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by Baruch Feigenbaum



# Reason Foundation



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# Texas High Speed Rail: Caution Ahead

By Baruch Feigenbaum



For the past 30 years, various entities have proposed building high-speed rail lines throughout Texas. All of these lines were to rely on public funding and in the end none were built. About four years ago, a new company, Texas Central Partners, proposed to build a high-speed rail connecting Dallas and Houston. Unlike past projects, Texas Central's line is supposedly privately financed, requiring no taxpayer subsidies.<sup>1</sup>

<sup>1</sup> Keith, Tim. "High-speed Rail Moving Texas Forward Without Taxpayer Grants or Bailouts." *Texas High Speed Rail News*. Texas Central. March 24, 2016. Web. Accessed June 5, 2016.

Construction of a privately funded high-speed rail line is an intriguing idea. The private sector can bring innovative financing tools that help stretch funding further. And, private sector efficiencies can typically reduce the costs of building a project by 20%. Think tanks across the political divide including the Brookings Institute, Eno Center for Transportation, Reason Foundation and Heritage Foundation support public private partnerships and private sector financing.<sup>2</sup> However, private sector involvement is not a panacea. A wildly unsuccessful project is not going to become feasible with private financing. Moreover, because Texas Central's project would be the first high-speed rail line in the United States, and the first privately constructed high-speed rail line in the world, a careful examination is vital.

Among other topics, this report examines the following:

- The feasibility of constructing Texas Central's proposed high-speed rail line between Dallas and Houston;
- The cost of building a line along the 240-mile proposed route;
- Ridership trends and projections in the Dallas to Houston corridor, which is well-served by the aviation and bus industries;
- Travel trends, central city density, car ownership levels and spatial structure of the corridor endpoints; and
- Traits specific to the Dallas to Houston corridor as compared to those of successful high-speed rail corridors in the U.S. and around the world.

Typically, we would not examine the feasibility of a private project because we believe that in most instances the private sector should be able to experiment on its own. However, this project is different. First, Texas Central is planning to apply for Railroad Rehabilitation and Investment Financing (RRIF) loans. These loans, which have very weak taxpayer protections, could be awarded to entities that do not have the resources to repay them.<sup>3</sup> Second, Texas Central has not released a business plan, nor has it provided any verifiable, objective data to support its ridership projections or cost estimates. Given that this multi-billion dollar project is unlike anything that has been built in the U.S., we feel it is imperative to closely scrutinize the project to make sure it is feasible, and that it can be privately funded and financed. We do not want the first U.S. high-speed rail line to fail.

To analyze Texas Central's proposed project, we compared it to earlier Texas high-speed rail plans, higher-speed rail in the Northeast corridor, and high-speed rail around the world. We also examined corridor density, corridor air service, corridor growth, corridor transit service and central city density. Our analysis raises many questions and concerns regarding Texas Central's project.

<sup>2</sup> Each of the think tanks has indicated past support for P3s in surface transportation projects.

<sup>3</sup> Poole, Robert. *Add Taxpayer Protections to FRA's RRIF Loan Program*. Reason Foundation, 2015. Web. <<http://reason.org/news/show/add-taxpayer-protections-to-fras-rr>>. January 6, 2016.



As we noted back in 2013 in our study titled “High-Speed Rail in Europe and Asia: Lessons for the United States,” only two high-speed train lines, anywhere in the westernized world, make money—Tokyo to Osaka and Paris to Lyon, and one breaks even—Hakata to Osaka—with the potential to make money if it remains in operation for at least 10 more years.<sup>4</sup> All other high-speed rail lines throughout Europe and Japan lose money. High-speed rail lines in these countries were built to relieve crowding on conventional rail lines and to connect central cities with extremely high residential and commercial population densities, low rates of car ownership, and large subway systems with high rates of usage. These cities also lack robust toll-free roadway systems and nearby airports with low-cost air service.

In contrast, among major U.S. regions, Dallas and Houston have some of the highest rates of car ownership, smallest transit systems and percentage of transit usage, and lowest population densities.<sup>5</sup> As a result, even by U.S. standards, the Dallas to Houston corridor is far from ideal for high-speed rail.

<sup>4</sup> Feigenbaum, Baruch. *High Speed Rail in Europe and Asia: Lessons for the United States*. Reason Foundation. 2013. Web. <<http://reason.org/news/show/high-speed-rail-in-europe-and-asia>>. December 14, 2016.

<sup>5</sup> “Commuting Characteristics by Sex,” and “Population, Housing Units, Area and Density.” U.S. Commerce Department. U.S. Census Bureau. *census.gov*. Jan. 1, 2017. Web. <[https://www.factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_15\\_5YR\\_S0801&prodType=table](https://www.factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_S0801&prodType=table)> and <[https://www.factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC\\_10\\_SF1\\_GCTPH1.ST10&prodType=table](https://www.factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_GCTPH1.ST10&prodType=table)> Jan. 17, 2017.

Table 1 displays an overview of our concerns with Texas Central's project. Some concerns, such as high car ownership, can likely be overcome. Other concerns, however, could prove to be fatal, particularly low ridership and high construction costs.

Concern	Details	Impact
Cost v. Ridership	Successful high-speed rail lines have been built in countries when and where land is cheaper and easier to acquire, construction costs are cheaper, and ridership is much higher.	Major
No Existing Passenger Rail Service	More than 2/3 of high-speed rail passengers have come from existing transit service. Without existing conventional rail service, a larger share of passengers must come from air and passenger vehicles.	Major
Airport Proximity to Downtown	Both Dallas and Houston have airports located within seven miles of downtown. High-speed rail has been successful in cities where airports are far or challenging to get to from downtown.	Major
Limited Transit Service	Both Dallas and Houston have limited rail transit networks. Houston has just redesigned its bus network, but the cities' transit networks are not designed to funnel passengers downtown. In cities with successful high-speed rail, five to 12 times more people were transit users than in Dallas and Houston.	Moderate
Low Population Density	Dallas ranks 143rd in population within 2 miles of downtown and Houston ranks 36th. Most high-speed rail services rely on travelers who live downtown because it is more convenient for those living outside of downtown to fly.	Moderate
Low Employment Density	Dallas ranks 16th in employment within 2 miles of downtown and Houston ranks 15th. High-speed rail lines cater to downtown employees since it is more convenient to take the rail line than fly.	Moderate
Car Ownership	Car ownership rates are 25%–50% higher in Dallas and Houston than in cities with successful high-speed rail. Car ownership affects not just the number of travelers who drive, but also the density and spatial structure of a city.	Minor

Table 2 displays the key comparisons between major world cities, including population density, transit usage, automobile ownership, gas tax and square kilometers of rail line. The table examines three categories of cities:

- 1) Tokyo and Paris, both endpoints for profitable high-speed rail lines;
- 2) New York City and Washington, D.C., considered to be the two U.S. cities most conducive to high-speed rail (presently, the Acela higher-speed rail line connects these two endpoints); and
- 3) Dallas and Houston, Texas Central's proposed endpoints for its project.

As shown in the table, Dallas and Houston lag behind in high-speed rail-friendly infrastructure.

Category	Tokyo	Paris	New York	DC*	Dallas	Houston
Population Density (Per Mile)	11,400	9,600	4,500	3,500	2,800	2,800
Transit Usage is Percent of Total Travel	60%	25%	32.5%	16.5%	1.8%	2.6%
Automobile Ownership	30%	50%	60%	70%	90%	90%
Gas Tax (Per Liter)	\$0.99	\$0.96	\$0.20	\$0.12	\$0.09	\$0.09
Square Kilometer of Rail Track per Kilometer (Lower number equals more track)	13.9	21.7	33.5	33.5	33.5	33.5

\* Washington, D.C. Sources: Demographia World Areas, International Energy Agency, CIA Factbook



Texas Central claims it will privately finance the project’s cost. While it is true that financing is the best way to pay for a project of this magnitude, significant capital will be required to pay back the debt. The availability of that capital primarily depends on the accuracy of Texas Central’s ridership projections and estimated costs. Our analysis indicates that Texas Central is exhibiting the same “optimism bias” and “demand exaggeration” that have plagued many public infrastructure projects—and especially high-speed rail projects—for decades. Simply put, Texas Central has exaggerated its ridership projections while underestimating costs.

Texas Central has released several different sets of ridership projections. Initially, Texas Central projected annual ridership of four million passengers by 2035.<sup>6</sup> More recently, Texas Central upped this projection to five million annual passengers by 2025.

Table 3 shows our ridership forecast for Texas Central’s project. High-speed rail ridership comes from many different modes including conventional rail, aviation, personal automobile, buses and “induced travel.”<sup>7</sup>

<sup>6</sup> “Facts.” Texas Central Rail. Texas Central Partners. Jan. 1, 2017, <<http://www.texascentral.com/about/>>. Accessed Jan. 15, 2017.

<sup>7</sup> Induced travel consists of trips that would not have been taken before, but now that high-speed rail is available, residents make the trip. Induced travel has been documented in both Europe and in the Northeast corridor.

Travel Mode	2015 Usage (one-way trips)	Growth Rate	2035 Total Passengers	Diversion Rate %	2035 Ridership (one-way trips)
Conventional Rail	0	N/A	0	N/A	0
Aviation	1,242,142	1.6%	1,706,261	42%	716,630
Personal Automobile	9,709,441	0.5%	10,727,918	5%	536,396
Bus	291,470	3.0%	526,427	4%	21,057
Induced	N/A	N/A	N/A	10%	127,408
<b>Total Ridership</b>	<b>11,243,053</b>		<b>12,960,606</b>		<b>1,401,491</b>

Sources: Aviation, U.S. Department of Transportation Consumer Airfare Report; Personal Automobile, Texas Department of Transportation Average Annual Daily Traffic Volume Maps 2015; Bus, Ridership statistics of Megabus, Bolt, Greyhound.

As shown in the table, based on our analysis we estimate Texas Central’s 2035 annual ridership at 1.4 million passengers. Our estimate is supported not only by public data and thorough research of U.S. and international rail systems, but also by the Texas Department of Transportation’s *December 2013 Statewide Ridership Analysis Report of Texas Central’s Project*, in which it projected 2035 annual ridership of 0.7 to 2.7 million annual passengers.<sup>8</sup> Creating an accurate ridership projection is critical because exaggerated ridership projections lead to revenue shortfalls, financial difficulties and, ultimately, taxpayer subsidies.

Regarding costs, Texas Central has estimated capital construction costs between \$10 billion and \$12 billion.<sup>9</sup> We believe this estimate is significantly understated. For our analysis, we erred on the side of caution. We gave Texas Central the benefit of the doubt by deliberately choosing the minimum costs for line construction, train and land acquisition, and station development. Our capital cost estimate is \$17.8 billion, although we believe actual construction costs may exceed \$20 billion. The Texas Department of Transportation, which projects multiple major transportation infrastructure project costs each year, *estimated up front capital costs of \$18.3 billion for Texas Central’s project*.<sup>10</sup>

Table 4 below shows our projected cost estimates for each of the necessary components of the project.

Expenditure Category	Actual Expenditures
Construction	\$16.10B
Operations and Maintenance	\$8.76 B <sup>11</sup>
Trains	\$0.60B
Train Stations	\$0.84B
Land Acquisition	\$0.30B
<b>Total</b>	<b>\$26.60B</b>

<sup>8</sup> “Statewide Ridership Analysis Report.” Texas Department of Transportation. December 2013. <<https://ftp.dot.state.tx.us/pub/txdot-info/rail/rail-ridership-report-1213.pdf>>. Dec. 15, 2016.

<sup>9</sup> “Facts.” Texas Central Rail. Texas Central Partners.

<sup>10</sup> “Statewide Ridership Analysis Report.” Texas Department of Transportation.

<sup>11</sup> \$8.76B is the Operations and Maintenance costs over 40 years rounded to the hundreds position. Forty years is the standard time period to repay the loan and also represents the lifecycle of the infrastructure.



Although Texas Central has not set a ticket price, it has promised that prices will be competitive with airfare. Setting the price at 80% of the \$177 average plane ticket between Dallas Love Field and Houston Hobby<sup>12</sup> yields a cost of \$141 round-trip or approximately \$70 in each direction. However, the Texas Department of Transportation used a fare of \$108 in each direction in its analysis, which was based partly on input directly from Texas Central. Taking into account this higher figure and the fact that some travelers will use either the higher-priced Dallas Fort Worth International and/or Houston Intercontinental Airports, for our analysis we set the ticket price at \$89, halfway between the \$70 and \$108 figures.

After crunching the final revenue and cost numbers, and assuming Texas Central receives a 5% simple interest rate on its loan, we estimate a \$21.5 billion gap between Texas Central's costs and revenues over the first 40 years of its operations. This equates to a \$537 million annual revenue shortfall. Table 5 shows a summary of costs and revenues with a 5% simple interest loan.

In reality, Texas Central would likely receive a 1% to 2% compound interest rate, which would add between \$4 billion and \$6.3 billion to the cost. Even applying a large discount rate for inflation, Texas Central figures to pay billions of dollars in interest payments. Finally, even if Texas Central were to receive an interest-free loan, our analysis concludes that the project would still operate in a multi-billion dollar hole.

	<b>Total</b>	<b>Yearly</b>
Capital Cost	\$17.8B	\$445M
Interest (Simple 5.0 %)	\$0.9B	\$22M
Capital Cost plus Interest	\$18.7B	\$467M
Operations and Maintenance Costs	\$8.8B	\$220M
<b>Total Costs</b>	<b>\$27.5B</b>	<b>\$687M</b>
Ticket Revenue	\$5B	\$125M
Value Capture	\$1B	\$25M
<b>Total Revenue</b>	<b>\$6B</b>	<b>\$150M</b>
<b>Project Gap</b>	<b>-\$21.5B</b>	<b>-\$537M</b>

While we strongly support privately constructed high-speed rail, particularly in the Northeast, we cannot support Texas Central's proposed Dallas to Houston project. In spite of their large and growing populations, Dallas and Houston are poster children for big cities where high-speed rail has no chance of succeeding without public funding unless land use and transit patterns change dramatically.

We truly hope that high-speed rail becomes a reality in the United States, and we would prefer that it be developed and implemented by the private sector. However, based on our experience and analysis we are concerned that Texas Central's project will fail so spectacularly that privately financed U.S. high-speed rail lines may never be given a second chance.

<sup>12</sup> "Domestic Airline Consumer Airfare Report." U.S. Department of Transportation. Office of Aviation Analysis. December 2016. Web.

<sup>13</sup> \$8.8B totals Operations and Maintenance costs over 40 years rounded to the tenths position. Ticket Revenue and Value Capture also cover 40 years.

Perhaps there are some hidden sources of funding of which we are not aware. But as it stands, Texas elected officials, lenders, investors and taxpayers should demand full disclosure and pay close attention to the details because we do not believe that Texas Central can build the rail line without significant public subsidies. We believe that loans could default and we are particularly concerned that Texas Central may receive an RRIF loan that lacks stringent taxpayer protections. While Texas Central may not be intending to take any public funding, we believe that if construction starts, the project will inevitably have to be bailed out by the taxpayers of Texas, which is unacceptable.



## About the Author

**Baruch Feigenbaum** is assistant director of transportation policy at Reason Foundation, a non-profit think tank advancing free minds and free markets. Feigenbaum has a diverse background researching and implementing transportation issues, including revenue and finance, public-private partnerships, highways, transit, high-speed rail, ports, intelligent transportation systems, land use and local policymaking.

Feigenbaum is involved with various transportation organizations. He is a member of the Transportation Research Board Bus Transit Systems and Intelligent Transportation Systems Committees. He is vice president of Programming for the Transportation and Research Forum Washington Chapter, a reviewer for the *Journal of the American Planning Association (JAPA)* and a contributor to *Planetizen*. He has appeared on NBC Nightly News and CNBC. His work has been featured in the *Washington Post* and *The Wall Street Journal*.

Prior to joining Reason, Feigenbaum handled transportation issues on Capitol Hill for Representative Lynn Westmoreland. He earned his master's degree in transportation from the Georgia Institute of Technology.



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