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SURFACE INFRASTRUCTURE

High-Speed Rail Projects in the United States





**United States
General Accounting Office
Washington, D.C. 20548**

**Resources, Community, and
Economic Development Division**

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January 14, 1999

The Honorable John R. Kasich
Chairman, Committee on the Budget
House of Representatives

Dear Mr. Chairman:

High-speed rail systems that travel 90 miles per hour or more are a common mode of ground transportation throughout Europe and Japan. The systems in operation have proven to be a relatively safe and effective means of transportation. Most systems receive some operating or capital subsidies from their governments. While high-speed rail is not in widespread use in the United States, these systems may be an effective alternative in corridors where travel is increasing and it is difficult to expand highway and airport capacity. However, high-speed rail systems are costly, and thus ridership levels may not be high enough in the United States for systems to cover their costs.

Concerned about the role that federal financial assistance might play in developing such systems, you asked us to review the status of high-speed rail development in the United States. In particular, you asked us to focus on project plans for the Florida corridor for which detailed studies on building a new high-speed rail system between Miami, Orlando, and Tampa have begun. Sponsors for the project, known as the Florida Overland Express (FOX) project, will request significant federal capital assistance in the near future. This report provides information on (1) the estimated cost, financing, ridership, and schedule for the FOX rail project; (2) the status of a new federal transportation infrastructure financing program and how federal funding decisions for the FOX project might affect the new program; and (3) the status of other planned high-speed rail corridors in the United States. To respond to these objectives, we reviewed cost, finance, ridership, and schedule documents on the FOX project; interviewed federal officials on the new infrastructure financing program; and interviewed state officials responsible for 11 other potential high-speed rail corridors in the United States.

Results in Brief

Because the Florida project is in the early phases of development, it faces uncertainties. Overall, it will be at least 2 more years before sufficient information is available to comprehensively assess the project's cost, financing, ridership, and schedule. First, the project's current estimated

cost ranges from \$6 billion to \$8 billion. However, the accuracy of the estimate is uncertain because the project is only at a 5-percent level of engineering design. Second, the finance plan, which relies heavily on debt, is incomplete, and the project's sponsors have secured only 5 percent of the estimated needed funding for the project. Third, the ridership forecast for the project relies on optimistic assumptions and could be overstated by 30 percent or more. Adjusting the forecast to reflect more conservative assumptions would reduce expected future system revenues and increase risks to the project's financial viability. Finally, the project's ambitious schedule calls for the train to begin operating over a 320-mile route in 2005, but several factors will make it difficult to meet this schedule. For example, the sponsors assume they can complete a very complex environmental review in 2.6 years—a process that we have reported takes on average over 5 years to complete.

To help pay for the Florida project's capital costs, the project's sponsors will seek a \$2 billion federal loan under the Department of Transportation's new Transportation Infrastructure Finance and Innovation Act program. The Department anticipates issuing regulations and guidance for this program in April 1999 and has not yet funded any projects under the program. The program was created to help large infrastructure projects—those costing at least \$100 million or 50 percent of a state's federal-aid highway apportionment for the preceding fiscal year—access capital by providing credit assistance through secured loans, lines of credit, or loan guarantees. Recipients of the program's funds must repay the assistance, in whole or in part, from a dedicated revenue stream such as tolls. Under the Federal Credit Reform Act of 1990, the Department must consider a project's risk of default and estimate the cost to the federal government of the credit provided for each project funded through the program. The Transportation Infrastructure Finance and Innovation Act provided a total of \$530 million for fiscal years 1999 through 2003 to cover the costs of providing all selected projects with credit. In order to cover the cost associated with a \$2 billion loan to the Florida project, the Department may need to obligate over one-half of the program's \$530 million. Providing the Florida project with a \$2 billion federal loan would constrain the Department's ability to fund other projects that are potential candidates for credit assistance.

At least 11 other corridors in the United States are in various stages of developing high-speed rail projects. Unlike the Florida project, most of the other corridors have not determined their funding sources. Most of the corridors are in the early stages of project planning, but officials in

Amtrak's Northeast corridor—between Washington, D.C., and Boston—have been upgrading their system for several years, and officials in the Pacific Northwest corridor—between Vancouver, British Columbia, and Eugene, Oregon—have bought high-speed trains and plan to upgrade their track. Ten of the 11 corridors have proposed upgrading track, signal systems, and train equipment on existing rail rights-of-way, thereby obtaining incremental increases in train speeds. These 10 projects have preliminary cost estimates ranging from \$315 million to \$4 billion. In contrast, officials in the California corridor have proposed a new dedicated rail line employing either very-high-speed or magnetic levitation technology. California's preliminary proposal could cost as much as \$29 billion.

Background

High-speed ground transportation, which includes rail or magnetic levitation (maglev) systems capable of speeds of 90 miles per hour (mph) or more, could be developed in a number of ways. System developers can (1) make incremental improvements to existing tracks, signaling systems, and grade crossings and purchase modern trains that could permit speeds between 90 and 150 mph on existing rights-of-way; (2) build completely new rail infrastructures to support very-high-speed operations of 200 mph or more; or (3) build maglev systems that could permit speeds around 300 mph. Typically, the cost to implement these options grows as the sophistication of the technology and speed increase.

Since 1975, most federal funding for high-speed rail development in the United States has been focused on making infrastructure improvements to Amtrak's Northeast corridor. However, high-speed rail corridors across the United States may have access to federal funds through the High-Speed Rail program, the Magnetic Levitation Transportation Technology Deployment program, the Railroad Rehabilitation and Improvement Financing program, and the finance provisions under the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) program. The TIFIA program is designed to help large infrastructure projects—those costing at least \$100 million or 50 percent of a state's federal-aid highway apportionment for the preceding fiscal year—access capital by using federal funds to leverage substantial private investment.¹ TIFIA authorizes the Secretary of Transportation to make secured loans, loan guarantees, and lines of credit available to eligible projects that will repay the assistance, in whole or in part, from dedicated revenue streams,

¹The act establishes a lower threshold—\$30 million—for projects that principally involve the installation of intelligent transportation systems—computer and telecommunications technologies designed to enhance the safety and efficiency of surface transportation.

such as tolls or passenger fares. TIFIA requires the Secretary of Transportation to establish criteria for selecting projects and includes general selection criteria such as whether a project is creditworthy and nationally or regionally significant and whether the use of federal funds would expedite implementing the project.

The three credit instruments under TIFIA—secured loans, loan guarantees, and lines of credit—can be used to fund up to one-third of the costs of a project. A secured loan would typically provide the project's sponsors with an infusion of capital needed to help pay for construction costs. The loan would have to be payable, in whole or in part, from some form of dedicated revenue and would typically be subordinate to other project debt. In general, TIFIA loans are contingent on the receipt of an investment-grade rating for a project's senior debt.² This measure helps ensure that the project is creditworthy. The second type of instrument, loan guarantees, involves a pledge by the Secretary to pay all or part of the principal of and interest on a loan or other debt obligation of the project. A loan guarantee would help a project obtain capital by providing added security to the debt. Finally, a line of credit is an agreement made by the Secretary to provide a project with a secured loan, if needed, during a project's initial 10-year operating period.

One project that plans to use very-high-speed French train a grande vitesse (TGV) technology and obtain TIFIA funding is FOX.³ The FOX system would link Miami, Orlando, and Tampa, cover 320 miles, and have seven stops along the route. Proponents of the system believe high-speed rail is needed to alleviate the future highway and airport congestion that will be caused by the anticipated growth in Florida's population and tourism. Trains could reach speeds of up to 200 mph, and the system would have no ground-level pedestrian or vehicle crossings. To help design, construct, and operate the system, the Florida Department of Transportation (FDOT) entered into a system franchise agreement in 1996 with the FOX consortium. The FOX members include Fluor Daniel, a U.S.-based engineering and construction firm; Alstom, the manufacturer of French TGV trains; and Bombardier, a manufacturer of rail passenger cars. The franchise agreement between FDOT and FOX (collectively referred to as the project's sponsors) calls for a public-private partnership to plan, design, build, operate, and finance the system.

²Under TIFIA, the Secretary may provide limited funding before a project receives an investment-grade rating for its senior debt obligations.

³The TGV is an electric train operating in France. In commercial service, it runs at a maximum speed of 186 mph.

The FOX Project Faces Several Challenges

The FOX project is in the early phases of development and faces several uncertainties regarding its cost, financing, ridership, and schedule. The project's sponsors are developing the detailed information needed to assess whether the high-speed rail project is viable. It will be at least 2 more years before sufficient information is available to comprehensively assess the project.

Preliminary Cost Estimates Range From \$6 Billion to \$8 Billion

FOX's engineer responsible for developing the cost estimate stated that the capital cost to construct the project may range from \$6 billion to \$8 billion (in 1997 dollars). This range reflects up to 54 potential route options for the new track under study in the environmental review process. Both FDOT and FOX officials stated that the estimates are preliminary because they are based on only a 5-percent level of design. These officials noted that by the end of 2000, the project will be at a 35-percent level of design, and therefore the cost estimate available at that time will be more precise.

The project's sponsors were unable to provide us with a detailed line-item breakout of the project's high and low cost estimates, nor were they able to provide detailed documentation explaining the \$2 billion difference between the estimates. However, according to FOX's engineer, the \$2 billion range reflects whether track for the various alignments must be elevated to cross roads and rivers and the degree to which the alignments can use existing rights-of-way. In general, the \$8 billion estimate assumes an alignment from Miami to Orlando that traverses urban areas on the east coast, using a significant amount of elevated track to avoid over 100 grade crossings and cross several rivers. In contrast, the \$6 billion estimate assumes a more westerly alignment that requires less elevated track and uses more state-owned rights-of-way along interstate highway corridors.

To develop more precise estimates over the next 2 years, FOX engineers will take field measurements to either validate or adjust the earlier conceptual estimates, according to FOX's engineer. Engineers will perform such tasks as taking instrument surveys to get actual measurements of potential alignments, calculate the alignments' grades and curvatures, determine soil conditions, and determine the exact nature of any bridge clearance problems. When completed by the end of 2000, this detailed engineering work will provide FOX with a 35-percent level of design—a level that will give FOX sufficient information to agree with FDOT on a fixed-price construction contract for building the system.

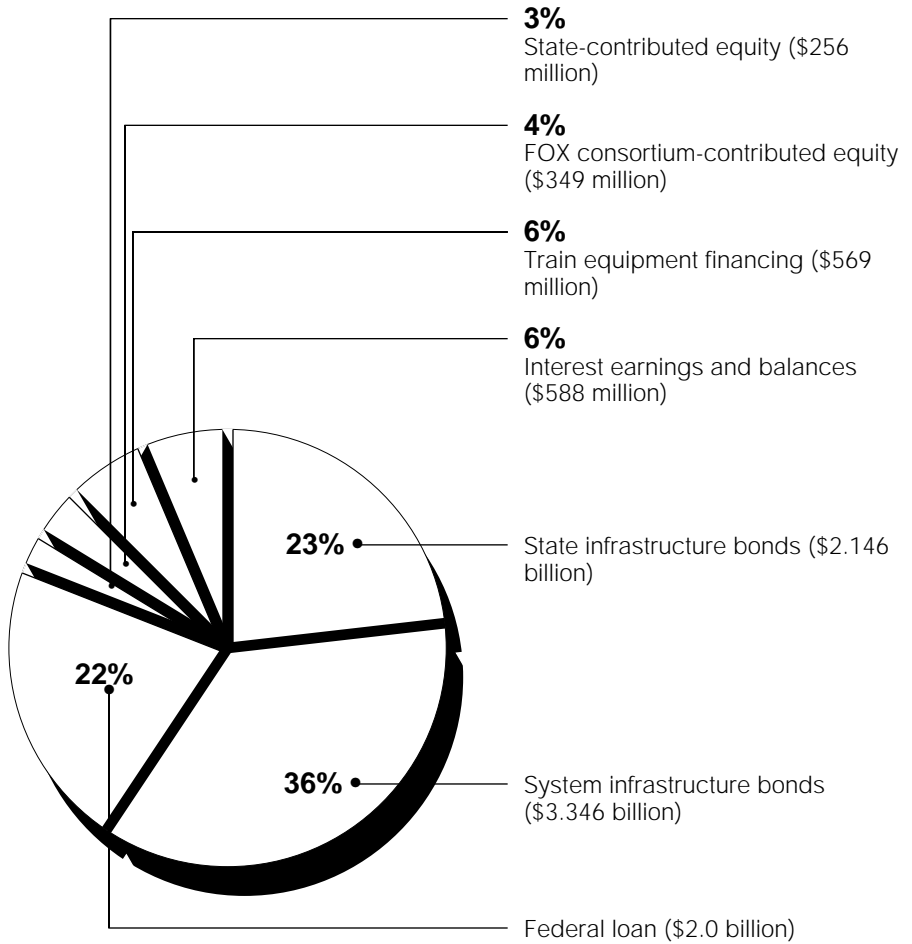
To help ensure the accuracy of the FOX estimates, FDOT officials have hired an independent engineering consultant to review the estimates. The initial review is focusing on the methods that FOX used to develop the current cost estimates. The review will report on whether FOX used industry-accepted estimation techniques and whether the estimates cover all capital cost components. It will also include spot audits of FOX's estimates for quantities and unit prices. FDOT officials said that they would continue to use independent engineering reviews throughout the cost estimation process.

The Project's Financing Is Incomplete

In developing their finance plan, the project's sponsors have assumed that the FOX system will cost \$6.3 billion (in 1997 dollars) to build. The project's sponsors are seeking federal, state, and private funds to finance these capital costs. As of December 1998, they had secured only \$436 million in financing and faced significant challenges in securing the remaining funds needed to build the project.

As figure 1 shows, the project's sponsors expect to use state infrastructure bonds and system infrastructure bonds—bonds backed by the state and future system revenues, respectively—and a \$2 billion federal loan to pay for about 81 percent of the project's financing needs. State cash contributions prior to issuing the bonds, contributions from the FOX consortium, private debt financing for the train equipment, and other income sources make up the rest of the project's financing.

Figure 1: Sources of Funds for the FOX Project



Source: GAO's presentation of data from FDOT.

The project's sponsors would rely on four sources of debt financing to raise most of the needed funding. One source of debt financing would be state infrastructure bonds. These bonds would be tax-exempt and backed by a dedicated state commitment of \$70 million per year for 40 years, adjusted for inflation at 4 percent per year, beginning in 2001. The project's sponsors anticipate that the bonds will have a 30- to 35-year maturity, with an interest rate of 6.67 percent. A second source of debt

financing would be system infrastructure bonds. These bonds would be tax-exempt and secured by a senior lien on net system revenues. A senior lien means that bondholders would have the first claim on available revenues after the payment of annual operating costs, principal, and interest payments on train equipment debt and a portion of FOX's return on equity.⁴ The project's sponsors anticipate that the bonds will have a 30- to 35-year maturity, with an interest rate of 6.67 percent. A third source of debt financing would be private-sector financing for most of the train equipment. Sponsors are considering using either a lease or private bonds. The train equipment would secure the debt, and repayment of the debt would have the first claim on system revenues available after the project pays its annual operating costs. Finally, the fourth source of debt financing would be a \$2 billion federal loan secured by a junior lien on the net system revenues. A junior lien means that the federal government would have the last claim on revenues and would be repaid after the project pays the annual operating costs, train equipment debt service, a portion of FOX's return on equity, and system infrastructure bondholders.⁵

The remaining funds will come from equity contributions made by the state and FOX, project balances, and interest earned on those balances. State equity consists of state contributions made before the state infrastructure bonds are issued. The FOX equity contributions include \$58 million to pay for project development and \$291 million to pay for some of the trains. The project's funding balances and interest earnings amount to \$588 million.

In total, the sponsors must secure nearly \$9.3 billion to finance the \$6.3 billion in initial capital costs. According to the project's sponsors, the financing needs exceed the estimated capital costs by about \$3 billion because the project must account for inflation, pay interest on state and system infrastructure bonds during the construction period, establish reserve funds required by bondholders, and cover the costs of issuing the bonds. As of December 1998, the project's sponsors had secured commitments for about \$436 million—\$349 million from the FOX consortium and about \$87 million from the state of Florida. Over the next 2 years, the project's sponsors will have to secure the remaining funding—about \$8.8 billion. Should the cost estimates increase as the sponsors complete more detailed engineering, FDOT's financial manager for

⁴A November 1996 agreement between FDOT and FOX stipulates that FOX receive, on average, a proposed 15-percent yearly after-tax return on its \$349 million equity investment. The agreement also provides that a partial return on equity of \$28.5 million each year be paid to FOX before the project makes any payments to system infrastructure bondholders.

⁵Under TIFIA, a secured federal loan would not be subordinate to claims from other project obligations in the event of bankruptcy.

the project stated that the sponsors would likely issue more bonds or work with bond issuers to lower reserve funding requirements.

The Project Must Meet Several Financing Challenges

The project's sponsors face several challenges in obtaining the nearly \$8.8 billion in estimated additional funding needed for the project. The major challenges include issuing two sets of bonds on favorable terms and obtaining the federal loan. To issue about \$5.4 billion in state and system infrastructure bonds, sponsors must convince the bond market that the project will have sufficient state and operating revenues to repay the bonds. To do this, sponsors must demonstrate that the state legislature will support a \$70 million yearly funding commitment for 40 years and that the ridership estimates and revenue projections are valid. To obtain the \$2 billion federal loan, the sponsors must also show that the project meets the criteria for assistance under TIFIA and deserves funding.

Challenges in Issuing State and System Infrastructure Bonds

The project's sponsors must convince the bond market that the state and system infrastructure bonds are a good investment. Potential investors will be more likely to buy the bonds if the bonds provide competitive returns on investment and if the project has a reliable source of revenue to pay back the principal and interest. According to FDOT officials, the state will provide \$70 million each year for the next 40 years to secure the \$2.1 billion in state infrastructure bonds. In addition, future operating revenues will secure the \$3.3 billion in system infrastructure bonds.

FDOT's lead attorney for the project stated that in early 2000, FDOT will seek the state legislature's commitment to provide the \$70 million in annual funding. The state's commitment is uncertain, however, because several members of the legislature have raised concerns about the project and the state's new governor has indicated skepticism about the project. In addition, should the legislature approve the 40-year funding commitment, FDOT must still obtain an annual appropriation. FDOT's lead attorney for the project stated that the legislature has appropriated funds for other transportation projects that were previously authorized and that he viewed the risk of not obtaining the appropriation as minimal.

In contrast to the state infrastructure bonds, the system infrastructure bonds will not be backed by a known amount of revenue. Instead, these bonds will be backed by operating revenues, which can fluctuate each year depending on the success of the system. On the basis of a 1998 FOX ridership study, the project's sponsors forecast that system revenues will be sufficient to repay the principal and interest on \$3.3 billion in system

infrastructure bonds. The sponsors are confident that bond-rating agencies will accept the revenue estimates and are planning to provide them with the cost, ridership, and revenue information needed to assess the bonds' creditworthiness and to thereafter issue a bond rating. FDOT's financial manager for the project does not anticipate issuing state or system infrastructure bonds until cost estimates are more precise and the amount of bonds needed is better known. The current plan is for the project's sponsors to receive a preliminary opinion from rating agencies in 1999 and obtain a final rating and issue the bonds in 2001.

Our discussions with officials from three bond-rating agencies—Moody's Investors Service, Standard and Poor's, and Fitch IBCA—revealed that these agencies have little detailed information about the FOX project. Of the three, Fitch's officials had the most knowledge of the project. Fitch officials told us that, in general, bond-rating agencies have little or no experience reviewing high-speed rail projects, but when asked to rate the project's proposed bonds, they will focus on the reliability of the ridership estimates and other important factors in assessing the project's revenue projections. On the basis of preliminary observations, one Fitch official stated that some of the assumptions used in the ridership study were optimistic and that the overall ridership estimate could be high. However, Fitch officials said it was too early to make any definitive statement about potential bond ratings for the project.

In addition to the ridership estimates, another factor that may affect the rating for the system infrastructure bonds is the order in which the project will pay its obligations. According to the November 1996 agreement between FOX and FDOT, the project must first cover its operating costs, principal and interest payments for the debt-financed train equipment and pay the FOX consortium a partial return on its investment before it pays back system infrastructure bond investors. This agreement subordinates the system infrastructure bondholders' claims on revenues and thereby makes the bonds less secure. FDOT's financial manager for the project stated that this agreement may make the system infrastructure bonds riskier to potential investors and therefore more difficult to sell. Our discussions with Fitch officials also revealed that potential bondholders would consider the structure of the FDOT and FOX agreement as something that adds risks to the bonds.

Challenges in Obtaining a Federal Loan

The project's sponsors intend to seek a \$2 billion federal loan from the U.S. Department of Transportation under the new TIFIA program. The sponsors cited language in the Transportation Equity Act for the 21st

Century (TEA-21) conference report as evidence of federal support for the project. The conference report noted the national significance of the FOX project and suggested that the Department favorably review the project's request for TIFIA funds as long as it meets the program's criteria. The project's sponsors intend to apply for a TIFIA loan as soon as the Department begins soliciting project applications. The sponsors anticipate a favorable preliminary decision by the Department by fall 1999. However, unanswered questions regarding the TIFIA program, the bond market's views of the project, and the impact of a single \$2 billion loan on the TIFIA program could have an impact on the timing and outcome of the Department's funding decisions.

As of January 1999, the Department was developing regulations to implement the TIFIA program, including the criteria it will use to select projects. The regulations and selection criteria will affect the FOX project. For example, during a September 1998 outreach session on the TIFIA program, an official from the Department said that TIFIA funds may not be forthcoming for projects that have not completed the environmental review process. If this criterion is part of the Department's TIFIA regulations, the FOX project would be unable to receive a commitment for TIFIA capital assistance until it completes its environmental review, projected for the end of 2000. In addition, TIFIA requires that a project's sponsors provide a preliminary rating letter from at least one bond-rating agency indicating that the project's senior obligations have the potential to achieve an investment-grade rating. An investment-grade rating indicates a relatively low probability of default. Until the project develops firmer cost and financing estimates for bond-rating agencies to review, a preliminary rating for the FOX project may not be forthcoming. Furthermore, TIFIA requires that, when selecting projects, the Department consider the amount it must obligate to fund the credit assistance. As discussed later in this report, providing the FOX project with the full \$2 billion loan would require the Department to obligate a significant amount of the program's available funding and would limit the funds that the Department has available to fund other projects through TIFIA.

Lower Ridership May Affect the Project's Financing

The FOX project's sponsors forecast that the system will carry 8.26 million passengers in 2010. From our analyses of the ridership study data, an independent review of the ridership forecast, and other data we found that the ridership forecast for the project may be overstated by 30 percent or more because it relies on optimistic assumptions. Using more conservative assumptions could reduce the ridership forecast to 5.59 million passengers

or fewer in 2010. Because lower ridership would reduce the amount of fare revenues that the system is expected to generate, revising the forecast could affect the debt rating needed to obtain private capital and the federal loan.

**Project's Sponsors Forecast
8.26 Million Passengers in 2010**

Official forecasts prepared for the proposed FOX system have estimated that the project's ridership could range from 8.01 million to 8.50 million; a consensus average is 8.26 million passengers in 2010.⁶ Table 1 shows the estimated number of annual FOX high-speed rail riders in 2010, categorized by the sources of the riders.

**Table 1: Annual Ridership Forecasts
for the FOX Project, 2010**

Sources of FOX passengers	KPMG Peat Marwick's estimate	SYSTRA's estimate	Consensus average	
			Number	Percentage
Diverted from automobiles	4,509,000	3,996,000	4,253,000	52
Transfer through code-share agreement with airlines ^a	1,476,000	1,477,000	1,477,000	18
Induced	865,000	1,787,000	1,326,000	16
Diverted from intrastate flights	1,158,000	1,244,000	1,201,000	15
Total annual riders	8,008,000	8,504,000	8,256,000	

Note: Totals may not be precise because of rounding.

^aA code share, or code sharing, is an agreement between passenger carriers whereby one carrier (in this case, the airline) purchases seats on selected routes on another carrier (FOX, in this case) and markets these FOX seats as it would market an airline flight. Under such an agreement, the airline ticket would cover air transportation, a seat on FOX, and necessary baggage handling.

Source: GAO's presentation of data from FOX, KPMG Peat Marwick, and SYSTRA.

As table 1 shows, the project's sponsors expect that over 50 percent of the high-speed rail riders will be people who would otherwise use automobiles to travel along the Tampa-Orlando-Miami corridor. The next largest source of riders is from the air transfer market, that is, those travelers who fly for one portion of their trip, but through a code-share agreement between FOX

⁶The project's sponsors hired two firms to produce independent ridership forecasts for the project. These firms were KPMG Peat Marwick and SYSTRA, a French transportation consulting firm. Both of these companies have extensive experience in producing high-speed rail ridership forecasts. Each firm produced a forecast; officials then averaged the two estimates to arrive at an official agreed-upon ridership forecast.

and an airline, are expected to transfer to or from FOX to reach their destination. The project’s sponsors also forecast that the new high-speed rail service will induce 1.3 million new trips in the corridor that otherwise would not have been taken if high-speed rail were not available. The remaining 1.2 million riders would be diverted from the local air market—those air trips that have their origins and destinations within the high-speed rail corridor.

Alternative Assumptions Could Produce a Significantly Lower Ridership Forecast

Experts in travel demand forecasting acknowledge that forecasting ridership for high-speed rail is difficult and that the results depend upon future assumptions that may or may not become reality. The ridership forecast is extremely important because it provides the basis for determining the expected revenues of a system and whether a system can be financially viable. On the basis of our review of an independent report on the ridership forecasts, actual average airfare data from the Department, the Federal Railroad Administration’s (FRA) estimates of induced travel—new travel made solely because a transportation system exists—and our interviews of airline industry officials, we concluded that the FOX ridership forecast is too high because some of the assumptions used to prepare the ridership studies were optimistic. Using alternative scenarios based on less optimistic assumptions could produce a ridership estimate of 5.59 million or lower in 2010. Table 2 summarizes the results of our analysis of how less optimistic assumptions about the air transfer market, lower airfares, and induced or new travel could reduce total ridership estimates for the FOX system.

Table 2: Effect of Less Optimistic Assumptions on Ridership

Thousands of passengers in 2010			
Calculation of less optimistic forecast	Reduction from KPMG Peat Marwick’s Forecast	Reduction from SYSTRA’s forecast	Average reduction from forecasts
Original KPMG Peat Marwick and SYSTRA forecasts	8,008	8,504	8,256
Assume no transfers through airline agreements	-1,476	-1,477	-1,477
Assume lower airfares	-60	-761	-410
Assume lower rate of induced travel	-298	-1,263	-781
Revised forecast	6,174	5,003	5,589

Note: Totals may not be precise because of rounding.

Source: GAO’s analysis, based on data from FOX, KPMG Peat Marwick, SYSTRA, and the Department.

First, the ridership forecasts for the FOX project assume that nearly 1.5 million passengers will be supplied to the FOX system by airlines operating in Florida markets. The assumption is that some airlines with hubs in Miami and Orlando will establish code-share agreements with FOX, thereby transferring short-haul intrastate air passengers to FOX so the airlines can maximize revenues on long-haul flights. For example, the ridership forecasts assume that through a code-share agreement, passengers flying to Miami or Orlando could transfer to the FOX system to reach another Florida destination in the high-speed rail corridor. An independent review of the ridership forecasts completed by Wilbur Smith Associates found that this assumption was unverified, and questioned the entire forecast of passengers transferring through airline agreements.⁷ In addition, officials from American Airlines, Delta Airlines, the Air Transport Association, and the Miami International Airport told us that airlines would not be interested in establishing a code-share agreement with a competitor such as high-speed rail. Accordingly, they contended that the forecast for passenger transfers through code-share agreements was unsupported. Without passengers from the air connect market, the FOX ridership forecast is reduced by about 1.47 million passengers. (See table 2.)

Second, the FOX ridership forecasts assume that some air passengers will choose FOX instead of air travel in local air markets. To divert these passengers, FOX's fares must be comparable with airfares. However, average 1997 airfares actually charged were generally lower than the fares assumed by the FOX ridership forecasts.⁸ This assumption could lead to an overestimate of the number of travelers who would use FOX instead of flying. The actual airfares charged by airlines in 1997 were, in some cases, 21 percent less than the airfares assumed in the ridership forecasts. For example, in the Fort Lauderdale-to-Orlando market, the ridership forecasts assumed an average one-way airfare of between \$62 and \$66, while the actual average airfare according to the Department's data, was \$52. In addition, FOX's forecast assumed that airfares would remain constant in real terms from 1997 through 2010. However, officials from one major airline stated that they would likely reduce fares in response to the introduction of high-speed rail service. Furthermore, the Department has found that over the past few years, established airlines have responded to

⁷Wilbur Smith Associates is a transportation consulting firm that has conducted numerous high-speed rail forecasts both in the United States and abroad. Wilbur Smith Associates was hired by the Florida Transportation Commission, an organization that oversees FDOT, to review the ridership forecasts. Wilbur Smith Associates issued its report in August 1998.

⁸The ridership forecasts used 1997 airfare data to help make the 2010 ridership estimate.

the entry of a new competitor by selling large numbers of seats at low fares.

In preparing their ridership estimates, both KPMG Peat Marwick and SYSTRA developed alternative scenarios that were based on lower airfares. KPMG Peat Marwick found that a 20-percent decrease in assumed airfares would reduce total high-speed rail ridership by 60,000 passengers, while SYSTRA found a 20-percent reduction in airfares would lead to 761,000 fewer high-speed rail passengers. We used these numbers to reflect the effect of more conservative assumptions on ridership. (See table 2.)

Third, the forecasts of passengers using the FOX system because of induced or new demand may also be optimistic. KPMG Peat Marwick's and SYSTRA's estimates for induced demand represent 11 and 21 percent of total forecast ridership on the FOX system, respectively. The consensus estimate—an average of the two forecasts—projects that 16 percent of the total riders will be induced travelers. However, Wilbur Smith Associates expressed concern about the amount of induced travel that the FOX system will actually produce. In addition, a 1997 FRA report noted that estimates of new demand are controversial because little historical information exists; defining and quantifying such demand is methodologically difficult.⁹ The FRA study assumed that the new or induced demand generated by high-speed rail service would equal 10 percent of the traffic diverted from local air and automobile travel. Using FRA's assumption for induced traffic, KPMG Peat Marwick's estimate would be reduced by 298,000 passengers, while SYSTRA's estimate would be reduced by 1.26 million passengers. (See table 2.)

Finally, the consensus ridership forecast also predicts that over 4.2 million passengers—52 percent of the total FOX ridership—will use the FOX system instead of automobiles. In its independent review report, Wilbur Smith Associates stated that the ability of a new high-speed rail system to cause travelers to choose it rather than to travel by automobile has not yet been proven in the United States. The report stated that while the level of diversion forecast by FOX could occur, lesser rates of diversion from private automobiles are also possible, which would result in lower ridership. Although we did not attempt to quantify the impact of a more conservative assumption regarding diversion from automobiles on the overall ridership forecast, reductions in this rate of diversion could reduce

⁹High Speed Ground Transportation for America, U.S. Department of Transportation, Federal Railroad Administration (Sept. 1997).

The Uncertainty in Ridership Estimates Increases Risks to the Project's Financial Viability

ridership below the 5.59-million-passenger forecast resulting from the analyses shown in table 2.

Lower ridership would reduce the fare revenues the FOX system generates. Lower fare revenues, in turn, would affect the project's ability to repay its infrastructure bonds and the federal loan. On the basis of their current ridership estimate of 8.26 million passengers in 2010, the project's sponsors predict that fare revenues will be sufficient to pay all operating costs and to repay bondholders and the federal government. However, if a lower ridership estimate, such as 5.59 million, is used, it is not clear whether the project can meet all of its obligations, given the lower fare revenues that would result. On the basis of the 8.26-million-passenger estimate, sponsors anticipate that revenues will be 1.5 times the principal and interest requirements for the system infrastructure bonds and 1.3 to 1.4 times the principal and interest requirements for the federal loan.

The FOX project's sponsors are in the process of analyzing financial scenarios and preparing updated cash flow statements. If the updated cash flow statements indicate that debt service payments are potentially in jeopardy, the bond-rating agencies have indicated that they will be less inclined to provide the project's senior debt obligations with the investment-grade debt rating that is necessary for participation in the TIFIA program. In addition, a lower rating for project debt would increase future interest costs for the project.

The Project's Schedule Is Ambitious

The FOX project is currently in the preliminary engineering stage of development; therefore, many tasks must be completed before construction can begin in 2001. Staying on schedule will require completing an extensive environmental review process,¹⁰ securing needed financing, passing several pieces of state legislation, and finalizing federal high-speed rail safety standards in a timely manner. The project's sponsors do not have direct control over these matters, and staying on schedule will be challenging.

An August 1996 agreement between FDOT and the FOX consortium sets out three phases for developing the FOX system prior to construction—the preliminary phase, the certification phase, and the final design phase.¹¹

¹⁰We use the phrase "environmental review process" to collectively refer to review processes required by the National Environmental Policy Act and the Clean Water Act (concerning wetlands permits).

¹¹During the certification phase, the project's sponsors must ensure that the project completes various requirements, including federal, state, and local environmental requirements.

The preliminary phase runs through January 31, 1999. During this phase, the project's sponsors will refine the project's concept, identify proposed alignments, refine capital cost estimates, and develop finance plans. Prior to January 31, 1999, FDOT and FOX must jointly assess the prospects for successful system development and decide whether they should continue the project and enter the certification phase. If they decide to terminate the project, a November 1996 agreement requires FDOT to reimburse FOX for eligible costs incurred through the preliminary phase, or about \$5.59 million. If the sponsors choose to proceed beyond the preliminary phase and complete remaining tasks on schedule, construction could begin in 2001. According to the current schedule, the construction of the Miami-to-Orlando segment would take about 4 years, and revenue operations on that segment would begin in 2005. Revenue operations on the Orlando-to-Tampa segment would begin in 2006.

The project's sponsors face many challenges in keeping the project on schedule. The environmental review could pose a significant challenge to the FOX project's schedule. According to the Federal Highway Administration's (FHWA) Florida Assistant Division Administrator, whose office has overall responsibility for this federal environmental review process, the environmental impact statement for this project will be among the largest in scope and the most complex the office has undertaken. The 320-mile FOX system could have an impact on wetlands, encroach on the habitats of threatened and endangered species, cause noise pollution, and adversely affect the region's water quality. The project's sponsors must study these and other impacts and, where necessary, develop plans to mitigate them. For example, if the project has a significant impact on wetlands, the project's sponsors will have to create new or improve existing wetlands. Depending on the proposed alignment, preliminary estimates by FOX show that mitigation plans may be needed for over 700 acres of wetlands affected by the project's construction. Construction cannot proceed until sponsors obtain a wetlands permit from the U.S. Army Corps of Engineers. To resolve these issues, FDOT must coordinate efforts among at least 15 state and federal agencies. Both FHWA and FDOT officials stated that the project is on schedule, and they are confident that they will complete the entire environmental review process in 2.6 years—by January 2001. Our previous work has found that the average time for completing complex FHWA-led environmental reviews for projects affecting wetlands was over 5 years.¹²

¹²Highway Planning: Agencies Are Attempting to Expedite Environmental Reviews, but Barriers Remain (GAO/RCED-94-211, Aug. 2, 1994). In the report, the length of the environmental review process was measured from the date that FHWA issued a notice of intent to prepare an environmental impact statement until the Corps of Engineers issued a wetlands permit.

The availability of TIFIA funding could also affect the FOX project's schedule. FDOT officials have stated that they cannot build the project, as currently proposed, without the federal loan. The project's sponsors plan to obtain a preliminary TIFIA funding decision in the fall of 1999—about 2 years prior to construction. However, as of January 1999, the Department had not issued the regulations for implementing the TIFIA program. According to a Department official, TIFIA's regulations could preclude the Department from making construction funding commitments to projects that have not completed the environmental review process. If the FOX project cannot secure a TIFIA funding commitment until its environmental review is completed, the project's ability to secure bond financing could also be delayed. These financing delays could delay the construction schedule.

The project's sponsors must also secure the state legislature's timely approval of several pieces of legislation needed to begin construction. FDOT expects to introduce the legislation in spring 2000, when it will also request that the legislature approve the \$70 million per year, 40-year funding commitment for the project. If approved, the proposed legislation would provide FOX with an exclusive right to develop high-speed rail in Florida, limit the project sponsors' liability in the event of an accident, and streamline and clarify the project certification process. FDOT expects the legislation to pass easily. However, should the legislation encounter difficulties or be held up by opponents to the project, the project could be delayed.

Finally, FOX officials stated that a delay in the issuance of new federal high-speed rail safety standards could affect the project's schedule. In February 1997, FOX petitioned FRA to develop a rule establishing safety standards for the FOX system. The project's sponsors requested the rule because FRA's safety regulations did not address a system with trains traveling at speeds of up to 200 mph. In December 1997, FRA issued a proposed rule containing a draft of the new safety standards for the FOX system. Having received public comments, FRA is now drafting the final rule. FRA officials stated that they are strongly committed to completing the final rule for the FOX system in a timely manner. However, they also stated that they have a large workload of other pressing safety issues to address, including some required by the Congress, and therefore have no timetable for issuing the final rule. Since the final rule may affect the design and cost of the trains, track, and other infrastructure, the project's sponsors believe they need a final rule before they can arrange financing for the project. FRA officials disagree and believe the proposed rule serves

as an excellent basis for financing the project because it addresses key elements of FOX's petition.

Funding FOX Would Constrain the Department's New Financing Program

Enacted in June 1998, the Transportation Infrastructure Finance and Innovation Act established a new transportation infrastructure financing program. The program is designed to help large infrastructure projects access capital by providing federal credit assistance. The FOX project's sponsors intend to seek a \$2 billion loan through the program to help finance their high-speed rail project. The result of providing the full \$2 billion to the FOX project may be that the Department dedicates over one-half of the funds available for subsidy costs under TIFIA to one project, thereby constraining the program's ability to fund other projects.

The Department Is Developing Regulations for the TIFIA Program

The Department has created a multiagency Credit Program Steering Committee and Working Group to coordinate and monitor all policy decisions and implementation actions associated with the Department's credit programs, including TIFIA. The Steering Committee and Working Group are composed of representatives from the Department's Office of Budget and Programs, Office of Intermodalism, FHWA, FRA, Federal Transit Administration, as well as other departmental agencies and offices. As of January 1999, the Department and the Office of Management and Budget (OMB) were reviewing a draft notice of proposed rulemaking (NPRM) for TIFIA. The current timetable calls for the NPRM to be published in January 1999. After receiving public comments and making necessary revisions, the Department plans to submit final regulations to OMB for review and clearance by April 1999. Both the final regulations and general policy guidelines should be published in April 1999. Once the regulations and guidelines are issued, the Department will begin accepting applications for TIFIA funds.

Before the Department can issue the regulations, an FHWA official stated that the Department must address a number of issues that will influence the program's structure. First, the Department must develop a clear and objective process, including criteria for selecting projects. Second, the Department must determine whether it should establish one deadline for applications or allow multiple deadlines since some projects may not be ready to apply at a particular time. Third, the Department must develop a methodology for comparing the relative merits of different types of projects (e.g., highway, rail, and port projects, e.g.). Fourth, the Department must determine whether a project should be at a certain stage

of development before it is eligible for assistance under TIFIA. For example, an FHWA official said that the Department might require that a project complete the environmental review process before the Department can provide a commitment for TIFIA construction funding. Fifth, the Department must decide what level of input from financial markets is necessary for the Department to determine whether a project is creditworthy and at what point in the process financial markets should become involved. Furthermore, the Department must determine how long it will take to review applications.

OMB is working with the Department to complete the TIFIA regulations. OMB officials told us that TIFIA funding decisions should be based on fair, objective, and transparent analyses. To ensure that this goal is met, they stressed that the process would benefit from having detailed information on all projects applying for TIFIA funds, such as a completed environmental impact statement, a cost estimate based on detailed engineering plans, and a finance plan with well defined and secured nonfederal funding commitments. The officials said that having this type of detailed information will enhance the Department's ability to make sound decisions on the financial viability of projects applying for TIFIA funds.

In addition to working with OMB, the Department is holding outreach sessions with stakeholders such as bond market rating agencies and state highway agencies to help develop the regulations. An FHWA official stated that a number of issues remain undecided, including what appropriate criteria the Department should use to make decisions; what level of information is needed to assess projects; and whether the Department can make funding commitments prior to and contingent on the resolution of certain events, such as completing an environmental review. He stated that the Department's legal counsel needed to address many of these issues, and no decisions had been made.

The Department Must Determine the Risk Level of Credit for Projects Funded Through TIFIA

Under the Federal Credit Reform Act of 1990, the Department has to obligate funds to cover the cost of the credit provided through TIFIA. The amount obligated, which is known as a subsidy amount, covers the expected long-term cost of the credit in case of default. The Department, in consultation with OMB and the applicable rating agency, will calculate the subsidy amount associated with the assistance to be provided for each project. The subsidy amount is based on the risk level of the credit—the more risky the credit, the greater the potential long-term cost and the greater the subsidy amount. TIFIA, as amended by the TEA-21 Restoration

Act, provides \$530 million over fiscal years 1999 through 2003 to cover the cost of up to \$10.6 billion in credit. The annual amounts provided and the credit limits are shown in table 3.

Table 3: Authorized TIFIA Funding, Fiscal Years 1999 Through 2003

Dollars in millions

Fiscal year	Funding level (available to cover subsidy cost)	Maximum credit level	Subsidy cost as a percentage of credit
1999	\$80	\$1,600	5
2000	90	1,800	5
2001	110	2,200	5
2002	120	2,400	5
2003	130	2,600	5
Total	\$530	\$10,600	5

Source: GAO's presentation of TEA-21's data.

As table 3 shows, the yearly authorized funding levels are equal to 5 percent of the annual maximum credit limit. Therefore, in order for the Department to issue the maximum amount of credit—\$10.6 billion—the average subsidy amount must be 5 percent. However, if the Department and OMB determine that credit for a particular project is more risky than this assumed average, they will require a greater risk subsidy percentage for the project. This means that to still provide the maximum amount of credit, the Department would have to fund other, less risky projects that require lower risk subsidies. Ultimately, whether the Department will be able to provide the full \$10.6 billion in credit will depend on the risk level of the projects it chooses to fund.

The FOX Project Could Require Over Half of TIFIA's Funds

The FOX project's sponsors intend to seek a \$2 billion loan through the TIFIA program. In connection with this loan, the Department, in consultation with OMB and the applicable rating agency, will have to prepare a risk analysis of the project and determine the subsidy amount associated with the loan. While it is too early to tell exactly what the subsidy amount will be, the subsidy amount for a \$2 billion loan could require a significant amount of TIFIA's total authorized funding. Table 4 shows a range of potential subsidy levels for a \$2 billion loan.

Table 4: Range of Potential Subsidy Amounts

Dollars in millions			
Loan amount	Subsidy percentage	Subsidy amount	Percentage of TIFIA's 5-year funding
\$2,000	5.00	\$100	19
2,000	10.00	200	38
2,000	14.75	295	56
2,000	20.00	400	75
2,000	26.50	530	100

Source: GAO's analysis.

As table 4 shows, the FOX project could require a substantial portion of TIFIA's total 5-year funding. In comparison, on the Alameda Corridor project, the Department and OMB determined that a subsidy amount of \$59 million would cover the long-term cost of a \$400 million federal loan—a risk subsidy of about 14.75 percent.¹³ If it uses the same subsidy rate for the FOX project, the Department would have to obligate \$295 million to support the \$2 billion loan, which would be 56 percent of TIFIA's \$530 million in total authorized funds. Bond market and OMB officials we contacted stated that in their opinion, a loan to the FOX project appears to be more risky than the loan to the Alameda Corridor and that the subsidy rate for FOX could be higher. They regarded the FOX project's risk as higher because it will depend on unproven high-speed rail passenger revenues to secure the federal loan, while the Alameda Corridor project used cargo revenues from one of the nation's largest established port complexes. With a higher subsidy rate, the Department would have to obligate more than \$295 million.

The Department has not developed a list of projects that may apply for TIFIA funding. However, in 1997, FHWA identified 31 projects nationwide, including FOX, that could be candidates for federal credit assistance. These projects include bridge, highway, and other types of projects, as well as high-speed rail. Our review of the report indicates that these projects' estimated capital costs range from \$100 million to over \$16 billion and that 10 of the projects are estimated to cost \$1 billion or more. (App. I contains a list of these projects and their estimated costs.) It is uncertain whether these projects will request TIFIA assistance or how much they might

¹³The Alameda Corridor project is designed to improve the movement of freight between the ports of Los Angeles and Long Beach and railroad switchyards near downtown Los Angeles. As security for the \$400 million federal loan, the project pledged revenues from cargo activities at the ports. The Department considers the Alameda funding agreement a model for the TIFIA program.

request. Given the large costs and scope of some of these projects, any one of several could require most of TIFIA's authorized funds if it applied for a large secured loan. However, limited TIFIA funds would be available for these projects if the Department decides to provide FOX with a \$2 billion loan.

Most Corridors Will Use the Incremental Approach to High-Speed Rail

In addition to the FOX project, we have identified 11 corridors in the United States that are either planning or implementing forms of high-speed rail (see table 5).¹⁴ Most of the corridors are in the early stages of project planning, but officials in Amtrak's Northeast corridor—between Washington, D.C., and Boston—have been upgrading Amtrak's system for several years, and officials in the Pacific Northwest corridor, between Vancouver, British Columbia, and Eugene, Oregon, have bought high-speed rail trains and secured funding to upgrade its track. Appendix II shows the locations of these corridors. Ten of the corridors will use an incremental approach to high-speed rail, which provides gradual speed increases by making incremental improvements to existing rail infrastructure or equipment. In contrast, the California corridor is considering the development of a new high-speed rail system that may use technologies similar to those of FOX or even more advanced technology capable of reaching speeds up to 310 mph. The preliminary cost estimates of these systems range from \$315 million to \$29 billion. Like FOX, most of these corridors are developing their finance plans. Unlike FOX, however, most of the corridors have not determined their funding sources. Two corridors have expressed interest in applying to the TIFIA program for funding, but none besides FOX have approached the Department about doing so. Some corridors are beyond the preliminary stages and have already begun to implement aspects of high-speed rail.

The 10 corridors that are concentrating on the incremental approach will upgrade current rail lines to accommodate higher-speed passenger rail traffic, as shown in table 5. Under this approach, the projects' sponsors would improve track, signals, and safety systems along existing rail lines. Improving track often involves modernizing switches, replacing wooden ties with concrete ties, and creating additional track capacity. More sophisticated signal and collision avoidance systems are also needed to handle the higher train speeds and the higher traffic density that accompanies high-speed rail.

¹⁴A 12th corridor, the Texas Triangle, also considered building a new high-speed rail system using French TGV technology but discontinued its efforts in 1994 because of a lack of funding. Currently, the corridor has no firm high-speed rail plans.

Table 5: Scope, Approach, and Costs for 11 High-Speed Rail Corridors

Dollars in millions			
Corridor	Scope	Approach	Estimated cost
California	Sacramento/San Francisco to San Diego (676 miles)	Considering new high-speed rail (220 mph) or maglev (310 mph)	\$21,000-\$29,000
Chicago-St. Louis	Chicago, Ill., to St. Louis, Mo. (282 miles)	Incremental (110 mph)	350
Chicago-Detroit	Chicago, Ill., to Detroit, Mich. (279 miles)	Incremental (110 mph)	800
Chicago-Milwaukee	Chicago, Ill., to Milwaukee, Wis. (85 miles)	Incremental (110 mph)	471
Wisconsin-Illinois-Minnesota	Chicago, Ill., to Minneapolis, Minn. (418 miles)	Incremental (speed unknown)	To be determined
Empire (N.Y.)	Buffalo to Albany to New York City (431 miles)	Incremental (125 mph)	315
Pacific Northwest	Vancouver, B.C., to Eugene, Oreg. (466 miles)	Incremental (125 mph)	1,865
Southeast	Washington, D.C., to Charlotte, N.C. (390 miles)	Incremental (110 mph)	To be determined
Keystone (Pa.)	Philadelphia to Harrisburg (104 miles)	Incremental (110 mph)	To be determined
Northeast corridor	Washington, D.C., to Boston, Mass. (457 miles)	Incremental (150 mph)	4,000
Gulf Coast	Houston, Tex., to Birmingham, Ala. (719 miles)	Incremental (speed unknown)	To be determined

The lengths of the corridors currently considering high-speed rail range from 85 miles on the Chicago-to-Milwaukee corridor to 719 miles on the Gulf Coast corridor. Costs range from \$315 million on the Empire corridor in New York to between \$21 billion and \$29 billion on the California corridor. Some corridors, such as the Wisconsin-Illinois-Minnesota and Gulf Coast corridors, are still in the process of developing feasibility studies for their proposed high-speed rail lines. As of December 1998, other corridors were implementing some high-speed rail improvements.

For example, the Empire corridor was running trains at speeds approaching 110 mph. Also, the Pacific Northwest corridor had purchased two high-speed rail trains that will operate initially at about 79 mph but can operate at higher speeds (125 mph) once the corridor is prepared for high-speed traffic. Appendixes III through XIV provide status reports on the 11 corridors with active high-speed rail plans and on the Texas Triangle corridor, where high-speed rail is not now under active consideration.

Conclusions

With TIFIA funds soon to be available to support large transportation projects nationwide, proposed high-speed rail systems and other types of transportation projects in the United States will have an important source of federal financing to further their development. The Florida Overland Express (FOX) project's sponsors will ask the Department of Transportation to provide the project with a \$2 billion loan in the near future. As a result of making this loan, the Department could provide at least one-half of the funding available for subsidy costs under TIFIA to this one project. However, the project's sponsors are at least 2 years from developing the information needed to determine whether the project is economically viable. Currently, there is great uncertainty about whether (1) the project can be built for the \$6.3 billion that the project's most recent finance plan assumes; (2) the project's sponsors can secure the needed funds to complete the project's financing; (3) the estimated ridership levels are accurate and, thus, whether the project will be able to generate sufficient revenues to repay the bonds and federal loan; and (4) the sponsors can complete the complex environmental review and mitigation process in time for construction to begin by 2001.

Similar to the FOX project, other large transportation projects applying for TIFIA funding will face challenges in developing accurate capital cost estimates, securing financing for those costs, generating sufficient revenues needed to repay project debt, and minimizing impacts on the environment. Some of these projects also have the potential to require most of TIFIA's funds, which would constrain the TIFIA funding available to other projects. Therefore, the Department must make informed decisions on each project's technical merits and must obtain and evaluate detailed information on the projects' costs, financing plans, revenue projections, and environmental impacts. As of January 1999, the Department was still developing regulations for the TIFIA program; therefore, the extent to which the Department will require this type of information is unclear. Without this important information, the Department cannot ensure that

TIFIA funds are targeted to financially viable transportation infrastructure projects.

Recommendations

In implementing the Transportation Infrastructure Finance and Innovation Act program, we recommend that the Secretary of Transportation direct appropriate Department officials to evaluate the economic feasibility of projects applying for the program's funds. Before providing a substantial amount of federal dollars to projects, such as the Florida Overland Express project, the Secretary should obtain and independently evaluate information including (1) a capital cost estimate based on detailed engineering plans, (2) a finance plan that is based on the detailed cost estimate and that specifies the source and security of all public and private-sector financial commitments, and (3) an operating plan that enumerates the project's future revenues and assesses the risks to the federal credit instrument should revenues be lower than projected. The Department's regulations or general policy guidelines on the program should indicate that the Department will conduct this evaluation. The Secretary should also ensure that the environmental review process has been completed before it makes substantial Transportation Infrastructure Finance and Innovation Act program funding commitments.

Agency Comments and Our Evaluation

We provided the Department, OMB, and FDOT with a draft of this report for review and comment. We also discussed the report with officials from the Department and FDOT—including the Associate Administrator for Railroad Development, FRA; the Director of Financial Management and Budgeting, FHWA; and the Manager, High-Speed Rail program, FDOT—to discuss their comments on the report. Overall, the Department's officials generally agreed with the report's findings and conclusions, while officials from Florida stated that the report was thorough. Officials from the Department and FDOT had specific comments on the report's (1) analyses of the FOX project's ridership forecast, (2) recommendations, (3) discussion of the impacts of a loan to the FOX project through the Transportation Infrastructure Finance and Innovation Act program, and (4) discussion of the time frames for completing the FOX project's environmental review.

With regard to our analysis of the FOX project's ridership forecast, FRA officials stated that we should adopt a less pessimistic stance on certain aspects of the project's ridership forecast. Specifically, the FRA officials stated that it was too early to expect the airlines to enter into code-sharing agreements with the FOX system; therefore, our ridership analysis should

not entirely dismiss the forecast number of passengers that these agreements could generate. The FDOT officials also affirmed their forecast's assumption that airlines will establish code-sharing agreements with FOX and therefore transfer a substantial number of air passengers to the FOX rail system. As a result, they stated that our ridership analysis should include these passengers.

The FDOT officials also disagreed with our assertion that the airfares used in their ridership forecast overstated the cost of air travel within Florida. They noted that their forecast accurately reflected the fares paid by passengers and cited first quarter 1998 airfare statistics that airlines reported to the Department as evidence. Accordingly, they contend that we should not reduce our ridership estimate on the basis of the assumption of lower airfares.

The FDOT officials further stated that our estimate of new, or induced, ridership was too low. They stated that their estimate was based on the state's intercity travel surveys, surveys that they contend are more precise than FRA's estimates used in our report.

As a final point on ridership, FRA officials stated that our report implied that FOX's fares must always be lower than the airlines' fares in order to remain competitive. The officials stated that this assumption was too simplistic because FOX's ridership would not solely be based on ticket prices. They noted that the FOX system could also attract passengers because it will have a higher quality of service and shorter trip times. The FRA officials further questioned whether the airlines could maintain low airfares over the long term and thereby remain competitive with FOX.

In responding to these comments on ridership, we recognize that making estimates of how many people will use a high-speed rail system, where none previously existed, is more an art than a science. The assumptions used can significantly affect the forecast level of ridership. We have developed a ridership forecast that is based on alternative scenarios that use less optimistic—but still quite plausible—assumptions. Our first alternative scenario evaluates whether the airlines, in a highly competitive Florida air market, would willingly give up their passengers to a new competitor—FOX. We acknowledge that FOX and some airlines might establish code-sharing agreements in the future and that FOX officials have cited positive statements made to them by at least one major airline to this effect. However, FOX officials could not provide us with any documentation showing that such agreements were likely. In addition, our

discussions with two major airlines, the Air Transport Association, and the Miami airport found little, if any, airline interest in establishing code-sharing agreements with FOX. Wilbur Smith Associates also questioned the viability of these potential agreements. On the basis of this evidence, we made no changes to our ridership analysis with regard to the possibility of ridership resulting from code-share agreements.

Our second alternative scenario evaluates whether the FOX ridership forecast assumed airfares consistent with what the major airlines reported to the Department. Using data from the first quarter of 1998, the FDOT officials stated that Florida airfares are comparable to proposed FOX fares, thus potentially enhancing FOX's competitive position with the airlines. This contrasts with our use of 1997 average reported airfares that are, in some cases, 21 percent lower than the ones FOX used in its ridership forecast. We used the average airfares for all of 1997 in reviewing the FOX forecast because (1) it is the same year as that for other data used throughout the FOX forecast and (2) a yearly average provides a more constant picture of the air market than a single quarter. Accordingly, we made no changes to our ridership analysis with regard to the level of airfares.

Our third alternative scenario assessed the project's assumptions regarding induced demand. The FDOT officials' suggestion that we use their assumption regarding induced demand rather than FRA's assumption highlights the uncertainty in making estimates of induced demand. Forecasting induced ridership is a subject of great uncertainty and controversy, since induced demand attempts to predict how many people will use a system simply because it provides a new service. The FDOT officials said that their assumption was more accurate than FRA's. However, FRA has reported that because of the uncertainty in forecasting induced demand, high-speed rail proponents should use caution when preparing such estimates. We agree and therefore have not revised our analysis to reflect the higher FOX assumption.

In addition, the FRA officials presented no evidence to support their assertion that the airlines may not be able to sustain lower airfares over the long term in competition with FOX. The experience of Southwest Airlines supports just the opposite conclusion. Southwest Airlines has established significant market shares in new markets while charging low fares and has sustained these markets in the long term. Nonetheless, we agree with the FRA officials' comment that FOX could have a competitive advantage over the airlines because it may provide better service and

faster trip times in some markets. Since the FOX forecast already assumed this service differential in its ridership assumptions and we did not question them, no change to our ridership analysis is needed.

Regarding our recommendations, officials from the Department stated they did not plan to independently verify information on the costs, financing, revenue estimates, and environmental impacts of projects applying for TIFIA program funds. They said that the Department would rely on the financial markets in the private sector to analyze these factors rather than on the Department to conduct its own independent analysis. They also stated that since the Department is responsible for completing the environmental review process, it did not need to independently validate the results of environmental reviews.

In regard to these comments, we agree that the Department cannot independently evaluate its own environmental document. As a result, we have changed our recommendation to reflect the importance of having the environmental review process completed before the Department provides substantial TIFIA funds to a project. However, we disagree with the assertion that the financial markets' assessment of a project's costs, financing, and revenue estimates will provide the independent evaluation that we call for in our recommendation. The financial markets' input, generally in the form of a bond rating, is important information that the Department can use to supplement its equally important engineering, financial, and transportation planning expertise. However, the Department must produce an independent assessment of the merits of projects seeking TIFIA funds. This is particularly important because the Department has the expertise to compare, for example, a highway project to a rail or transit project that might apply for TIFIA funds. As of January 1999, the Department had not yet determined which of its agencies will have the lead responsibility for performing such evaluations. Therefore, our recommendation is targeted to the Secretary of Transportation, who can ensure that the Department uses its analytical expertise as a basis for awarding federal funds.

Regarding a potential federal loan to the FOX project, the FDOT officials disagreed with our assertion that by funding the FOX project, the TIFIA program would use over half of its available funding. The officials stated that the subsidy rate that the Department used for the Alameda Corridor project—a freight rail improvement project in Southern California—was conservative and we should not use it to estimate the subsidy cost of a federal loan to the FOX project. The FDOT officials believe that the subsidy

rates for TIFIA-funded projects would be less than 10 percent rather than the 14.7 percent used for the Alameda Corridor.

The FDOT officials' questioning our use of the subsidy level for the Alameda Corridor project's loan as a model for TIFIA-funded projects is not based on evidence from OMB or the bond rating agencies we contacted. These groups will play critical roles in determining FOX's loan subsidy amount. OMB officials believe that the 14.7-percent subsidy cost for the Alameda Corridor was accurate. In addition, both OMB and bond-rating agency officials we contacted stated that a federal loan to FOX is riskier than the loan to the Alameda Corridor because the loan repayment is premised on unproven revenues from future ridership. In contrast, the loan repayment for the Alameda Corridor comes from proven cargo revenues from one of the nation's largest ports.

In terms of the environmental review process, officials from both FHWA and Florida expressed confidence that the project will complete the environmental review process on schedule. The Florida officials stated that our skepticism of their projected date for completing the environmental review process is unwarranted. Because they have worked early and closely with environmental review agencies to identify impacts, they expect to meet their timetable for completing the environmental review.

We have added language in the report to reflect the agencies' confidence in meeting their schedule. However, to accomplish this over the next 2 years, the project's sponsors must assess the 320-mile-long project's impact on wetlands (over 700 acres), endangered and threatened species, and water quality; seek and incorporate public comments; develop mitigation plans acceptable to at least 15 state and federal agencies; and obtain wetlands permits from the Army Corps of Engineers. An FHWA official characterized the environmental review for the FOX project as one of the largest and most complex ever undertaken by the office. The complexity and amount of work remaining to be done continue to suggest that it might take longer than planned to complete the required environmental reviews.

Finally, officials from FRA, FHWA, the Department's Office of the Secretary, OMB, and the Florida High-Speed Rail program offered additional technical comments that we incorporated throughout the report, where appropriate.

Scope and Methodology

To identify the status of the FOX project's costs, financing, ridership estimates, and schedule, we reviewed project documents, including the engineering cost report, the finance agreement, the ridership studies, and project status reports. To learn more about the status of the project, we also interviewed officials from FDOT's High-Speed Rail Office and the FOX consortium. To identify challenges facing the project, we reviewed independent analyses of the project and contacted numerous officials with knowledge of the project. For example, to identify issues surrounding the ridership forecast and the potential for the airlines to agree to transfer passengers to the FOX project, we reviewed Wilbur Smith Associates' independent review of the ridership forecast and interviewed officials from the U.S. airline industry, including officials from the Miami and Orlando airports, several U.S. airlines serving Florida, and the Air Transport Association. In addition, to identify issues surrounding the finance plan and the environmental mitigation for the project, we contacted bond-rating agencies and state and federal environmental review agencies.

To obtain information about the TIFIA program, we reviewed the act as established in the Transportation Equity Act for the 21st Century, and as amended by the TEA-21 Restoration Act. To learn more about the goals and objectives of the program, we discussed the program with FHWA's credit program manager, attended a TIFIA outreach session in New York City in September 1998, and reviewed FHWA documentation regarding the TIFIA program. We also contacted OMB and bond-rating agency officials to obtain their views on the potential risks to the federal government of providing a \$2 billion loan to the FOX project.

To obtain information on the current status of other high-speed rail corridors, we reviewed information published by FRA and the High-Speed Ground Transportation Association. To obtain further information on the specifics of other high-speed rail projects, we contacted officials in states responsible for planning and developing the projects and reviewed the status reports they provided.

We performed our work from July 1998 through January 1999 in accordance with generally accepted government auditing standards.

We will send copies of this report to cognizant congressional committees; the Secretary of Transportation; the Administrator, FHWA; the Administrator, FRA; the Director, OMB; the state of Florida's Governor and

Secretary of Transportation; and other interested parties. We will make copies available to others upon request. Please call me at (202) 512-2834 if you or your staff have any questions. Major contributors to this report are listed in appendix XV.

Sincerely yours,

A handwritten signature in black ink that reads "Phyllis F. Scheinberg". The signature is written in a cursive style with a large, sweeping "P" and "S".

Phyllis F. Scheinberg
Associate Director,
Transportation Issues

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Abbreviations

DOT	Department of Transportation
FDOT	Florida Department of Transportation
FOX	Florida Overland Express
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
NPRM	notice of proposed rulemaking
OMB	Office of Management and Budget
TGV	train a grande vitesse
TIFIA	Transportation Infrastructure Finance and Innovation Act of 1998

Candidates for Federal Credit Assistance

In November 1997, the Federal Highway Administration (FHWA) issued a draft report entitled Federal Credit for Surface Transportation: Exploring Concepts and Issues. In that report, FHWA identified 30 projects besides the Florida Overland Express that could be candidates for federal credit assistance. The projects are listed in table I.1.

Table I.1: Projects That FHWA Identified as Candidates for Federal Credit Assistance

Dollars in millions		
Project	Location	Estimated cost
Dalton Highway	Alaska	\$165
Hoover Bridge	Arizona-Nevada	\$120
South Mountain Toll Road	Phoenix, Arizona	\$380
Shreveport-to-Kansas City High-Priority Corridor	Arkansas, Louisiana, Missouri	\$2,380
California High-Speed Rail	Los Angeles, Calif. to San Francisco, Calif.	\$16,800
Foothill-South Transportation Corridor	Orange County, Calif.	\$1,500
Port of Oakland Intermodal Terminal	Oakland, Calif.	\$750
SR 125 Toll Road	San Diego, Calif.	\$400
E-470 Public Highway Phase IV	Denver, Colo.	\$230
Quinnipiac River Bridge	New Haven, Conn.	\$375
Miami Intermodal Center	Miami, Fla.	\$1,700
Atlanta Multi-Modal Passenger Terminal	Atlanta, Ga.	\$183
High-Priority Corridor 18 (I-69 Extension)	Indiana, Kentucky, Tennessee, Mississippi, Arkansas, Louisiana, and Texas	\$7,250
Louisville Bridges	Louisville, Ky	\$507
I-75 at Ambassador Bridge	Detroit, Mich.	\$107
US 82 Mississippi River Bridge	Greenville, Miss.	\$166
Meadowlands Rail Transfer Station	East Rutherford, N.J.	\$374
Farley/Penn Station Project	New York, N.Y.	\$315
Midtown-Kennedy Airport Rail Link	New York, N.Y.	\$800
Maumee River Crossing	Toledo, Ohio	\$220
South-North Light Rail Transit Project	Portland, Oregon	\$1,300

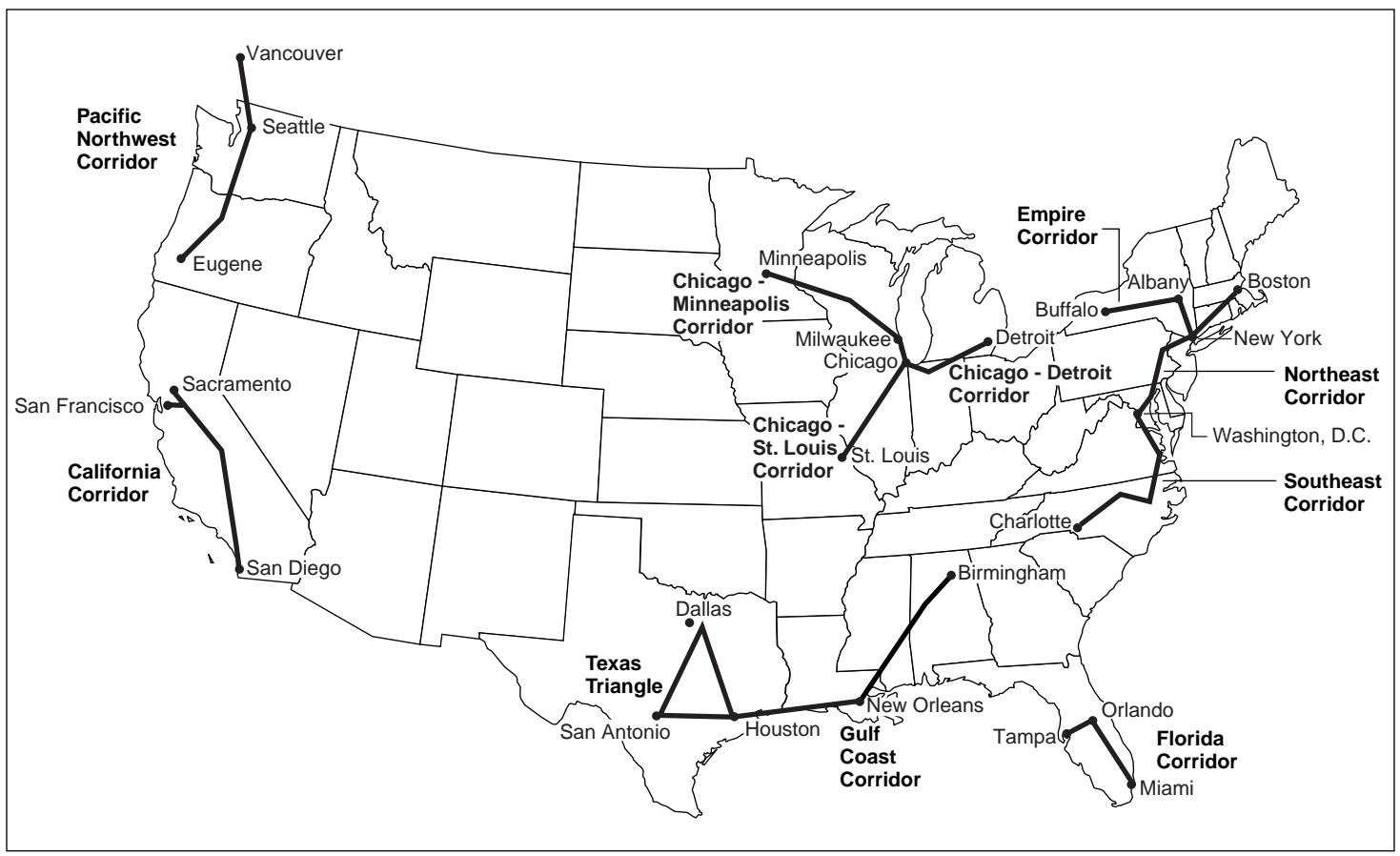
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Appendix I
Candidates for Federal Credit Assistance

Dollars in millions

Project	Location	Estimated cost
Freight Rail Improvement/Access Road Project	Rhode Island	\$247
Grace Bridge Project	Charleston, S.C.	\$400
Camino Columbia Toll Road	Laredo, Texas	\$100
ITS Deployment: Weber, Davis, Salt Lake, Summit, and Utah Counties	Utah	\$220
I-15 Reconstruction	Salt Lake City, Utah	\$1,600
Hampton Roads Bridge-Tunnel	Virginia	\$2,000
Woodrow Wilson Bridge	Virginia-Maryland	\$1,750
North Duwamish Intermodal Facility	Seattle, Wash.	\$1,000
Tacoma Narrows Bridge	Seattle-Tacoma, Wash.	\$800

High-Speed Rail Corridors in the United States



California Intercity High-Speed Rail Corridor

Background	The California Intercity High-Speed Rail Commission was created in 1993 to study the feasibility of implementing a high-speed ground transportation system in California. In 1996, the Commission issued its study, which found that high-speed rail offered California an environmentally and physically feasible alternative to highway and air transportation for accommodating future growth in intercity travel. The report also found that revenues from the high-speed rail system would be able to cover its operating costs but not all construction costs. The report concluded that construction of the system would rely on substantial public investments. In 1996, the state legislature created the High-Speed Rail Authority, which now is responsible for implementing the system.
Proposed Technology	A new high-speed rail or magnetic levitation (maglev) system.
Project's Goals/Scope	To build a high-speed ground transportation system to link northern and southern California. The proposed system covers 676 miles and would link Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, and San Diego. The project's sponsors are considering using either a new high-speed rail system with speeds reaching up to 220 mph or a maglev system with speeds up to 310 mph. A new high-speed rail system could carry up to 19.8 million passengers per year in 2015, while a maglev system could carry 26.4 million passengers.
Cost Estimates	The current cost estimates range from \$21 billion for the new high-speed rail system to \$29 billion for a maglev system.
Status	The Commission is continuing to study the feasibility of the system and is trying to secure financing. The current schedule calls for a statewide vote on the proposal by 2000.

Chicago-St. Louis High-Speed Rail Corridor

Background	<p>Under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the Secretary designated the Chicago-to-St. Louis corridor as a high-speed rail corridor. In May 1994, the State of Illinois published a feasibility study on the financial potential of implementing high-speed passenger rail service in the corridor. The study found that revenues from projected ridership would cover all the operating and maintenance costs and a portion of the capital improvement costs for the project. The state hopes to cover the remainder of the capital costs with federal or state government assistance.</p>
Proposed Technology	<p>Incremental improvements.</p>
Project's Goals/Scope	<p>To create a high-speed rail system connecting Chicago and St. Louis. The proposed system covers 282 miles and would also link Springfield, Illinois and Bloomington-Normal, Illinois to Chicago and St. Louis. The Illinois Department of Transportation (IDOT) plans to improve grade crossings across the state, rebuild track in the East St. Louis area, and develop a new signal system on an existing rail line between Chicago and St. Louis. Currently, trains in the corridor travel at a top speed of 79 mph, with the proposed improvements increasing speed up to 110 mph.</p>
Cost Estimate	<p>IDOT estimates the cost of the project to be \$350 million.</p>
Status	<p>IDOT is currently working on a draft environmental impact statement for the corridor and developing a grade crossing arrestor net that will block the road when trains approach to prevent train-vehicle collisions. Also, IDOT is working with the Association of American Railroads and the Federal Railroad Administration to develop a train control system that will increase safety along the line by overriding certain engineer actions. For example, the control system would automatically stop a train if the engineer runs a red signal or exceeds the speed limit. Once these tasks are complete, IDOT will seek a private sector partner for the project. IDOT hopes high-speed service could begin in 2003.</p>

Chicago-Detroit High-Speed Rail Corridor

Background	Since 1981, the State of Michigan has been exploring high-speed rail technology. Under ISTEA, the Secretary designated the Chicago-to-Detroit corridor as a high-speed rail corridor. The State of Michigan has developed a plan of incremental improvements for the corridor.
Proposed Technology	Incremental improvements.
Project's Goals/Scope	To create a high-speed rail system connecting Chicago and Detroit. The system would run approximately 279 miles and also link Ann Arbor, Michigan and Kalamazoo, Michigan with Chicago and Detroit. The Michigan Department of Transportation (MDOT) and Amtrak plan to rebuild stations and improve signals on an existing rail line between Chicago and Detroit to accommodate trains traveling at speeds up to 110 mph. Trains would also need to be refurbished. MDOT estimates that if the line is fully upgraded, 3.5 million passengers will ride the corridor's trains annually by 2010.
Cost Estimate	MDOT estimates the cost for the improvements to be \$800 million.
Status	MDOT and Amtrak are working on an automatic control system that would help avoid collisions by using a computer to alert train engineers to hazards out of their line of sight. It has also closed a number of grade crossings and is constructing new stations and renovating existing stations. MDOT and Amtrak plan on beginning high-speed service along a portion of the corridor sometime in 1999 and along the full corridor by 2006.

Chicago-Milwaukee High-Speed Rail Corridor

Background	The states of Illinois and Wisconsin completed a feasibility study for the Chicago-to-Milwaukee high-speed rail corridor in 1994. The study identified the existing Amtrak route between Chicago and Milwaukee as the preferred route for high-speed service. The study also concluded that operating revenues from a system with trains operating at 110 mph or 125 mph would cover operating costs and some capital costs. The study also mapped out a comprehensive plan to allow the right-of-way to be shared by high-speed rail, Amtrak, freight lines, and Metra, a Chicago area commuter rail service.
Proposed Technology	Incremental improvements.
Project's Goals/Scope	To create a high-speed rail system between Chicago and Milwaukee. The system would run approximately 85 miles, most likely along an existing Amtrak route. The Wisconsin Department of Transportation (WisDOT) plans to improve track and stations along an existing rail line between Chicago and Milwaukee to accommodate trains traveling up to 110 mph.
Cost Estimates	WisDOT's cost estimate for the project is \$471 million.
Status	WisDOT is currently working with a nine-state coalition to determine funding sources for high-speed rail. WisDOT has no construction planned at this time and has not set a date for the start of revenue service, although it hopes to have some high-speed service running by 2006.

Wisconsin-Illinois-Minnesota High-Speed Rail Corridor

Background

In 1991, the Minnesota Department of Transportation (MN/DOT), along with the Illinois and Wisconsin transportation departments, completed a feasibility study for a Chicago-Milwaukee-Twin Cities high-speed rail system. The study looked at the engineering, environmental, financial, and economic impacts of a high-speed rail system and concluded that such a system might be economically viable. The Minnesota legislature provided \$500,000 for a more detailed feasibility study that is in progress. The second study will deal with the engineering and environmental issues associated with a high-speed rail system, while also determining ridership and revenue projections, as well as other issues.

Proposed Technology

Incremental improvements.

Project's Goals/Scope

To create a high-speed rail system between Chicago and Minneapolis-St. Paul. The system would run approximately 418 miles and link Chicago and Minneapolis with Milwaukee and perhaps Madison, Wisconsin and Wisconsin Dells. The project's sponsors plan on incrementally improving an existing rail line between the two end points to accommodate high-speed trains. The exact speed of trains and form of improvements along the corridor are still to be determined.

Cost Estimate

The project's sponsors have not released any cost estimates at this time.

Status

The second, more detailed feasibility study is under way and should be completed in early 1999. Future actions are uncertain and depend on MN/DOT identifying sources of funding.

Empire High-Speed Rail Corridor

Background	The Transportation Equity Act for the 21st Century (TEA-21) designated the Empire corridor as a federally recognized high-speed rail corridor. On September 29, 1998, the state of New York and Amtrak announced a plan to split \$185 million in rail line improvements to the Empire corridor.
Proposed Technology	Incremental improvements.
Project's Goals/Scope	To increase the maximum speed on portions of the existing high-speed rail line between New York City and Buffalo to 125 mph. The line would link Rochester, Syracuse, and Albany with New York City and Buffalo. The project's sponsors plan to embark on a capital investment plan to improve the condition and technology of the existing rail service between these cities. Currently, the trains' top speed is 110 mph, although only a portion of the corridor is capable of handling trains at that speed. The line will be approximately 431 miles long. The New York Department of Transportation (NYDOT) estimates that once the corridor is finished, annual ridership will be approximately 3 million.
Cost Estimate	The funding for the current round of improvements is set at \$185 million. Future planned improvements would bring the total cost of upgrading the corridor to \$315 million.
Status	Amtrak and NYDOT have acquired funding and will soon begin work on adding a second track for a portion of the corridor, improving curves so trains can negotiate them at faster speeds, and upgrading seven trains to travel at speeds of up to 125 mph. The work should be completed by 2004.

Pacific Northwest High-Speed Rail Corridor

Background	<p>In 1993, the states of Washington and Oregon began funding additional train service along Amtrak's Pacific Northwest line. Since then, ridership on the line has nearly doubled. The Washington State Department of Transportation (WSDOT) leased two Talgo trains for the line. Talgo trains are made in Spain, have tilt technology that allows them to travel around curves faster than a conventional train, and have a top speed of 125 mph. However, in the Pacific Northwest corridor they are limited to 79 mph because of track conditions. WSDOT and Amtrak have purchased three new Talgo trains to replace the leased ones.</p>
Proposed Technology	Incremental improvements.
Project Goals/Scope	<p>To create a high-speed rail corridor between Vancouver, British Columbia, and Eugene, Oregon. The line would run approximately 466 miles and link Portland and Seattle with Vancouver and Eugene. The project's sponsors plan to install a new signal and monitoring system using global positioning satellites, renovate stations and improve grade crossings along the current rail line between these cities. Also, new sidings and track will be added in some places to add capacity to the line, which will serve freight, commuter, and high-speed trains.</p>
Cost Estimate	<p>WSDOT estimates the total cost for bringing 125 mph service to the corridor at \$1.865 billion.</p>
Status	<p>The State of Washington and Amtrak have purchased three Talgo trains capable of traveling 125 mph. These trains were scheduled for service on the existing Amtrak line in late 1998. The new trains will reduce the travel times along the route because of their speed around curves. Also, WSDOT and the Oregon Department of Transportation are currently preparing an environmental impact statement and a 20-year investment plan for the corridor. The project's sponsors have not announced any schedule for the start of high-speed rail service.</p>

Southeast High-Speed Rail Corridor

Background	Under ISTEA, the Secretary designated the Washington-to-Charlotte corridor as a high-speed rail corridor. The states of North Carolina and Virginia are working together to develop the corridor. The Virginia Department of Rail and Public Transportation (VDRPT) and the North Carolina Department of Transportation have done a preliminary engineering study. Currently, the project's sponsors are performing an environmental impact study of the corridor.
Proposed Technology	Incremental improvements.
Project's Goals/Scope	To create a high-speed rail line between Washington, D.C., and Charlotte, North Carolina. The line would run approximately 390 miles and link Richmond, Virginia; Raleigh, North Carolina; and Greensboro, North Carolina; with Washington, D.C. and Charlotte, North Carolina. The project's sponsors plan to straighten curves, add track, and improve signals along an existing right-of-way between the end points, and eventually run rail service at speeds up to 110 mph.
Cost Estimate	No cost estimates have been released for the corridor. However, VDRPT has estimated the cost of adding another track on the corridor at \$350 million.
Status	The State of Virginia has approved a six-stage high-speed rail plan for the Washington-to-Richmond corridor. The plan allocates funding to straighten curves, improve signals, and eliminate speed restrictions along this corridor. This work should be completed in 2002 and allow the maximum train speed in the corridor to rise to 90 mph. Future improvements on the corridor have not yet been determined. The project's sponsors are negotiating with CSX Transportation Corporation to purchase some rights-of-way. The project's sponsors have not set a starting date for 110 mph service.

Keystone High-Speed Rail Corridor

Background	In 1995, Amtrak sought help from the Pennsylvania Department of Transportation (PennDOT) to save the deteriorating rights-of-way between Philadelphia and Harrisburg. PennDOT began giving Amtrak \$2.6 million per year to help operate service along the corridor. TEA-21 designated this corridor as a high-speed rail corridor. The corridor is already electrified, although few electric trains now serve the corridor. A few sections of track along the corridor are capable of handling 90 mph service.
Proposed Technology	Incremental improvements.
Project's Goals/Scope	To create a high-speed rail line between Harrisburg and Philadelphia. The line would run 104 miles. PennDOT hopes to improve track, overhead wiring, and stations along existing, electrified rights-of-way to reduce travel times between Harrisburg and Philadelphia.
Cost Estimates	The project's sponsors have not released any cost estimates for the project.
Status	FRA, PennDOT, and Amtrak are working on identifying the corridor's investment needs. PennDOT is negotiating the purchase of trains capable of traveling 110 mph. PennDOT has not set a starting date for high-speed rail service.

Texas Triangle High-Speed Rail Corridor

Background	In 1989, the Texas state legislature created the Texas High-Speed Rail Authority to award a franchise to build a high-speed rail system in Texas. The Texas TGV Corporation eventually won this franchise but could not arrange financing for the project. In early 1994, the Authority determined that Texas TGV had not fulfilled the terms of the franchise agreement and terminated the franchise.
Proposed Technology	Texas TGV was planning on building a new high-speed rail system using French <u>train a grande vitesse</u> (TGV) technology.
Project's Goals/Scope	The franchise intended to link Dallas, Houston, and San Antonio, a distance of 436 miles.
Cost Estimate	The final cost estimate for the project was \$4 billion.
Status	Plans for a new high-speed rail system are dormant. As of December 1998, the Texas Department of Transportation was in discussions with private investors and a major railroad about taking an incremental improvement approach to high-speed rail in Texas, but the proposal remains in the planning stage.

Northeast High-Speed Rail Corridor

Background	With the introduction of the Metroliner in 1969, the Northeast corridor between Washington, D.C., and Boston became the first high-speed rail corridor in the United States. In fiscal year 1997, the Northeast corridor carried over 9 million of Amtrak's passengers, making it the most highly utilized Amtrak route. In 1990, the Congress directed Amtrak to upgrade service on the corridor.
Proposed Technology	Incremental improvements.
Project's Goals/Scope	To improve the existing high-speed rail line between Washington, D.C., and Boston by electrifying the corridor north of New Haven, Connecticut, installing continuous welded rail and concrete ties, rebuilding bridges, and making numerous other improvements. The line is 457 miles long and links Washington and Boston with New York, Baltimore, Philadelphia, and New Haven. High-speed trains will operate at up to 150 mph.
Cost Estimate	The total cost for the improvement project will be approximately \$4 billion.
Status	Work is under way to mitigate environmental impacts, straighten curves to allow higher speeds, install concrete ties for a smoother ride, and improve the existing signal system. This work is to be completed by 2001. Electrification of the section of track between New Haven and Boston will be completed by 1999. Amtrak is buying 20 new electric trains capable of traveling 150 mph. New trains are set to begin service in fall 1999, with higher speed operation beginning sometime in 2000.

Gulf Coast High-Speed Rail Corridor

Background	Under TEA-21, the Secretary designated the Houston-to-Birmingham corridor as a high-speed rail corridor. The states of Mississippi, Alabama and Louisiana are working together to obtain funding for the Gulf Coast corridor.
Proposed Technology	Incremental improvements.
Project's Goals/Scope	To create a high-speed rail system linking Houston, New Orleans, and Birmingham. The line would be approximately 719 miles. No further plans have been created.
Cost Estimate	The project's sponsors have not released any cost estimates.
Status	A ridership and feasibility study is under way.

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