, Texas High-Speed Rail Authority, to Mr. E. Glenn Biggs, CEO, Texas TGV Corporation.

June 27, 1994: from Mr. Michael S. Dukakis, former Governor of Massachusetts, currently with the Department of Political Science, Northeastern University, to the author.

IV  Telephone interviews conducted from March to June 1994:  
(Titles represent positions held at the time of the interviews)

Mr. E. Glenn Biggs, Chairman and CEO, Texas TGV
Mr. Daniel Brand, Vice President, Charles River Associates
Mr. Marc H. Burns, Executive Director, Texas High Speed Rail Authority
Mr. Gil Carmichael, Senior Vice President, Morrison Knudsen
Mr. Piers Dennison, Senior Associate, SG Warburg Securities
Mr. Michael S. Dukakis, former Governor of Massachusetts, currently with the Department of Political Science, Northeastern University.
Mr. James C Gerber, Director of Finance and Vice President, Texas TGV
Mr. Pierre MacDonald, Vice President, Projet TGV, Bombardier.
Mr. Stewart C. Myers, Gordon Y. Billard, Professor of Finance, Sloan School of Management, MIT
Mr. Steven Polunsky, Director of Research and Planning, Texas High Speed Rail Authority
Mr. David W. Rece, President and COO, Texas TGV
Ms. Harriett L. Stanley, Principal, The Hadley Group