An Analysis of the Impacts of Florida High Speed Rail: Executive Summary

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Executive Summary

An Analysis of the Impacts of Florida High Speed Rail

by

Center for Economic Forecasting and Analysis
Florida State University

and

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AN ANALYSIS OF THE IMPACTS OF FLORIDA HIGH SPEED RAIL

INTRODUCTION & STUDY FOCUS

This Executive Summary presents the findings of two studies: the first entitled An Analysis of the Economic Impacts of Florida High Speed Rail and the second entitled Travel Time, Safety, Energy and Air Quality Impacts of Florida High Speed Rail. The studies were undertaken during the first half of 1997 by Tim Lynch, Ph.D., Director of the Center for Economic Forecasting and Analysis (CEFA) at Florida State University (Tallahassee) and Steven Polzin, Ph.D., Deputy Director, Center for Urban Transportation Research (CUTR) at the University of South Florida (Tampa). Two companion technical reports provide more detailed discussions of the methodologies and findings of the studies.

The Florida high speed rail project will have a significant impact on the state of Florida, creating thousands of job opportunities, stimulating economic development, serving and encouraging tourism, and providing increased transportation capacity. Travelers will save time, cost, and energy while traveling on a safer and less polluting mode.

- The diversion of passengers from auto to high speed rail will result in 1.4 million fewer auto trips in 2010.
- The diversion of passengers from air to high speed rail will result in 60 thousand fewer aircraft flights in 2010.
- Florida high speed rail will serve 1.116 billion passenger miles of travel in 2010.
- An average of 5,380 person-years of employment will be created and supported over the life of the high speed rail franchise.
- During the four peak construction years, the project will increase economic activity by $1.667 billion (1997 dollars) per year in Florida.¹
- A traveler shifting from auto to high speed rail from Tampa to Miami could be expected to save 2.7 hours of travel time per trip.
- An air or auto traveler shifting to high speed rail between Miami and Orlando in 2010 would be expected to reduce pollutants by 80 pounds and reduce energy consumption by the equivalent of 4.7 gallons of gasoline.
- Based on the expected shifts of demand, the Florida high speed rail project would be expected to prevent 389 auto accidents, 380 auto accident injuries and 5 auto fatalities annually.

This analysis employed the most sophisticated economic modeling tools currently available. Two economic impact assessment models were initially used to determine the economic impacts on the state of Florida of implementing the Florida high speed rail project. The first model was the U.S. Department of Commerce, Regional Input Output Modeling System (RIMS II) which is a static model.² The other model is a dynamic, integrated input output econometric model, Regional Economic Model, Inc. (REMI).³ The REMI model, used in this report, is capable of measuring the socio-economic impacts of variations of economic flows over extended periods of time. This model is widely accepted and has been used extensively over two decades by private, public and academic researchers to simulate the economic impacts of investment and policy options.

The analysis also incorporated financial data and ridership estimates produced and provided to the researchers by the Florida Department of Transportation and FLORIDA OVERLAND EXPRESS (FOX) team members.⁴ The projected ridership, costs and revenues for the system are major factors in evaluating the viability of the high speed rail project. Consequently, over the life of the project, changes in fare revenues or costs of operation could affect the resultant financial feasibility and the subsequent economic benefits of the high speed rail project.⁵ Similarly, attaining the projected number of riders is a prerequisite to realizing the travel time and congestion reduction benefits estimated in this report.⁶ Other benefit calculations, such as safety improvements, energy savings and air quality benefits, are dependent on the ridership forecasts and a variety of estimates of the expected performance of high speed rail and competing modes, over time.

A number of technical, financial, ridership and economic feasibility studies completed over the last decade established the feasibility of high speed rail in the rapidly urbanizing corridors of central and south Florida. These studies also served as a backdrop and foundation for the current analysis. The evaluation in this current study is a melding of the most recent ridership, construction and operation costs, projected revenues, and other financial data into a comprehensive economic impact assessment.▼
EXECUTIVE SUMMARY

BACKGROUND

Investments in Transportation
Transportation fulfills many social needs and is considered an essential component of the infrastructure of today's society. Investments in transportation represent significant economic benefits to the community through the movement of people and goods. These benefits accrue directly to those who use the investment as well as indirectly to those who may not use a particular transportation facility. Some benefits, such as the economic stimulus and employment increases from construction, are a direct result of the decision to invest in Florida high speed rail. Other benefits, such as savings in energy, travel time, safety and emissions, are dependent on the ridership and the actual performance of high speed rail in comparison to alternative forms of transport over the life of the project. These benefits are determined based on the best current estimates of ridership and the performance characteristics of air, auto and high speed rail travel.

Growth and Limitations
Florida has experienced population and tourism growth over the past few decades virtually unrivaled elsewhere in the United States. Considerable progress has been made in expanding Florida's highways, ports, airports and public transportation systems; however, growing demand has continued to outpace the supply of new transportation capacity. In addition, it is becoming increasingly clear that the costs and consequences of unlimited expansion of Florida's roadways are more than can be borne by our environment and by the taxpayers.

High Speed Rail Alternative
The Florida Department of Transportation has aggressively sought alternatives to meet the travel needs of Florida residents and tourists while still being responsible stewards of the environment and public resources. In this search, the prospect of implementing a high speed rail system for Florida began in 1982 and is currently mandated by the 1992 Florida High Speed Rail Transportation Act.

Meanwhile, high speed rail has grown more attractive as modern rail technology has proven itself in an increasing number of travel markets across the globe. Florida's rapid population and tourism growth, flat topography, cluster of large urbanized areas, and growing densities have created a travel market that, in part, may best be served by a transportation system that includes high speed rail.

Part of an Integrated Multimodal System
The proposed Florida high speed rail project is not a single cure-all for the pressing travel congestion problems facing the state. High speed rail is, however, one of
several pivotal transportation investments needed within the integrated infrastructure of the state to resolve these growing concerns. The Florida high speed rail project is designed to complement other modes of travel. It will serve as an important link in the United States’ first multimodal transportation system that will include high speed rail integrated with auto, air travel, buses, vans, park-n-ride facilities, urban rail and other regional transit services.

FLORIDA HIGH SPEED RAIL PROJECT

In 1996, the Florida Department of Transportation entered into a public/private partnership agreement with Florida Overland Express (FOX), a consortium of four of the world’s largest and most respected international engineering, construction and rail equipment companies, to implement a high speed rail system linking Tampa, Orlando and Miami. The Florida Department of Transportation and FOX are currently in the process of conducting comprehensive studies of ridership, route alignment, construction costs and financing.

The Florida high speed rail system is designed to operate on 320 miles of new electrified track connecting Florida’s largest urban areas. The system proposes connections with five major airports, the highway system, and growing regional rail and bus transit systems across the state’s largest metropolitan areas. The counties directly served by this proposed high speed rail system are forecast to contain more than 45% of the state’s 15.4 million people by the year 2000 and receive more than 58% of Florida’s tourist development tax revenues. Major tourism attractions include recreation areas, beaches, cruise ships, theme parks and urban centers.

Environmental, planning and engineering studies will continue through 1999 and construction is slated to begin in 2000. The first passengers will be able to travel from Miami to Orlando beginning in 2004 and to Tampa in 2006.

TRANSPORTATION BENEFITS OF HIGH SPEED RAIL

As a precursor to estimating the economic impacts, this study looked at the transportation benefits expected from the project. These benefits are of interest both because they contribute to economic impacts, and because safety, air quality and energy use are among the important considerations in making transportation investment decisions.

Transportation benefits accrue to persons choosing to use high speed rail and to non-users that benefit from the presence of this transportation alternative. These benefits take two forms. The first is the benefit to the traveler, above and beyond the cost of the fare, including consumer surplus, safety, environmental and other savings. The second is the economic and other savings for travelers using existing transportation modes in the form of reductions in congestion as a result of some air and auto travelers switching to high speed rail.

High Speed Rail Ridership

Florida high speed rail is projected to carry 6.13 million one-way riders in the year 2010. This will result in approximately 16,780 daily trips, averaging 182 miles. Forty-six percent of the ridership will be concentrated in the Orlando-Miami segment, with 36 percent and 18 percent in the Tampa-Orlando and Tampa-Miami segments, respectively. Fifty-seven percent of these trips would be made for business purposes, the remainder being personal travel and tourism. Of the total ridership, 31 percent is estimated to shift to high speed rail from air travel, 45 percent from auto, and 24 percent would be new trips induced by the cost and convenience of high speed rail. Approximately 5 percent of highway traffic between the cities served is expected to shift to high speed rail, while approximately 80 percent of intra-Florida air traffic will be diverted to high speed rail. High speed rail ridership represents about 11 percent of the total travel that starts and ends in the cities served in the Tampa-Orlando-Miami corridor. The average fare is projected to be approximately $64 per trip or $0.35 per passenger mile.

High speed rail would serve approximately 1.1 billion passenger miles of travel in 2010, helping to meet needs in a state that currently has over 127 billion vehicle miles of travel on roadways. These statistics demonstrate how high speed rail would provide significant transportation capacity and carry a large ridership, yet in the context of the total travel demand in Florida, its role, like that of any single project, is to serve as one part of an overall transportation system.
Traveler Benefits

Traveler benefits are estimated by comparing the forecasted performance of the proposed system with the forecasted performance of auto and air modes. Estimates are developed from the ridership forecast (and source of travelers, i.e., shift from air, shift from auto, and induced) and the comparative performance of the modes. Benefits to non-users in the form of time savings from reduced congestion were also estimated and included among the inputs to the economic impact assessment.

TIME - High speed rail travelers who shift from auto and air can be expected to save an annual average of 3.8 million hours of time over the 2004 to 2043 time period. The time savings reflect the sum of the estimated door-to-door travel time differences.

SAFETY - Internationally, high speed rail has attained an exceptional safety record which is assumed to continue in Florida operations. Historical trends in air and auto safety are used as a basis for determining the number of accidents, injuries, and fatalities that might be avoided by the shifts of travelers to high speed rail.

ENERGY - Based on forecasted 2010 and 2035 conditions, the presence of the high speed rail service should reduce transportation energy consumption significantly. This savings is the equivalent of 16.2 million gallons of gasoline or 386,000 barrels of oil or 1.674 billion British thermal units in 2010; and 21.2 million gallons of gasoline or 506,000 barrels of oil or 2.111 British thermal units in 2035.

AIR QUALITY - High speed rail will provide reduced pollutants due to travelers shifting from either auto or air travel. The following chart presents changes in tons of pollutants for 2010 and 2035 based on estimated modal characteristics for that time.

### NET REDUCTION IN TONS OF AIR QUALITY POLLUTANTS (OPERATING YEARS 2010 AND 2035)

<table>
<thead>
<tr>
<th>Year</th>
<th>Pollutant</th>
<th>Auto</th>
<th>Air</th>
<th>FHSR*</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Carbon Monoxide</td>
<td>4,414</td>
<td>17,210</td>
<td>9</td>
<td>21,625</td>
</tr>
<tr>
<td>2010</td>
<td>Hydrocarbons</td>
<td>582</td>
<td>14,799</td>
<td>15</td>
<td>15,181</td>
</tr>
<tr>
<td>2010</td>
<td>Nitrous Oxides</td>
<td>307</td>
<td>654</td>
<td>191</td>
<td>770</td>
</tr>
<tr>
<td>2010</td>
<td>Sulfur Matter</td>
<td>121</td>
<td>259</td>
<td>277</td>
<td>117</td>
</tr>
<tr>
<td>2010</td>
<td>Sulfur Oxides</td>
<td>28</td>
<td>145</td>
<td>287</td>
<td>117</td>
</tr>
<tr>
<td>2010</td>
<td>Totals</td>
<td>75,074</td>
<td>96,857</td>
<td>41,778</td>
<td>130,171</td>
</tr>
<tr>
<td>2035</td>
<td>Carbon Monoxide</td>
<td>7,145</td>
<td>23,876</td>
<td>15</td>
<td>35,506</td>
</tr>
<tr>
<td>2035</td>
<td>Hydrocarbons</td>
<td>1,058</td>
<td>3,189</td>
<td>2</td>
<td>3,481</td>
</tr>
<tr>
<td>2035</td>
<td>Nitrous Oxides</td>
<td>497</td>
<td>1,058</td>
<td>509</td>
<td>1,246</td>
</tr>
<tr>
<td>2035</td>
<td>Sulfur Matter</td>
<td>424</td>
<td>1,644</td>
<td>1,214</td>
<td>1,659</td>
</tr>
<tr>
<td>2035</td>
<td>Sulfur Oxides</td>
<td>40</td>
<td>235</td>
<td>465</td>
<td>190</td>
</tr>
<tr>
<td>2035</td>
<td>Totals</td>
<td>121,533</td>
<td>156,824</td>
<td>67,634</td>
<td>210,723</td>
</tr>
</tbody>
</table>

*Florida High Speed Rail
Methodology
The basic assumption of this economic impact analysis is that benefits flow from improvements in transportation systems (e.g., reduced travel times and associated costs) and from new dollars attracted to an area. Thus, simply taking taxpayer or private sector dollars and spending them on transportation as opposed to an alternative use will not necessarily create the same positive economic impacts. Realizing positive benefits requires the inflow of new resources (private sector and federal investment in an economic activity) and/or the realization of transportation benefits to travelers that result in savings produced by the new investment.

This analysis evaluates the expected direct and indirect changes in employment, income, and business activity that would be attributable to constructing and operating the high speed rail project in Florida. These impacts result from new money stimulants to the Florida economy that would otherwise not exist in the state's future. The economic impacts measured in this report are only a portion of the total economic benefits that can accrue to Florida from this investment.

Inflow of New Money as Economic Stimulus
The decision to implement a high speed rail project in Florida results in flows of money into the state's economy. The analysis of economic impacts requires an understanding of the flows of money and the consequences that they have on the economy of Florida and the affected regions. A project of this magnitude will have a complex interaction with the state's economy. Investment funds come from several sources: the state, the federal government and the private sector. The principal effects of this investment come from new funds entering the state and from the economic benefits associated with the transportation services that are provided. Thus, the private sector equity investment by the FOX consortium, the contribution of federal funds and the direct benefits associated with improved transportation are the stimulus for additional economic growth. The Florida high speed rail project is forecast to generate a direct return to the state of Florida on its initial and ongoing investment. That investment is secured by state ownership of the high speed rail infrastructure. For the purpose of this analysis, the financial return to the state of Florida is assumed to be reinvested in other high speed rail projects in Florida.

Statewide Employment
Results of the analysis indicate that an estimated 78,102 jobs will be created by the high speed rail project during the planning and construction phase (8 years). An additional 174,786 jobs will be created over the period of operation and reinvestment (39 years). These jobs would be distributed broadly across most sectors of the economy. Out of the average annual 5,380 jobs, the strongest job growth, at approximately 4,000 jobs per year, is in the non-manufacturing sector. This includes growth in services including tourism, transportation, retail trade, finance and government. Additionally, an average annual increase of 200 jobs will be realized in the manufacturing sector during the years of high speed rail operation.

This overall increase in employment is attributable to the construction and operation of the high speed rail system and subsequent economic impacts. The secondary impacts result from the increase in the competitiveness of Florida's businesses and the attractiveness of Florida's economy.

Regional Impacts
Regional impacts are presented for five regions along the route. The study provides estimates of the number of new jobs, annual wages and salaries, and economic activity created by the project. New jobs include those directly involved in the construction and operation of the system, and those that result from stimulated economic activity. Along with the creation of jobs, the project contributes to the economic activity of the state and accordingly increases earnings by the workforce throughout the state.

The projected employment growth is generally distributed in proportion to the spending in each region of the state. This spending will be influenced by the amount of track in the various regions and other infrastructure to be built and operated, such as stations and maintenance facilities. Other employment growth will result from commercial ventures that will support the communities, riders and suppliers affected by the high speed rail system.

In addition, over the long term, funds paid to the state of Florida as return on its investment are available as new revenue for programming and expenditure statewide, as determined by the Florida appropriations process.
CONCLUSIONS

The Florida High Speed Rail Project will:

Benefit travelers by:
- Reducing yearly highway travel by over 261 million vehicle miles, thus removing 1.4 million auto trips from the roads in 2010
- Reducing yearly air travel by over 559 million passenger miles, thus enabling a reduction of 60 thousand aircraft flights annually in 2010
- Reducing time spent in roadway congestion by over 1.6 million hours per year
- Reducing yearly deaths and injuries by auto travel by 5 and 380, respectively

Benefit the environment by:
- Reducing annual fuel consumption by the equivalent of 16.2 million gallons of gas in 2010
- Reducing annual pollutants by 130,171 tons in 2010

Improve Florida's economy by:
- Creating 78,102 full time jobs and $2.84 billion in wages and salaries over the first 8 years of the project (planning and construction phase)
- Creating 174,786 full time jobs and $6.04 billion in wages and salaries over the next 39 years (operations and reinvestment phase)

Provide a stimulus for development of new industries in Florida by:
- Motivating economic development and growth management activities
- Attracting new business and additional tourists to Florida
- Demonstrating a willingness to invest in new ideas, and
- Being a model of public/private partnership.
THE RESEARCHERS

The Florida State University Center for Economic Forecasting and Analysis (CEFA) specializes in applying advanced computer-based economic evaluation and forecasting models that examine and help resolve pressing public policy issues confronting the state of Florida. The Center conducts applied economic research and educational training across a wide range of public policy areas. CEFA staff has decades of applied research leadership in a number of important public and private policy areas. They include expertise in public transportation (with specialized knowledge in the areas of high speed rail and magnetic levitation technology assessment); health care finance and policy; taxation and fiscal issues; health and property insurance; and environmental, land use, energy and planning issues.

The Center for Urban Transportation Research (CUTR) at the University of South Florida conducts a broad range of policy research addressing local, state, and national transportation issues. With a multidisciplinary staff of nearly 40 full-time researchers and 20 graduate assistants, CUTR conducts more than $5 million in sponsored research annually. Since its establishment in 1988 by the Florida legislature, CUTR has completed in excess of 200 projects, valued at nearly $30 million. CUTR houses the National Urban Transit Institute and the editorial office of the Journal of Public Transportation with its distinguished Editorial Board. In the nine years since its inception, CUTR has become one of the top-ranked transportation research centers in the country.

ENDNOTES

1 All references to dollars in this report are in 1997 dollars.
4 The information provided to the researchers by Florida Department of Transportation and FOX was based on actual quantity of material estimates, locally-based unit prices of material, labor to install, staffing of construction and operational phases, and maintenance of the system during the franchise per Florida Department of Transportation franchise agreements: FOX Proposal dated October 31, 1995; Post-Franchise Agreement dated August 2, 1996; Pre-Certification Post-Franchise Agreement dated November 12, 1996.
5 FOX will be implementing maximum yield pricing as currently employed by the airline industry and other transportation providers.
6 In addition to the 1993 Florida Department of Transportation ridership study forecast incorporated in the FOX proposal, two independent ridership studies are currently being conducted.
8 Extrapolation of Florida Department of Transportation, Bureau of Transportation Statistics data.
10 Florida Department of Transportation and FOX Pre-Certification Post-Franchise Agreement dated November 12, 1996, and supporting documents.
12 According to accepted industry standards, a job is defined as one person employed full time for one year.

FOR FURTHER INFORMATION

This Executive Summary was developed from two reports entitled: An Analysis of the Economic Impacts of Florida High Speed Rail and Travel Time, Safety, Energy and Air Quality Impacts of Florida High Speed Rail. For further information please contact Dr. Tim Lynch, Center for Economic Forecasting and Analysis, Florida State University, (904) 644-7357, e-mail: tplynch@garnet.acns.fsu.edu or Dr. Steven Polzin, Center for Urban Transportation Research, University of South Florida, (813) 974-9849, e-mail: polzin@eng.usf.edu. Report information can be obtained from website: www.cefa.fsu.edu.

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