INTERCITY PASSENGER / HIGH SPEED RAIL IN TEXAS

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CENTER FOR TRANSPORTATION RESEARCH

The University of Texas at Austin

September 2009

PASSENGER RAIL: FEDERAL GUIDANCE

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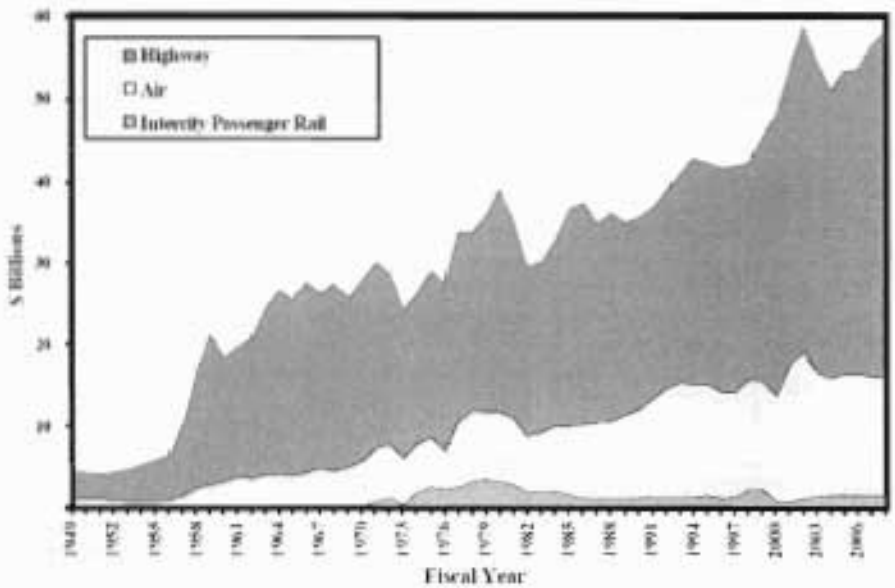
1. Introduction

For many years the effort to implement intercity passenger rail (IPR) as an important element of the U.S. transportation system was characterized by the following dichotomy – attempting to implement a vision of 300 mile per hour (mph) trains, but struggling from year to year to fund Amtrak (AASHTO, 2009). American transportation culture has generally been more supportive of automobiles than trains, and public policy in the U.S. has been biased against passenger rail.

Improved passenger rail service, which would help the country alleviate traffic, energy, and environmental concerns has been less readily accepted by leaders in the U.S. (Dilger, 2003). In the past, some of the major difficulties to create and implement an effective federal passenger rail service have been (Fisher & Nice, 2007):

- American's affinity for the private automobile and relatively low gas prices,
- the population sprawl of most metropolitan areas,
- long distances between population centers, and
- land use policies.

Even though much of the initiation and planning is being done by the States, the success of high speed rail (HSR) and improved IPR programs will depend on the availability of federal funding to support state planning and construction. While federal funding sources support construction and maintenance of the highway, air and transit systems, there has been no similar funding to support state efforts to implement HSR or IPR service (see graphic below).



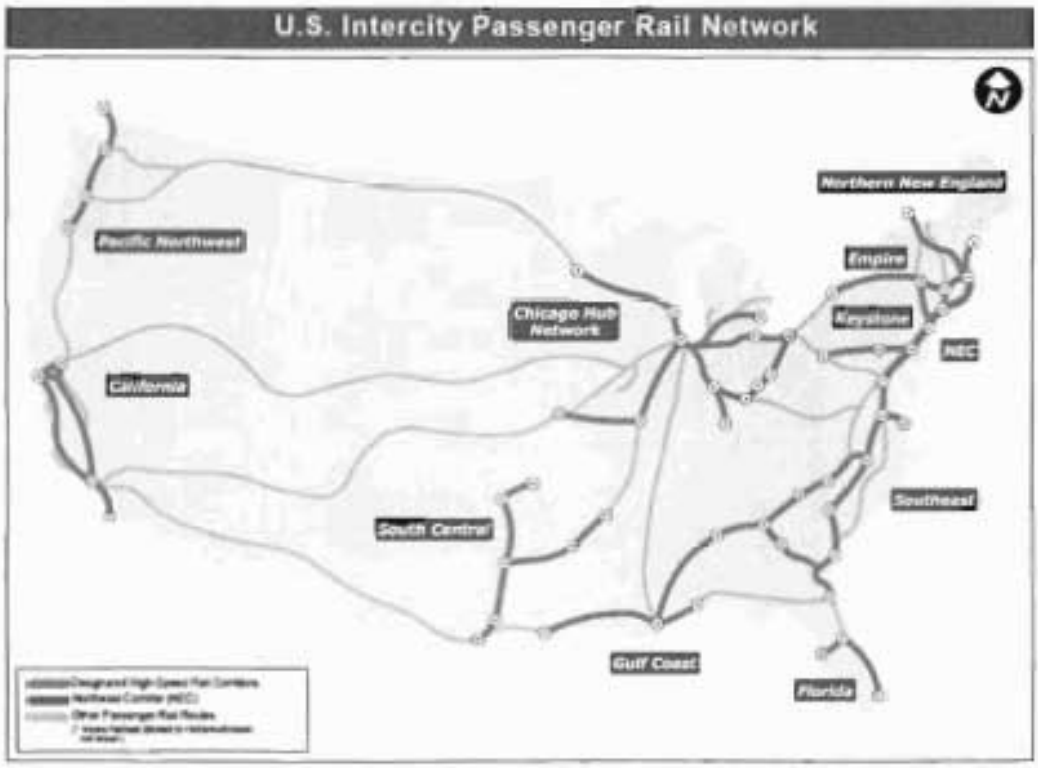
Source: FRA, 2009

States, Congress, the Obama Administration and a broad range of transportation experts and interests agree that the U.S. needs a national IPR system (AASHTO, 2009). Already since 2002, States have increased their efforts to develop IPR and HSR and made specific demands to Congress for this purpose.

Congress has responded providing the necessary funding for Amtrak to continue operations. In Fiscal Year (FY) 2008, Congress allocated $30 million dollars for a first grant program - managed by the Federal Rail Administration (FRA) - for States to apply for IPR implementation. For FY 2009, Congress made available a $90 million allocation for passenger rail grants. Additionally, in October, 2008, the Passenger Rail Investment and Improvement Act (PRIIA) was enacted and in February 2009, $8 billion were authorized for IPR as part of The American Recovery and Reinvestment Act (ARRA or Recovery Act).

On April 16, 2009, President Obama announced a new vision for developing HSR and IPR in America, calling for a collaborative effort among the federal government, States, railroads and other key stakeholders. Furthermore, in President Obama's proposed budget for FY 2010, Congress should initially allocate an additional $5 billion for IPR. Directed by States or groups of States, these grants should lead to the creation or improvement of HSR corridors linking mega-regions and high density areas across the U.S.

The federal funding available through ARRA and PRIIA intend to provide seed money to fund a transformation in passenger rail in the U.S. President Obama's vision document instructs to attend to the following selected corridors for the development of an improved IPR or HSR service (see graphic below).



Source: FRA, 2009

The availability of these funds represents both an opportunity and challenge for the States. Although federal funding comes with significant rules and conditions, the ARRA funding will likely be one of the most highly monitored federal funding programs to date (Wing Stone & Robson, 2009); inefficient use of funds or unexpected project delays could be readily visible and

commented upon. Also, it is important to point out that ARRA is a "temporary" measure, intended to preserve and create jobs to stabilize the U.S. economy (Patton Boggs, LLP, 2009).

This document provides an overview of the federal guidance and funding available for improving and implementing IPR and HSR in the U.S. Specifically, the document provides background information, review available grants for IPR and HSR development, including the grant requirements and procedures. The appendices provide a glossary for passenger rail services and the history in terms of HSR corridor development in the U.S.

2. Background

FY 2008 marks two important steps regarding the start of an improved policy and vision for HSR and IPR in America:

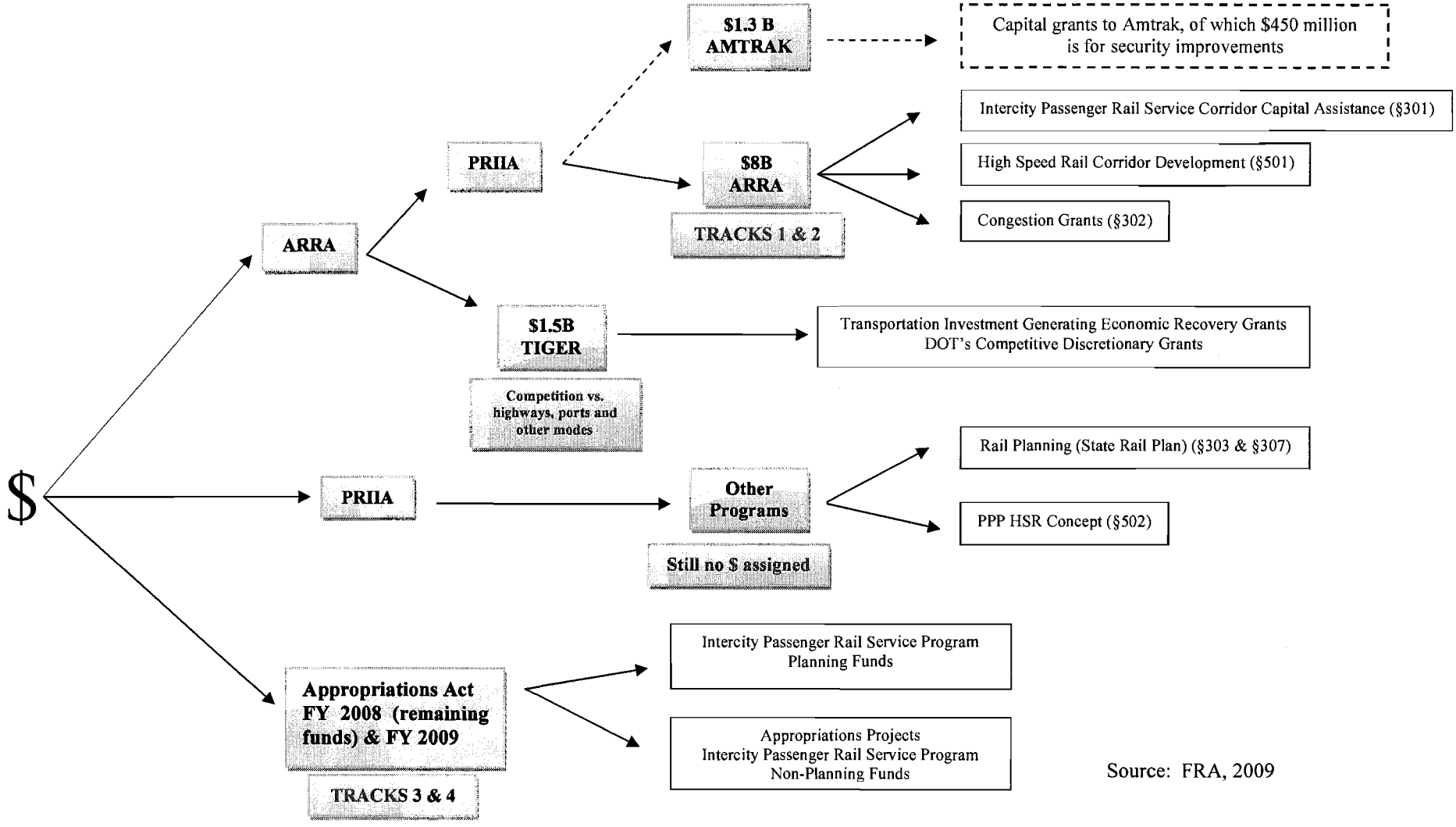
- *first,* Congress appropriated funds for FRA grants: 25 applications from 22 States culminated in the award of 15 grants, and
- *second,* after a 7 year effort, PRIIA was enacted authorizing initially $1.9 billion in grants for States to fund IPR over a 5 year period (AASHTO, 2009).

Furthermore, on February 17, 2009, President Obama signed into law the ARRA in response to the economic situation in the U.S. The ARRA amounts to the largest one-time domestic spending program in U.S. history and aims to specifically create or save 3.5 million jobs during the President's first two years in office (Patton Boggs, LLP, 2009). In brief, this stimulus package will provide $575 billion in Federal spending.

On April, 2009, President Obama presented his *"Vision for High Speed Rail in America"* offering a bold framework for the future implementation of improved HSR and IPR federal funding. The rules of procedure, or *"true"* implementation parameters were enacted subsequently by the FRA on June 17, 2009. In the latter, the FRA established a four track approach and established July 10, 2009 as a deadline for pre-application procedures for the grants.

2.1 Current Federal Passenger Rail Grants & Programs at a Glance

The following chart presents the federal monies available for IPR and HSR service improvement. Some grants and programs are directly related to the ARRA; others are funds remaining from past years (FY 2008) or stems from the 2009 Appropriations Act or PRIIA. The following chart presents funding according to the FRA's Interim Program Guidelines issued on June 17, 2009.



Source: FRA, 2009

2.2 Tracks Available for Federal Funding

A track could be interpreted as an "avenue" for requesting federal funding by applicants. As per President Obama's Vision of April 2009, there were three tracks available for applicants. As per the FRA's Interim Program Guidance of June 2009, there are four tracks available. The latter document prevails because of several exceptions provided in ARRA, which will be explained in the following sections. Which "track" to apply for depends on the:

- nature of the project (Is the project on a HSR corridor? Is it an independent passenger rail project?)
- status of the project (Is the project in the planning phase? Is the applicant ready to start building and have all the pertinent authorizations and studies been obtained and conducted?)
- matching funds available (Has a state appropriation been dedicated for this project? Is the project only relying on federal funding?)
- timeframe in which the project should be completed (2 years? 5 years?)

The following table provides a summary of the programs and tracks available for federal funding of IPR.

Track	Legal Foundation	Purpose	Amount Available	Type of Award	Eligible Participants	Application deadlines	Federal Fund Sharing	Timeframe for Completion
1	ARRA PRIIA 301 PRIIA 302	•"Ready to go projects" •Projects requiring only preliminary engineering and final environmental clearance •Projects that have independent utility	$8B* (**shared with Track 2**) with no predetermined allocation between tracks	Final design and construction grants (Sub-track 1) PE/NEPA cooperative agreements (Sub-track 2)	States, Amtrak, and for PRIIA 301: • Groups of States • Interstate Compacts • Applicable State IPR Agencies	August 24, 2009	100% although leverage funding is desirable	Within 2 years of obligation
2	ARRA PRIIA 301 PRIIA 501 **Priority Track for the FRA**	•Development of HSR/ IPR services or substantial upgrades to existing corridor services •Need to be inter-related projects that constitute a phase or geographic section of a long-range service development plan •Not all projects need to be "ready to go", but at least the participant needs to present:	$8B* (**shared with Track 1**) with no predetermined allocation between tracks	Letter of Intent: Federal Government's commitment to fund the entire program obligating funds for the final design/construction phases Cooperative Agreements	States, Groups of States, Interstate Compacts and For PRIIA 301: • Applicable State IPR Agencies For PRIIA 501: • Applicable State HSR Agencies • Amtrak	October 2, 2009	100%, although funding leverage is desirable	September 30, 2017

Track	Legal Foundation	Purpose	Amount Available	Type of Award	Eligible Participants	Application deadlines	Federal Fund Sharing	Timeframe for Completion
		- TIER I or corridor NEPA study - HSR or IPR Service Development Plan or an equivalent approach. • Programs generally address infrastructure, equipment, and stations or facilities in a comprehensive manner						
3	Funds for Interstate Passenger Rail Planning FYs 2008 (remaining funds) & 2009 Appropriations Act	• Planning: aims at establishing a pipeline of future projects by advancing planning activities • Opportunity to complete pre-requisite work needed to submit Track 1 & 2 applications	Up to $9.55 M	Cooperative Agreements	States	August 24, 2009	Up to 50%	Within 2 years of obligation
4	Appropriations Projects (non-planning funds) FYs 2008 (remaining funds) & 2009 Appropriations Act	• Alternative for projects that would fit under Track ,1 but where State applicants are offering at least a 50% non-Federal match • Can be submitted concurrent with application under Track 1	No less than $82.3 M	Simplified final design and construction grants	States	August 24, 2009	Up to 50%	Within 5 years of obligation

Source: FRA, 2009

3. American Recovery and Reinvestment Act

The American Recovery and Reinvestment Act of 2009 (ARRA, Pub. L. No. 111-5, 2/17/2009) was enacted by Congress to:

- preserve and create jobs, and promote economic recovery,
- assist those most impacted by the recession,
- provide investments needed to increase economic efficiency,
- invest in transportation, environmental protection, and other infrastructure that will provide long-term economic benefits, and
- stabilize state and local government budgets to minimize and avoid reductions in essential services and counterproductive state and local tax increases.

3.1 ARRA and PRIIA

There are two major types of rail grant programs under ARRA:

- $1.3 billion for capital grants to Amtrak, of which $450 million is for security improvements, including "life saving" improvements. Amtrak is the only eligible applicant for the $1.3 billion Amtrak grant program, and
- $8 billion for capital grants for HSR corridors and IPR service.

These ARRA rail grant programs fund certain programs under PRIIA. PRIIA's programs and rules thus provide a framework to distribute the federal ARRA funds. It is important to note that several PRIIA requirements are contradictory with ARRA or the FRA's Interim Program Guidelines. However, ARRA allows for the issuance of interim guidance that may waive the original requirements provided by PRIIA. Thus, ARRA and, ultimately, the FRA's guidance prevail. Several examples of this occurring are provided in the following sections.

PRIIA (Public Law 110-432) enacted on October 16th, 2008 is divided in two sections:

- Division A, which focuses on rail safety (Rail Safety Improvement Act of 2008), and
- Division B, which reauthorizes AMTRAK and serves other purposes.

This document focuses on the latter, and specifically, on grants that are available to States or groups of States.

3.1.1 AMTRAK Grant

Pursuant to ARRA, the FRA is to make available by use of a grant agreement to the National Passenger Railroad Corporation (Amtrak) $1.3 billion, of which:

- $450 million shall be used for capital security grants, including "life saving" improvements, and
- $5 million is to be made available for the Amtrak Office of Inspector General.

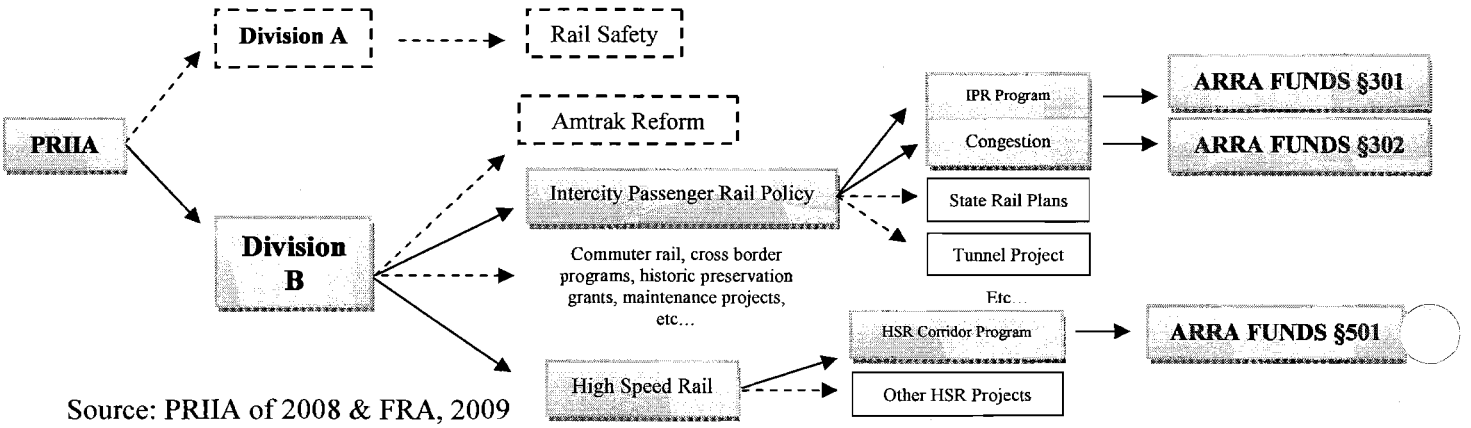
These funds were authorized by Congress through PRIIA's framework. Priority for the use of the $850 million in non-security funds is to be given to projects for the repair,

rehabilitation, or upgrade of railroad assets or infrastructure, and for capital projects that expand passenger rail capacity, including the rehabilitation of rolling stock.

In addition, no more than 60% of the non-security funds may be spent on projects along the Northeast Corridor. Projects are to be completed within 2 years of enactment of the ARRA, and are to supplement and not replace planned expenditures for such activities from other Federal, State, local, and corporate sources.

3.1.2 ARRA Tracks 1 & 2

The following figure illustrates how the PRIIA framework is used to distribute Track 1 & 2 ARRA funds. Thus, PRIIA has many additional sections related to commuter rail, cross border programs, other grants not related to ARRA, instructions on how to draft state rail plans, instructions on private participation in HSR projects, among others. However, only sections 301, 302, and 502 are used to distribute the ARRA funds.



Source: PRIIA of 2008 & FRA, 2009

Eligible Applicants

Documentation requesting funding under ARRA is required to be submitted by eligible applicants in accordance with PRIIA and the FRA's Interim Program Guidance. Eligible applicants for Track 1 and 2 funding are illustrated in the Table below.

Type of Applicant	TRACK 1		TRACK 2	
	§301	§302	§301	§501
States	X	X	X	X
Groups of States & Interstate Compacts	X		X	X
Public Agencies established by 1 or more States and having responsibility for providing IPR	X		X	
Public Agencies established by 1 or more state(s) and having responsibility for providing HSR				X
Amtrak	X*	X**		X

* Amtrak may enter into a cooperative agreement with one or more State(s)

** Amtrak eligible only in cooperation with States

Source: FRA, 2009

Eligible Programs

Under PRIIA, there are three specific rail grant programs funded through Tracks 1 and 2:

- HSR corridor development grants (authorized in Section 501 of PRIIA),
- IPR service corridor capital assistance grants (authorized in Section 301 of PRIIA), and
- congestion grants (authorized in Section 302 of PRIIA).

Under ARRA, $8 billion has been allocated to fund Track 1 and 2 projects. No predetermined allocation has been made between Track 1 and 2 projects. It is, however, expected that some of this funding will be available for soliciting subsequent applications in early 2010.

Track 4 will be discussed in parallel with Track 1, since the FRA will apply the same criteria to evaluate Track 4 applications. However, the major differences between Track 4 and 1 are:

- *Funding source and amount available* - Track 4 is funded through the Appropriations Acts of FY 2009 and funds remaining from FY 2008 pertaining to the Appropriations Projects (annual appropriations funds for Interstate Passenger Rail – non-planning). The funds available for this track are no less than $82.3 million.
- *Match requirement* - Track 4 applicants are required to provide at least a 50% match to the federal funds requested.
- *Timeframe to complete the project* - Track 4 projects have an extra 3 years compared to Track 1 projects. Track 4 applicants have 5 years to complete the project.
- *Submission* - Track 1 and Track 4 applications can be submitted concurrently, for the same project to be considered under both funding scenarios.
- *Type of Applicant* - Only States may apply for Track 4.

A description of PRIIA's sections is provided below. In addition, the table below highlights the applicable ARRA funding waivers and selected Interim Program Guidelines.

PRIIA	Description of the Program
§301	This section encompasses the broadest of the new grant programs established under PRIIA, creating a framework for the new IPR Service Capital Assistance Program.
IPR Program	PRIIA established that projects must be included in a State Rail Plan, as well as a state match of at least 50%. ARRA, however, waived the State Rail Plan and the match requirements. The US DOT is authorized to use appropriated funds to make grants to assist in financing the capital costs of facilities, infrastructure, and equipment necessary to provide or improve IPR transportation.
Tracks 1, 2 & 4*	This program is modeled on the capital assistance to States, IPR service program that was implemented by FRA in FY2008 and is being implemented in FY2009. Excludes commuter rail and all local, regional rail transit, such as light rail, streetcars, and heavy rail (see Appendix A for a glossary of passenger rail service definitions).
§302	PRIIA authorizes the appropriation of funds to U.S. DOT to make grants to States or to Amtrak (in cooperation with States) for financing the capital costs of facilities, infrastructure, and equipment for high priority rail corridor projects necessary to reduce congestion or facilitate ridership growth in IPR transportation.

PRIIA	Description of the Program
Congestion ***Tracks 1 & 4****	Eligible projects include those: • identified by Amtrak to reduce congestion or facilitate ridership growth in heavily traveled rail corridors • identified by the Surface Transportation Board to improve on time performance and reliability, and • designated by US DOT as meeting the purpose of the program and being sufficiently advanced so as to be ready for implementation. U.S. DOT is authorized to establish appropriate grant eligibility, qualification, and administration conditions. The FRA, in its Interim Program Guidelines, specifically established that *"eligible projects intended to reduce congestion by alleviating major rail capacity bottlenecks, particularly those that benefit multiple railroad operators [...] in a congested corridor will likely be considered for funding under the Congestion Grant program".*
§501 **HSR Corridor Program** ***Track 2***	PRIIA authorizes the appropriation of funds to U.S. DOT to establish and implement a high-speed rail corridor development program. High-speed rail is defined as IPR service that is reasonably expected to achieve operating speeds of at least 110 miles per hour. US DOT is authorized to specify grant application requirements and PRIIA identifies a number of grant selection evaluation criteria, including that the project be part of a State rail plan, that the applicant have the ability to carry out the project, and that the project result in significant improvements to IPR service. ARRA, however, waived the State Rail Plan and the match requirements. Eligible corridors include the ten high-speed rail corridors previously designated by the Secretary of Transportation (see Appendix B). Grants could be used for capital projects, which broadly include typical activities in support of acquiring, constructing, or improving rail structures and equipment. These grants are available for: • acquiring, constructing, improving, or inspecting equipment, track, and track structures, or a facility of use in or for the primary benefit of high-speed rail service, expenses incidental to the acquisition or construction (including designing, engineering, location surveying, mapping, environmental studies, and acquiring rights-of-way), payments for the capital portions of rail trackage rights agreement, highway-rail grade crossing improvements related to high-speed rail service, mitigating environmental impacts, communication and signalization improvements, relocation assistance, acquiring replacement housing sites, and acquiring, constructing, relocating, and rehabilitating replacement housing; or • projects aimed at rehabilitating, remanufacturing or overhauling rail rolling stock and facilities used primarily in IPR service.

Source: PRIIA of 2008 & FRA, 2009

Track and Award Requirements

The Interim Program Guidance published by the FRA on June 17, 2009 established the following parameters, prerequisites, and types of awards for the different tracks.

Track	Description of Requirements & Type of Award
1 **4***	Awards can be made through: • Grants agreements supporting final design and project construction (Sub-Track 1) - final design (if not completed) may be funded, - NEPA documentation and preliminary engineering conforming to all regulatory, safety, security, and design are required,

Track	Description of Requirements & Type of Award
PRIIA §301 §302	- agreements with key project partners (including, infrastructure-owning railroads and potential or existing future operators) are required, - operator must be chosen, and if proposed, the application must state valid reasons, - project management plan (including, mitigation and risks measures) is required, - financial plan is required, - compliance with standardized next-generation rail corridor equipment pool, if applicable, - compliance with Positive Train Control requirements, if applicable, - service development plan desirable, - FRA approval required prior the commencement of construction activities, and - might cover alternative construction scenarios (design-build approach). • Cooperative agreements for completion of preliminary engineering and/or NEPA documentation (Sub-Track 2) - FRA actively collaborating by providing technical assistance, participating in key meetings and assisting in the preparation of the applicable engineering and environmental documents, and - FRA to approve the project deliverables through a milestone procedure and granting authorization to proceed to subsequent stages. • If multiple railroad operations benefit from projects, project costs will be shared proportionally to the benefit of each operator. Awards will be made under the following circumstances:
2 ***PRIIA §301 §501***	• The project does not have to be ready-to-go. The Federal Government may provide specific milestones and deadlines through: - the issuance of a Letter of Intent to fund the final design or construction of the project , and - fund the project through a cooperative agreement when the project is ready to be implemented. • However, a Service Development Program is required, and encompasses: - A plan for initiating or improving existing high speed IPR, - FRA to assist in assessing if the plan is acceptable, - Should address at a minimum the following topics: program rationale, service/operations plan, capital needs, operating and financial results, investment plan for infrastructure, fleet and facilities, public benefits, and program implementation, - should address if service is to be developed in cooperation with freight, commuter or intercity rail partners, if applicable, - Minimum completed requirements: corridor-wide service NEPA study, business and investment justification with sufficient project cost and benefit estimates, - Should comprehensively address infrastructure, equipment, and facility investments. • Rigorous management approach is expected – the FRA will focus on collaborative, long term efforts.

Source: FRA, 2009

3.2 ARRA & TIGER Grants

Title XII of the Recovery Act appropriates $1.5 billion - available through September 30, 2011 - for Supplementary Discretionary Grants for a National Surface Transportation System. These grants are to be awarded on a competitive basis for capital investments in surface transportation projects that will have a significant impact on the Nation, a metropolitan area, or a region. The U.S. Department of Transportation (DOT) is calling these Supplementary Discretionary Grants for a National Transportation System "TIGER Discretionary Grants" (Transportation Investment Generating Economic Recovery).

The ARRA specified that TIGER Discretionary Grants may be no less than $20 million and no greater than $300 million. The U.S. DOT has, however, discretion under the Recovery Act to waive the $20 million minimum grant size requirement for significant projects in smaller cities, regions, or States. Applications for TIGER Discretionary Grants of less than $20 million are thus encouraged.

3.2.1 Eligibility

TIGER grants can be awarded to State and local governments, including U.S. territories, tribal governments, transit agencies, port authorities, other state political subdivisions or local governments, and multi-State or multi-jurisdictional applicants (NYSDOT, 2009). ARRA specifies that capital investments in surface transportation projects that are eligible for TIGER funding *"shall include, but not be limited to"*:

- highway or bridge projects eligible under United States Code (USC) Title 23 (i.e., interstate rehabilitation, improvements to the rural collector road system, reconstruction of overpasses and interchanges, bridge replacements, seismic retrofit projects for bridges, and road realignments),
- public transportation projects eligible under chapter 53 of title 49, USC, including investments in projects included in the New Starts or Small Starts programs to expedite the completion of these projects and therefore their ability to raise revenues,
- passenger and freight rail transportation projects, and
- port infrastructure investments, including projects that connect ports to other modes of transportation and improve the efficiency of freight movements.

Up to $200 million of the $1.5 billion available for TIGER Discretionary Grants may be used as a subsidy and for the administrative costs of the Transportation Infrastructure Finance and Innovation Act (TIFIA) credit assistance program if it would further the implementation of the TIGER Discretionary Grants program (TIGER TIFIA Payments).

3.2.2 Selection Criteria

TIGER Discretionary Grants will be awarded considering the following criteria (U.S. DOT, 2009):

- *Long-Term Outcomes* - Priority will be given to projects that have a significant impact on desirable long-term outcomes for the Nation, a metropolitan area, or a region. The following long-term outcomes are desirable:

- State of Good Repair: Improving the condition of existing transportation facilities and systems, with particular emphasis on projects that minimize life-cycle costs.
- Economic Competitiveness: Contributing to the economic competitiveness of the United States over the medium- to long-term.
- Livability: Improving the quality of living and working environments and the experience for people in communities across the U.S.
- Sustainability: Improving energy efficiency, reducing dependence on oil, reducing greenhouse gas emissions, and benefitting the environment.
- Safety: Improving the safety of U.S. transportation facilities and systems.

- *Job Creation and Economic Stimulus*: Priority will be given to projects that are expected to create and preserve jobs rapidly and stimulate increased economic activity, particularly jobs and activity that benefit economically distressed areas.
- *Innovation:* Priority will be given to projects that use innovative strategies to pursue the long-term outcomes outlined above.
- *Partnership:* Priority will be given to projects that demonstrate strong partnerships and collaboration among a broad range of stakeholders and/or integration of transportation with other public service efforts.

Higher weights will be placed on the *Long-Term Outcomes* and *Jobs Creation & Economic Stimulus* criteria than on the *Innovation* and *Partnership* criteria (U.S. DOT, 2009). Projects that are unable to demonstrate a likelihood of significant long-term benefits in any of the five long-term outcomes is less likely to proceed in the evaluation process. For the *Jobs Creation & Economic Stimulus* criterion, a project that is not ready to be implemented is less likely to be successful.

Finally, applicants will also be required to identify, quantify, and compare the project's expected benefits and costs. This requirement will be waived for applicants seeking $20 million or less (admitted to apply by waiver), but compulsory if seeking $100 million or more.

4. Other PRIIA Programs

PRIIA provides opportunities for the private sector to operate and improve IPR services through:

- Rail Planning (§303) and
- Additional HSR Projects (§502).

These additional programs were not funded by ARRA and, as of July 2009, no federal funding has been made available to implement these programs.

4.1 Rail Planning Grants

PRIIA Section 303 requires States to prepare and maintain a State Rail plan to:

- set policy involving freight and passenger rail transportation within their boundaries,
- establish priorities and implementation strategies to enhance rail service in the public interest, and
- serve as the basis for Federal and State rail investments in the State.

State Rail Plans are to address a broad spectrum of issues. At a minimum a state must include the following in the State Rail Plan:

- an inventory of the existing overall rail transportation system, rail services, and facilities within the State, and an analysis of the role of rail transportation within the State's surface transportation system,
- a review of all rail lines within the State, including proposed HSR corridors and significant rail line segments not currently in service,
- a statement of the State's passenger rail service objectives, including minimum service levels for rail transportation routes in the State,
- a general analysis of rail's transportation, economic, and environmental impacts in the State, including congestion mitigation, trade and economic development, air quality, land use, energy-use, and community impacts,
- a long-range rail investment program for current and future freight and passenger infrastructure in the State that meets the requirements of subsection (b),
- a statement of public financing issues for rail projects and service in the State, including a list of current and prospective public capital and operating funding resources, public subsidies, State taxation, and other financial policies relating to rail infrastructure development, and
- an identification of rail infrastructure issues within the State that reflects consultation with all relevant stakeholders.

The plans are to be coordinated with other State transportation planning programs and clarify long-term service and investment needs and requirements. U.S. DOT will establish minimum standards for the preparation and periodic revision of State Rail Plans.

4.2 Other High Speed Rail Projects

On December 16, 2008, the FRA published a *"Notice Requesting Expressions of Interest in Implementing a High-Speed Intercity Passenger Rail Corridor"* in the Federal Register. The

latter applied to potential projects for financing, designing, constructing, operating, and maintaining an improved HSR intercity passenger system in the Northeast Corridor or in one of ten federally designated corridors (see Appendix B).

All Expressions of Interest in response to the notice have to be submitted by Monday, September 14, 2009. However, FRA requested that potential participants consider filing a response to this notice by providing a letter to the FRA with names and contact information by Friday, January 30, 2009. This initial letter was to help FRA determine the level of interest in the Request for Expressions of Interest (RFEI) process and facilitates future communication with applicants, including an invitation to a possible information session in the Spring of 2009 to further address questions from potential applicants and to provide information and guidance regarding the RFEI process.

Failure to provide the January letter, however, does not prevent participants from submitting an Expression of Interest in September 2009. However, it may be concluded that those that have submitted a letter may have some advantage *vis-a-vis* other applicants who did not prepare their application with the FRA's assistance and guidance.

The RFEI requires the Secretary of Transportation to *"issue a request for proposals for projects for the financing, design, construction, operation, and maintenance of a high-speed intercity passenger rail system operating within"* either the Northeast Corridor or a federally designated HSR corridor. All Expressions of Interest received will be considered by the Secretary and possibly by commissions representing affected and involved governors, mayors, freight railroads, transit authorities, labor organizations, and Amtrak. The results of these reviews will be summarized in one or more reports to Congress, which will make recommendations for further action regarding no more than one project concept for each corridor.

FRA envisions this as the first phase of a qualification process that Congress may follow with more specific actions regarding particular proposals in one or more corridors. It was made clear to respondents to the notice that the likelihood of future funding and implementation of the projects covered by this notice is unknown. Also, that the Federal Government will not be liable for any costs incurred in the preparation of responses to this notice.

The objectives are (a) to reduce existing minimum intercity rail scheduled service trip times - as shown in Amtrak's published timetable effective October 16, 2008 - between endpoints and all other main corridor city-pairs by a minimum of 25%, and (b) provide a reliable service. If no service presently exists in the corridor, the proposer needs to demonstrate that the proposed service will be reliable and time competitive in accordance with the definition of HSR.

Finally, Section 502 calls for comprehensive proposals that will address all the tasks necessary to implement HSR. Potential proposers are advised to verify that they would be able to assemble a cohesive team that can plan, organize, finance, design, and construct a complete HSR system in an eligible corridor, as well as gain the support of key public and private stakeholders, and successfully operate and maintain the service over the long term.

5. Appropriations Acts (Tracks 3 & 4)

Each fiscal year, the Appropriations Act allocates federal funding to the U.S. DOT for a broad range of highway, aviation, traffic safety, rail, transit, and marine transportation programs. The funding for Tracks 3 and 4 are from the FY2009, and the remaining (non-appropriated) funds from the FY2008 Appropriation Act's Capital Assistance to States – IPR Program.

On March 11, 2009, President Obama signed the 2009 Omnibus Appropriations Act (H.R. 1105), which appropriated unobligated funds from the FY2009[1] federal budget. The $410 billion bill includes $10.2 billion for transit and $1.8 billion for rail (FRA, 2009). The Omnibus Appropriations Act provides $90 million to be dedicated to the IPR Program. As for the FY 2008 Appropriations Act, as of June 2009, the estimated amount remaining is approximately, $1.9 million.

5.1 Requirements

These grants are provided to cover the capital costs of improving IPR service and are awarded by the FRA to States - usually under the following conditions:

- only States may apply for these grants,
- the grants are provided to a State on a reimbursable basis,
- at least a 50% match by the State is required,
- only 10% should be allocated for planning activities, and
- project(s) should be part of the Statewide Transportation Improvement Plan (STIP) at the time of the application.

Priority is given to projects that:

- improve the safety and reliability of intercity passenger trains,
- involve a commitment by freight railroads to an enforceable on-time performance of passenger trains of 80% or greater,
- involve a commitment by freight railroads of financial resources commensurate with the benefit expected to their operations,
- improve or extend service on a route that requires little or no Federal assistance for its operations, and
- involve a commitment by States or railroads of financial resources to improve the safety of highway/rail grade crossings over which the passenger service operates.

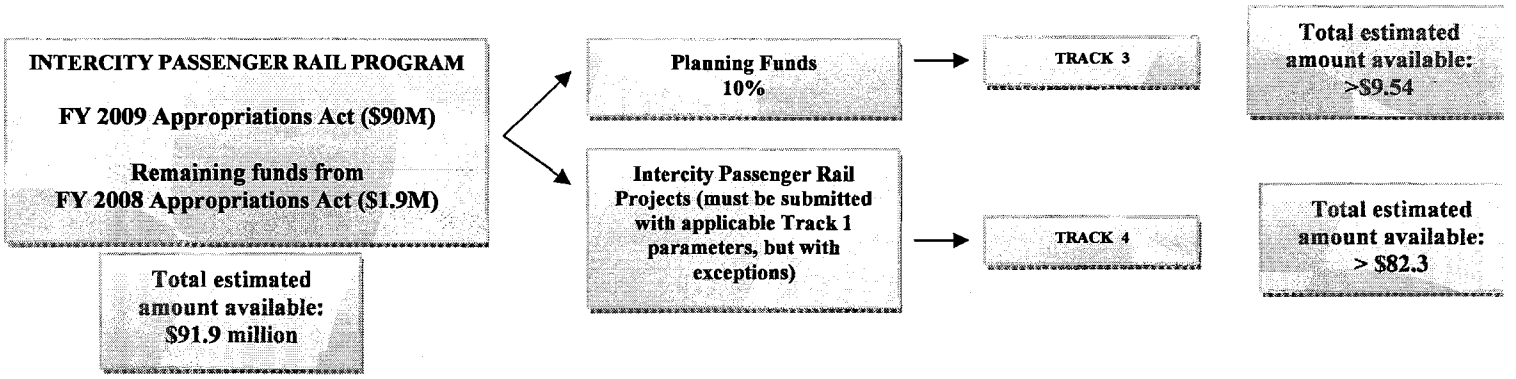
5.2 Available Funding

The FRA established in its Interim Program Guidelines that:

- Track 3 is intended to provide the necessary funding for States to prepare their applications for Tracks 1, 2 & 4, and
- Track 1 and 4 are similar although a different set of exceptions apply to Track 4 (as highlighted in Section 3.1.2).

[1] The federal fiscal year ends September 30, 2009.

The following chart illustrates the federal funding and allocations available under Tracks 3 and 4.



Source: FRA, 2009

6. Selection & Evaluation Criteria Applicable to All Tracks

6.1 Eligibility Requirements

While planning is an essential component of successful projects, it is not an eligible use of ARRA grant funds (Tracks 1 and 2) or Appropriation Act funds (Track 4). FRA, however, encourages the use of Appropriations Act funds (under Track 3) for planning and project development activities.

Expenses for post-planning activities that are directly related to construction (including, design work, engineering, location surveying, mapping, environmental studies, and acquiring right-of-way) are eligible for ARRA grant funds, but ARRA requires that priority be given to applications for funding of "shovel ready" projects.

The following expenses/ projects are ineligible for funding under all Tracks (FRA, 2009):

- grants cannot be used for operating expenses,
- applications cannot be submitted by private entities other than Amtrak, and
- projects in which commuter rail passenger transportation is the primary beneficiary.

Furthermore, for Tracks 1 and 4, the following are ineligible projects:

- support for the introduction of a new IPR service,
- construction of railroad infrastructure on a new or previously abandoned alignment,
- individual projects, although FRA will consider individual projects if they collectively yield a significant benefit to IPR services operating in one or more corridors on a case-by-case basis, and
- physical improvements outside the U.S.

Furthermore, all proposals under all Tracks must comply with the following requirements (FRA, 2009):

- the completed application must demonstrate that the project has been identified through a rational planning process,
- the application must be consistent with an overall plan (except for Track 3), and
- applicants must demonstrate that the project has independent utility (except for Track 3).

6.2 FRA's Award Criteria

FRA has provided evaluation criteria, as well as the priority/weights to be assigned to the evaluation criteria in the Interim Program Guidance. The table below summarizes the evaluation criteria and priority ranking by Track, as well as the required supporting documentation to be included in the application.

Evaluation Criteria	Weight & Priority Track 1	Track 2	Track 3	Track 4	Supporting Documents
Public Return on Investment					
• **Transportation Benefits**	X	X	X	X	• Service Development Plan
• **Economic Recovery Benefits**	X	X	n/a	n/a	• Quantitative Output measures (related to service and transportation)
• **Other Public Benefits**	X	X	n/a	X	
Project Success Factors					• Project Management Plan
• **Project Management**	X	X	X	X	• Financial Plan
• **Sustainability of Benefits**	X	X		X	• Stakeholder Agreements
Other Attributes					• Project Schedule
• **Timeliness of Project Completion**	X	X	X	X	

X – High priority X – Medium priority X – Low priority

Source: FRA, 2009

As thus can be seen from the table, priority will be given to:

- For all Tracks: mainly the public return of investment, but specifically the *"transportation benefits"* – which may be translated as improved IPR service, the integration of a network, and safety benefits.
- For Track 1, the *"economic recovery benefits"*, thus preserving and creating jobs.
- For Track 2, *"other public benefits"* by increasing the environmental quality and energy efficiency.
- For Tracks 3 & 4: the ability of the applicant to manage, keep record, organize, and demonstrate progress towards implementing the project.

7. Pre-Applications Received

The FRA encouraged potential applicants to engage the agency in pre-application discussions. The latter helps the applicant to understand the application process and the issues that need to be addressed. In addition, pre-applications provide the FRA with a preliminary idea of the plans and viability of the projects each State considers.

The pre-application deadline for all Tracks was July 10, 2009. The deadlines for the submission of the formal applications, however, vary:

- August 24, 2009 for Tracks 1, 3 and 4, and
- October 2, 2009 for Track 2.

As of July 2009, the FRA reported to have received the following preliminary submission amounts by state:

State	Preliminary Submission Amounts ($ Millions)
1. Alabama	$787
2. Alaska	-
3. Arizona	$237
4. Arkansas	$1
5. California**	$21,699
6. Colorado	$1
7. Connecticut**	$2,185
8. Delaware	$258
9. District of Columbia	$26
10. Florida	$3,002
11. Georgia	$296
12. Hawaii	-
13. Idaho	$5
14. Illinois**	$3,562
15. Indiana**	$166
16. Iowa	$228
17. Kansas	$17.2
18. Kentucky	-
19. Louisiana**	$202
20. Maine	$106
21. Maryland**	$11,205
22. Massachusetts	$2,072
23. Michigan	$563
24. Minnesota**	$933
25. Mississippi	-
26. Missouri	$139
27. Montana	TBD
28. Nebraska	-
29. Nevada*	$12,564
30. New Hampshire	$258
31. New Jersey	$852
32. New Mexico**	$21
33. New York*	$9,697
34. North Carolina**	$5,140
35. North Dakota	-
36. Ohio**	$5,845
37. Oklahoma	$1,992
38. Oregon	$2,130
39. Pennsylvania	$6,820
40. Rhode Island	TBD
41. South Carolina	$115
42. South Dakota	-
43. Tennessee	-
44. Texas**	$3,159
45. Utah	-
46. Vermont	$121
47. Virginia	$2,484
48. Washington	$1,817
49. West Virginia	$0.8
50. Wisconsin**	$1,842
51. Wyoming	-
GRAND TOTAL	$103,545
TOTAL States	40

Notes:
- indicates no submission was made by the state
TBD indicates that the state submitted a pre-application, but did not specify the amount requested
* Includes funds submitted by non Public entities
** Indicates that the state submitted on behalf of other states

Source: FRA, 2009

The total pre-application submissions amounted to more than $103 billion – almost 13 times the amount of available funding.

8. Concluding Remarks

FYs 2008 and 2009 have marked a new "era" in federal funding allocation for IPR and HSR rail service. President Obama, through ARRA, has allocated the historical sum of $8 billion dollars to be dedicated to rail congestion grants and improved IPR and HSR development in selected corridors. Under a different set of restrictions – but with the same objective – additional funding is also available through the 2008 and 2009 Appropriations Acts.

In June 2009, the FRA published the guidelines establishing the rules governing the application process for future recipients. In most cases, the applicants are in different planning/implementation stages. Because of this situation, the FRA decided to adopt a four track approach according to each purpose, thereby attempting to better serve the needs of future grant recipients. The federal funds will be distributed in several rounds, giving applicants the opportunity to apply in the future in the case of less advanced projects.

ARRA funds, Appropriations Act funds, and President Obama's vision for HSR and IPR represent a necessary first step to achieve a better passenger rail service in the U.S. Although Amtrak has stemmed a decrease in rail ridership over the last decades, these programs are regarded a necessary step to initiate the upgrade and implementation of IPR and HSR on selected routes and corridors.

The allocated funds are, however, considered to be a "down payment", thereby recognizing that it is insufficient to implement HSR on each of the designated corridors. At the same times, concern has been expressed about the potential success of a substantial rail investment program given other factors that persist in the U.S. Vast distances between cities, relatively low priced alternative modes, and the *"car"* culture are a few of the factors that are considered significant in determining the competitiveness of IPR and HSR in the U.S.

Appendix A: Passenger Rail Glossary

Given the current widespread interest in the development of passenger rail in the U.S., there are sometimes confusion as to the definition of the various passenger rail markets and the important characteristics that, for example, distinguish commuter rail from light rail or heavy rail. It is therefore important and useful to define the different types of passenger rail transportation services. This Appendix compares some of the basic characteristics of different passenger rail services.

Passenger Rail Service Characteristics

The table below summarizes the specific characteristics of different types of passenger rail services operated in North American.

Characteristics/ Types of Service	Light Rail	Heavy Rail	Commuter Rail	Intercity Rail	High-Speed Rail
Usual Vehicles	Modern articulated streetcars	Modern subway or elevated cars coaches	Locomotive-hauled or self-propelled coaches	Locomotive-hauled coaches	Locomotive-hauled coaches
Train length	1-3 cars	4-10 cars	2-8 coaches	2-14 coaches	8-12 coaches
Propulsion System	Electric using overhead wire	Electric using third rail	Diesel-electric (a)	Diesel-electric	Electric using overhead wire
Right-of-Way requirements	New surface alignment	New grade-separated alignment	Existing main-line railway trackage	Existing main-line railway trackage	Upgraded existing or new main-line railway trackage
Typical route length (miles)	5-15	5-15	20-50	50-2,000	100-500
Average station spacing (miles)	0.25-1	0.5-2	2-5	5-50	10-50
Boarding platforms at stations	Low or high	High	Low	Low	High
Typical fare collection method(s)	Self-service	At stations	On board	On board	At stations or on board
Speed (miles / hour)					
Maximum operating	50	70	79	79-90	125-250
Average along route	10-20 (b) 20-30 (c)	25-40	30-50	40-70	100-150
Typical primary passenger market	Trips within densely developed urbanized areas	Trips within densely developed urbanized areas	Trips within metropolitan areas between suburbs and major urban centers including central business district	Long-distance trips between cities	Long-distance trips between major metropolitan areas

Frequency of Service					
Peak-Period	5-10 minutes	5-10 minutes	30-60 minutes	1-2 hours	30-60 minutes
Nonpeak-Period	10-20 minutes	10-20 minutes	1-3 hours	Daily	1-2 hours

Footnotes:
(a) Self-propelled coaches may be either diesel-electric, diesel-hydraulic, or diesel-mechanical.
(b) Involves extensive use of street rights-of-way.
(c) Involves extensive use of exclusive, grade-separated rights-of-way

Source: Paolino, 1998

Commuter Rail

U.S. Code, Chapter 49 (§24102), defines commuter rail as "*short-haul rail passenger transportation in metropolitan and suburban areas usually having reduced fare, multiple-ride, and commuter tickets and morning and evening peak period operations.*"

Commuter rail typically utilizes diesel-electric or electrically propelled trains, operating over existing railway trackage on the same rights-of-way used by intercity railway freight and passenger trains. Common practice in the U.S and Canada is to use trains of coaches drawn by diesel-electric locomotives, as opposed to electrified multiple-unit equipment. Some commuter rail service is provided by self-propelled diesel-powered coaches. Fare collection is typically on board the train by cash or ticket, and boarding is normally from low platforms (Paolino, 1998).

Commuter rail normally accommodates mainly the longest-distance trips made within metropolitan regions during weekday peak travel periods at average operating speeds of typically between 30 and 50 mph, with relatively few station stops. Typical commuter rail routes range from 20 to 50 miles in length (Paolino, 1998). Because the railway track usually is shared with intercity freight and passenger trains, commuter rail normally requires neither the acquisition of new right-of-way nor the construction of new main-line trackage. However, for safety and operational reasons, locomotives and cars must be manufactured to main-line railway standards with respect to size and strength. These characteristics, together with the relatively long station spacings of two to five miles, characterize commuter rail as having the ability to provide a very high level of riding comfort for passengers.

Commuter rail is the oldest of all railway passenger transit modes, but presently exists only in corridors with substantial concentrations of passenger-trip origins in the outlying suburban areas of a corridor with destinations in the central business district of the corridor. Most of the existing commuter rail systems in the U.S. and Canada have made efforts to attract off-peak as well as peak-travel-period ridership and markets its service to attract passengers using the private automobile to the railway service (Paolino, 1998).

Typical commuter rail frequency of service on individual routes may be every 30 minutes in the peak travel direction during weekday peak travel periods, with midday, evening, and weekend service frequencies varying from one to three hours where such nonpeak service is operated at all. In the U.S. and Canada, commuter rail systems are found only in the largest metropolitan areas. In other countries, commuter rail is often referred to as *"regional rail"* to emphasize the length of the lines involved and to emphasize the high level of service provided throughout the entire day, as opposed to the mainly peak-travel-period, peak-direction service typically provided by existing commuter rail systems in the U.S. (Paolino, 1998).

Light Rail

Light rail may be defined as an urban passenger transportation service that utilizes electrically propelled cars, or trains of cars, operating primarily at surface level either over exclusive rights-of way or over public streets. Light rail is essentially an improved and modernized version of the old streetcars and electric interurban railways that were common in the U.S. from the 1890s through World War II (Paolino, 1998). Light rail can best be envisioned as trains of one to three articulated rail vehicles powered by electricity from overhead trolley wires. Fare collection is typically self service, using tickets purchased from vending machines. Boarding may be from either high- or low level platforms.

The trackage used for light rail operations is not normally shared with freight and other railway passenger trains. Light rail systems are intended to accommodate all types and lengths of passenger trips within the most densely developed portions of metropolitan areas during weekday peak travel periods, as well as during midday and evening off-peak travel periods and on weekends. Typically, light rail routes range from five to 15 miles in length (Paolino, 1998).

Typical average overall speeds for express transit light rail routes operating primarily over public streets may range from 10 to 20 miles per hour. Such speeds for rapid light rail routes operating extensively over exclusive, grade-separated rights-of-way may range from 20 to 30 mph. Frequency of service on light rail systems typically ranges from five to 10 minutes during peak travel periods, and from 10 to 20 minutes during other times of the day.

Unlike commuter rail, which utilizes existing railway trackage, the development of a new light rail system typically requires the acquisition or dedication of new rights-of-way and the construction of new trackage (Paolino, 1998). Thus, the capital cost of implementing a light rail route will normally be significantly greater than the capital cost of a commuter rail route.

Heavy Rail

Heavy rail may be defined as a type of urban passenger transportation service that utilizes electrically propelled trains of cars operating over fully grade-separated rights-of-way (Paolino, 1998). Heavy rail may best be envisioned as high-capacity, semi automated trains of four to 10 cars powered by electricity from a third rail. Because heavy rail systems require an exclusive, completely grade-separated alignment, extensive subways and elevated structures are needed, both of which are costly and disruptive to construct. Fare collection is typically done at stations, and boarding is from high level platforms.

The trackage used for heavy rail operations is not shared with freight and other railway passenger trains. Like light rail, heavy rail systems are intended to accommodate all types and lengths of passenger trips within the most densely developed portions of metropolitan areas during weekday peak travel periods, as well as during midday and evening off-peak travel periods and on weekends. Typically, heavy rail routes range from five to 15 miles in length (Paolino, 1998). Typical average overall speeds may range from 25 to 40 miles per hour. Frequency of service on heavy rail systems typically ranges from five to 10 minutes during peak travel periods, and from 10 to 20 minutes during other times of the day.

Unlike commuter rail, which utilizes existing railway trackage already in place, the development of a heavy rail system typically requires the acquisition or dedication of new rights-of-way and the construction of new trackage. Unlike light rail, which is intended to operate primarily at surface level, heavy rail requires fully grade-separated elevated or subway locations

(Paolino, 1998). Thus, the capital cost of implementing a heavy rail route will normally be much greater than the capital cost of either a commuter rail or light rail route.

Intercity & High-Speed Rail

"*High-speed rail (HSR)*" is a technical term which defines a type of long-distance IPR service. IPR is defined by the U.S. Code, Chapter 49 (§24102), as "*rail passenger transportation, except commuter rail passenger transportation.*" In this sense, the previous passenger rail legislation (PRIIA of 2005 – S. 1516) provided a different definition stating that IPR were "*transportation services with the primary purpose of passenger transportation between towns, cities, and metropolitan areas by rail, including high speed rail*". Thus today, IPR excludes according to U.S. legislation any type of commuter rail services.

HSR, a category fitting within IPR has been a subject of increasing interest within the U.S. It is intended to serve the same passenger market as does Amtrak, that is, passengers traveling between metropolitan areas, rather than passengers traveling within metropolitan areas.

HSR would require the use of either an improved existing railway alignment or a new alignment that includes very gentle horizontal and vertical curvatures as well as few, if any, grade crossings. While commuter rail, light rail, and heavy rail trains may be expected to have maximum operating speeds of between 50 and 79 mph, high-speed inter-city trains may be envisioned as operating at maximum speeds of anywhere from 125 to 250 mph (Paolino, 1998). Conventional Amtrak trains typically operate at top speeds of 79 to 90 mph. For example, the present maximum operating speed for the Amtrak trains operating between Milwaukee and Chicago is 79 mph (Paolino, 1998). The only true high-speed intercity rail service currently operating in North America is in the corridor between New York and Washington, D.C., although HSR systems are common in other parts of the world, especially France, Germany, the United Kingdom, and Japan.

Appendix B: High Speed Rail in America

2.1 Background

In December 1991, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) Section 1010, called for the selection of not more than five corridors to be designated as HSR corridors. Thus, in 1992, the U.S. DOT designated five HSR corridors across the country and in 1998 the Transportation Equity Act for the 21st Century (TEA-21) designated additional corridors. The regional corridors were state and regional initiatives and represented the potential start of a network of HSR lines.

Currently the northeastern U.S. has the only American HSR route. The American experience to date demonstrates that service improvements, even of a more incremental nature, attract more riders to passenger trains. However, the success of any HSR initiative is tied to the willingness of States to work together.

Until now, the lack of adequate consistent federal funding for Amtrak and IPR/HSR has limited the modernization of IPR/HSR, particularly outside the Northeast Corridor. Consequently, any proposal to improve passenger rail service envisions the States taking a leading role in bringing HSR service to various parts of the U.S. As in past attempts, the implementation of HSR corridors has revolved around the concept of regional corridors.

2.2 Past Designation of High Speed Rail Corridors

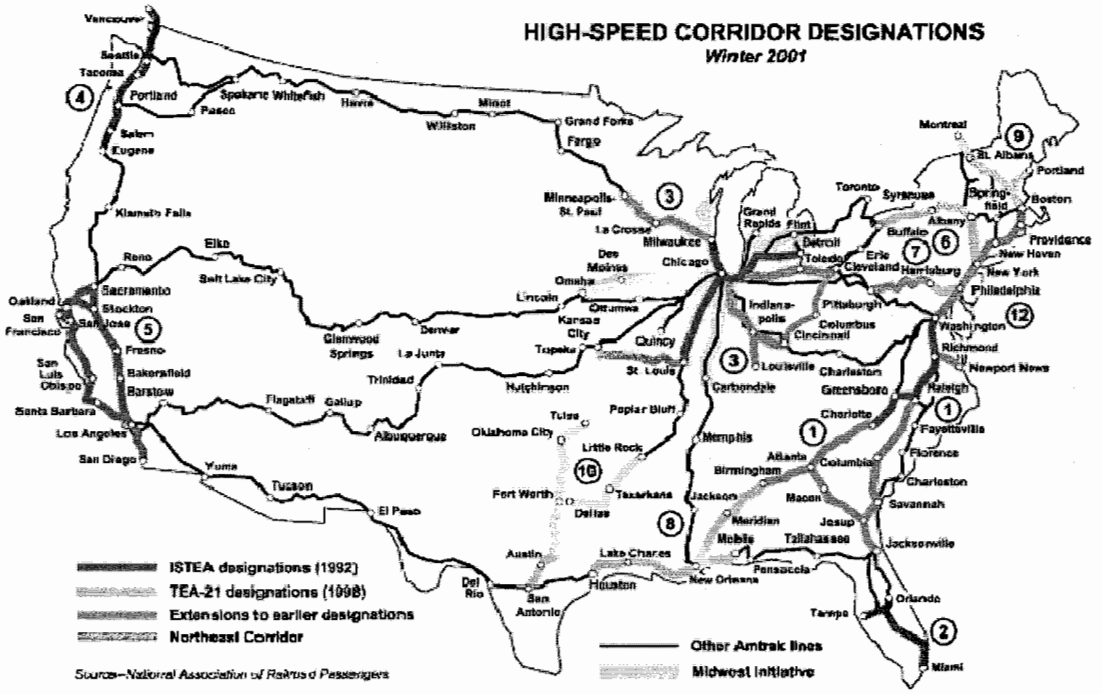
The following table illustrates how past HSR corridors have been selected in the U.S. between 1992 and 2005.

1992 ISTEA Designations	Midwest high-speed rail corridor linking Chicago , IL with Detroit , MI , St. Louis MO and Milwaukee WI .
	Florida high-speed rail corridor linking Miami with Orlando and Tampa.
	California high-speed rail corridor linking San Diego and Los Angeles with the Bay Area and Sacramento via the San Joaquin Valley.
	Southeast high-speed rail corridor connecting Charlotte, NC, Richmond, VA, and Washington, DC.
	Pacific Northwest high-speed rail corridor linking Eugene and Portland, OR with Seattle, WA and Vancouver, BC, Canada.
1995 Additional Designations	Extension of the Southeast corridor from Richmond, VA to Hampton Roads, VA.
	In New Orleans, LA, Secretary Rodney Slater announces designation of the TEA-21 authorized Gulf Coast high-speed rail corridor.

1998 TEA 21 designations	Extension of the Southeast corridor from Charlotte to Greenville , SC to Atlanta , GA to Macon ; and from Raleigh to Columbia , SC and to Savannah , GA and Jacksonville , FL.
	Keystone and Empire State corridors designated
	Extension of the Midwest High-Speed Rail Corridor (now called the Chicago Hub corridor) from Milwaukee, WI to Minneapolis/St. Paul, MN, in the Federal Register.
	Extension of the Chicago Hub corridor to Indianapolis, IN and Cincinnati, OH.
2000 New Corridor Designations	Northern New England corridor, linking a hub in Boston with (a) Portland/Auburn, Maine and (b) Montreal, P.Q., via New Hampshire and Vermont
	South Central corridor linking Dallas/Ft. Worth with (a) Austin and San Antonio, Texas; (b) Oklahoma City and Tulsa, Oklahoma; and (c) Texarkana, Texas/Arkansas, and Little Rock, Arkansas.
2000 Corridor Extensions	Southeast corridor from Macon to Jesup, GA
	Gulf Coast corridor from Birmingham, AL to Atlanta, GA (joining the Southeast and Gulf Coast corridors)
	Keystone corridor from Harrisburg to Pittsburgh, PA
	Chicago Hub corridor—three extensions: - From Chicago to Toledo and Cleveland , OH ; - From Indianapolis, IN to Louisville, KY, and - Between Cleveland, Columbus, Dayton, and Cincinnati, OH (the '3Cs' corridor);
	Clarification: "the designated California corridor comprehends the entire region lying between and among the extensive metropolitan areas of the San Francisco Bay, Sacramento, Los Angeles, and San Diego."
2001 Corridor Extension	Extension of the Chicago Hub corridor from St. Louis, MO to Kansas City, MO.
FY 2005 Appropriations Act's Extensions	Extension of the Northern New England HSR Corridor from Boston, MA, to Springfield, MA and Albany, NY, and from Springfield, MA, to New Haven, CT.

Source: FRA

Thus, the corridors presented by President Obama and the FRA (see figure below) had already been designated in the past in discussions regarding a federal policy and goals for the development of HSR and IPR.



Source: National Association of Railroad Passengers, 2009

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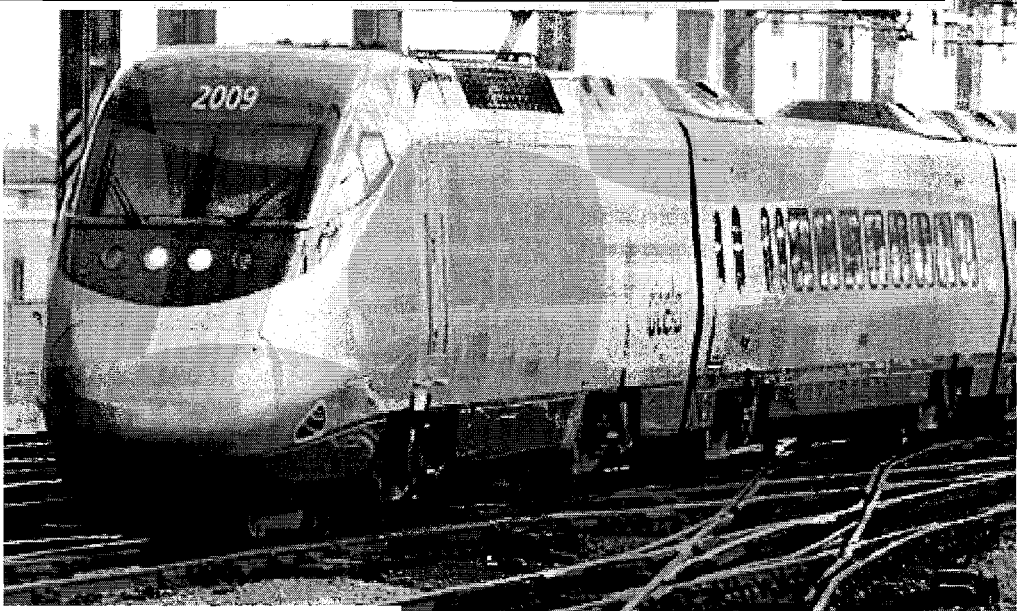

Source: AP Images, 2005

CENTER FOR TRANSPORTATION RESEARCH

The University of Texas at Austin

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EXECUTIVE SUMMARY

A review of national inter-city (IPR) and high speed passenger rail (HSR) studies has revealed a variety of study types. Study types identified thus far include state rail plans, long-term vision plans, feasibility studies, corridor development plans, environmental impact statements (often tiered with planning level and specific-corridor components), technology and alignment evaluations, and due diligence reports. A total of 25 reports have been reviewed for existing and planned projects in the Northeast, California, Florida, the Midwest, the Southeast, and the Gulf Coast region.

A number of benefits, concerns, and trends have been identified from the review of these studies. The following summarize major findings that describe the current state of IPR and HSR planning and operations in the U.S.

1. *Primary benefits* of HSR include:
   - direct service between city centers,
   - congestion relief for air and highway modes,
   - dense development in station regions,
   - improved mobility to non-drivers,
   - job creation and improved access to employment centers,
   - improved access to small cities not served by commercial airlines (and connectivity to airports),
   - depending on technology, reductions in negative air quality impacts and specific pollutant emissions, and
   - depending on technology chosen and operating conditions, reductions in energy consumption.

2. Potential *areas of concern* regarding impacts on the natural and built environment that must be identified, minimized, and mitigated include:
   - wetlands,
   - floodplains,
   - protected coastal regions,
   - protected parklands,
   - endangered species,
   - architectural sites,
   - archeological sites,
   - historical sites,
   - contaminated/hazmat sites,
   - noise pollution (particularly in urban regions),
   - increased Nitrogen oxide (NOx) emissions (gas turbine technologies only),
   - vibrations,
   - magnetic fields (Maglev only),
   - city and farm bisection, and
   - displacement of homes and businesses.

3. Identified *indicators of favorable conditions* for HSR corridor development include:
   - congestion on or lack of competitive air and highway modes,
   - considerable express bus ridership in the corridor,
   - population and business centers and tourist destinations, and
   - local political and community support, and
   - financial commitment.

4. A number of *HSR technologies* have been examined for application in the U.S. These include:
   - gas-turbine (currently used on Amtrak's Acela in the Northeast Corridor),
   - electric propulsion,
   - diesel-electric,
   - steel-wheel on steel-track, and
   - Maglev.

5. *Shared tracks and right-of-way* among modes can lead to conflicts and delay. Some examples include:
   - In the Northeast Corridor, Amtrak's role as primary owner and operator creates some conflict of interest in system prioritizations for commuter and freight operators on the same infrastructure.
   - In New York, the primary cause of delay for IPR is interaction with commuter rail. Freight operations are also a major source of delay, especially on freight owned tracks.
   - In California, a lack of capacity on existing Union Pacific tracks has hampered development of proposed IPR routes.
   - In the Gulf Coast Corridor, drawbridge crossings that must open on-demand for marine traffic hamper existing rail travel.
   - Speed restrictions due to curve and infrastructure design, safety requirements, maintenance, and shared right-of-way contribute to delay.
   - To mitigate mixed use impacts, double tracks and longer sidings should be used to facilitate passing.

6. However, there are some benefits to the use of *shared guideway*. These include:
   - capital improvements funded by one use can benefit multiple types of users,
   - freight railroads can be strong advocates for project delivery if a *"win-win"* situation can be achieved, and
   - use of existing/shared guideway limits the environmental impacts of shared right-of-way.

7. A number of *service factors impact ridership*. These include:
   - system reliability,
   - system speeds,
   - line-haul travel times,
   - access/egress times,
   - trip frequency, and

- on-board and station amenities.

8. A wide range of speeds have been examined for HSR application in the U.S. *Speed* related findings include:
   - speeds ranging from 79 mph up to 250 mph have been considered for implementation,
   - speed performance is often limited by curve geometry, terrain, and mixed system use before technology limits are reached,
   - speeds above 79 mph on shared guideways are limited by FRA safety requirements for automatic detection technologies, and
   - achieved speeds may also be limited compared to international vehicles as additional vehicle weight will be required to meet FRA crash safety impact requirements.

9. *Interconnectivity* to other travel modes also enhances ridership. A number of studies found that:
   - HSR should connect to local distributer transit systems,
   - connecting express bus services generally increase ridership,
   - inter-regional connections to adjacent systems generally increase ridership,
   - adequate parking should be provided at stations primarily accessible by automobile,
   - suburban stations should be located close to existing highway systems, and
   - adequate information for travel transfers should be provided.

10. *Funding* is always a major concern for both capital delivery and operations. A variety of revenue sources have been identified. These include but are not limited to:
    - American Recovery and Reinvestment Act Funds,
    - Federal High Speed Inter-City Passenger Rail Funds,
    - Federal TIFIA loans,
    - operating revenue bonds (Projections on many systems estimate operating revenues in excess of costs),
    - state matching funds,
    - state and local dedicated taxes, and
    - dedicated revenue from greenhouse gas reduction programs (e.g., cap and trade and carbon tax).

11. *Station design* must also be carefully considered to serve passenger, commuter, and freight rail uses. Specific areas of concern include:
    - HSR must operate on separate guideway if it does not meet FRA collision safety requirements for mixed use (and most worldwide HSR technologies do not),
    - HSR will require grade separation at highway intersections,
    - tunnels are very expensive and may be required for HSR access to urban areas, and
    - changes in curve radii, superelevation, and spiral design may be required for high speed operations.

12. In corridors that traverse multiple states, Memorandums of Understanding (MOUs) are often signed by governors or state agencies to *promote joint planning and financing* of IPR/HSR. Some recent examples include:
    - MOU signed by 8 Midwestern Governors and the Mayor of Chicago to maintain clear understanding of applications for stimulus funding, and
    - MOU signed by Georgia, South Carolina, and North Carolina to promote joint planning on the Southeast High Speed Rail Corridor.

13. *Inter-agency, industry, and public involvement* are all extremely important in project delivery. Some methods of involvement include:
    - working groups, advisory committees, and task forces,
    - public meetings and hearings,
    - media campaigns, and
    - web site development.

1. The Northeast

Northeast Corridor Action Plan: A Call for a New Federal-State Partnership (2006)

Performed for: Newark Regional Business Partnership

Performed by: Alan M. Voorhees Transportation Center, Rutgers University and Hamilton, Rabinovitz, and Alschuler, Inc.

Summary: This study examines the operations and financing of the nation's most developed inter-city rail corridor. Amtrak services on the Northeast Corridor, connecting Washington, DC to Boston via Baltimore, Wilmington, Philadelphia, Trenton, Newark, New York, New Haven, and Providence, carry about half of the nation's IPR passengers. Additionally, 80% of all commuter rail passengers in the U.S. travel on seven commuter rail systems in the corridor. Freight rail services also operate in the corridor. Eighty-Five percent of the corridor is owned and operated by Amtrak, with the remaining 15% under ownership of three states. This report provides an action plan for improved governance of the corridor.

Major Findings:

- Intercity rail provides service directly to city centers, eliminating a local commute usually required to access airports.
- Because of its connectivity to city centers, inter-city rail encourages central development and reduces highway construction and sprawling development
- Rail reduces congestion on parallel highway routes, and can alleviate congestion at airports.
- Although Amtrak owns the vast majority of the network, Northeastern states have heavily invested in infrastructure and capital improvements. Total Northeastern investment in inter-city infrastructure from 2002 to 2006 nearly equaled Amtrak's nationwide investments.

Challenges:

- Amtrak funding shortages have led to a considerable backlog in maintenance and upgrades, leading to degradations in both safety and reliability.
- Amtrak's debt acquisition to finance rolling stock has led to increasing debt service requirements.
- Amtrak's dual role as owner and operator creates a potential source of conflict with freight and commuter services operating in the corridor.
- Financial instability has negatively impacted worker attraction and retention.

Source: http://policy.rutgers.edu/vtc/reports/REPORTS/NECAP.pdf

New York State Rail Plan 2009: Strategies for a New Age

Performed by: New York State Department of Transportation

Summary: The New York State Rail plan provides an overview of all rail operations and infrastructure in the state, including inter-city passenger, commuter, and freight rail. Major IPR services operated by Amtrak in the state include the Empire Line (Buffalo –Albany-New York City), the Adirondack Line (Montreal –Albany-New York City), and the Northeast Corridor (Washington - Boston via New York City).

Major Findings:

- Rail allows travel from one city center to another. On most routes rail is competitive with automobile in terms of travel time.
- Connectivity to local travel modes (e.g., light rail, bus) is essential to good service. Good connectivity requires readily available transfer information.
- Despite heavy delays due to freight traffic, Amtrak ridership between Buffalo and Albany has increased considerably in recent years.

Challenges:

- Speed restrictions are the primary cause of delay on the network.
- Rail infrastructure in New York is owned and operated by a variety of agencies. CSX, New York's City's Metro North Commuter Railroad, Canadian Pacific, Amtrak, and the Niagara Falls Bridge Commission all own segments of the infrastructure. Changes in ownership lead to different prioritization for freight, inter-city passenger, and commuter system users, which results in delays.
- Insufficient track capacity, customs and immigration review, and external factors (e.g. weather) also contribute to delay.
- Lack of funding is a continuous problem. Greenhouse gas reduction programs (e.g., cap and trade or carbon tax) may provide a source of dedicated federal funding for rail.
- Adequate federal funding for capital programs (80% share) must be in place for state to invest.
- Amtrak needs an improved financial accounting system for better allocation of costs to system users.
- States that invest in infrastructure should have more say in operations on that corridor.

Source: https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan

New York State Senate High Speed Rail Task Force: Final Task Force Report (2005)

Performed by: New York State Senate High Speed Rail Task Force

Summary: This report summarizes the findings of a State Senate Task Force organized to examine the future of IPR/HSR in New York, specifically the federally designated Empire HSR Corridor.

Major Findings:

- The proposed Empire Corridor will provide connectivity with major Canadian destinations, as well as the proposed Ohio Hub Corridor.
- Currently, Amtrak IPR is given lowest priority on the mostly freight-owned Empire Corridor.
- Rail improvements have potential energy and air quality benefits over existing highway routes. Savings of 2 million car trips and $9 million in gasoline are projected for the corridor.
- The Task Force recommends investment in station development, parking, and multi-modal connectivity.
- Frequency and reliability will be key factors in increasing passenger rail ridership.

Challenges:

- The first step in implementing a HSR corridor must be identification and reservation of dedicated guideway for a separate passenger network.
- The state must assume increased responsibility for the Empire Corridor infrastructure if it plans to operate passenger services.
- Different needs on different segments of the corridor must be considered, e.g., while the Albany to New York City corridor serves primarily business travelers, the slower Buffalo to Albany corridor serves more price-sensitive travelers.
- Capacity at some stations is extremely limited (e.g., New York Penn Station and Grand Central Station). If new services will operate, terminal space must be identified and reserved.
- Existing Amtrak equipment is old and "lacks amenities," but improvements are limited by funding constraints.

Source:
http://www.cdta.org/hsr/High%20Speed%20Rail%20Task%20Force%20Documents%20and%20Reports.htm

Baltimore-Washington Maglev Draft Environmental Impact Statement

Performed by: Maryland Transit Administration (MTA)

Summary: This report analyzes the potential environmental impact of a Maglev train operation between Washington's Union station and Downtown Baltimore, via the Baltimore-Washington International Airport (BWI). The routes were previously chosen from multiple potential routes. Most of the routes parallel existing Amtrak services.

Major Findings:

- Transportation benefits of the Maglev system will include more capacity to meet growing regional demand; reduced congestion on parallel highways; reduced need for highway construction; improved access to BWI.
- Broader social and economic benefits of the system will include focused access to "revitalized" areas in central Baltimore and Washington; reduced vmt, and as a result, air pollution; reduced regional dependence on gasoline; employment generation and better access to additional employment centers; improved regional economic relations; and promotion of tourism by reducing the city-to-city commute time to approximately 20 minutes.
- VOCs, CO, and NOx are all projected to be reduced in the region.
- Financing sources include tax exempt operating revenue bonds, Federal TIFIA bonds, interest earnings on construction cash balances, and federal and non-federal grants.
- MTA has involved the public in planning, including public and special interest group meetings, newsletters, fact sheets, a project specific website, consideration of public commentary in alternative selection, and other communications.

Challenges:

- The proposed system will require considerable infrastructure investment, including tunnels for entry to all three stations.
- Potential project impacts to the natural environment include wetlands, forests/woodlands, forest interior dwelling species habitats, endangered species, the Coastal Zone, and the Chesapeake Bay Critical Area.
- The project may also impact protected historic, architectural, and archaeological areas, as well as state and national parkland.
- Noise pollution will result from both construction and operation. Construction noise mitigation strategies include: limiting hours, use of modern equipment, and preparation of a community noise management plan. Noise barriers are also recommended.
- The proposed alignment would require displacement of homes and businesses.
- Maglev operations will create a magnetic field around tracks, in vehicles, and in stations. In most locations, magnetic fields are similar to *"those found near common household appliances"* and cause no major threat. Mitigation strategies include: use of *"properly designed"* switching cabinets, signage in stations warning passengers to keep a safe distance from tracks, and preventing public access to electrical and switching stations.

Source: http://www.bwmaglev.com/eis/final_report.htm

Pennsylvania High Speed Maglev Project: Draft Environmental Impact Statement

Performed by: U.S. Department of Transportation, Federal Railroad Administration (FRA), Port Authority of Allegheny County and Pennsylvania Department of Transportation (PennDOT) in cooperation with Federal Aviation Administration, Federal Highway Administration, Federal Transit Administration, U.S. Army Corps of Engineers, and U.S. Coast Guard

Summary: This report examined the potential environmental impacts of constructing and operating a Maglev system connecting Pittsburgh International Airport (PIA) to Greensburg, PA via downtown Pittsburgh. The objective of this project is also to demonstrate the capability of Maglev operations in the U.S. Alternatives were evaluated through engineering and environmental studies. Alternatives that *"failed to meet engineering design criteria, had high environmental impacts, and/or faced public opposition and future controversy"* were eliminated.

Major Findings:

- Benefits of the project include: improved access between two major population centers and PIA; expand use of existing airport, transit, and highway networks; reduce car trips; facilitate development at station locations; promote regional economic development; and support *"Smart Growth"* and land use planning.
- Reductions in car trips can produce air quality improvements, energy savings, and safety improvements (by reducing accidents).
- Three types of *"coordination and consultation"* were employed for this project. These include agency scoping, interagency cooperation, and technical advisory committee meetings.
- Information was distributed and exchanged with multiple stakeholder groups during each project phase. Fact sheets, newsletters, and meeting announcements were distributed by local, regional, state, and federal sources.
- Information was also distributed through public meetings, cable television, newspaper letters to the editor, telephone, and websites.

Challenges:

- The study area contains sites of local, regional, and national historical importance, as well as archaeological sites.
- The area is traversed by three rivers, with associated wetlands, floodplains, and natural species.
- The study area includes many land-use types, including urban areas, ranch land, cropland and pasture, forest land, and barren land.
- The study area includes a number of potential hazardous waste sites.
- There was some public and municipal opposition to the project. Concerns included: impacts to private property, future funding, ridership projections, division of communities, loss of tax base through land acquisition, and noise and sight impacts.
- Native American tribal areas may be impacted; coordination with tribal representatives will be required.
- Further coordination with the FAA will be required at PIA.
- Private partners must be identified for station development.

- Further coordination with state and federal agencies must be completed to minimize and mitigate impacts on protected species.

Source: http://www.portauthority.org/PAAC/Portals/Capital/DEIS/DEISFrame.asp

2. California

California State Rail Plan 2007-08 to 2017-18

Performed by: California Department of Transportation

Summary: The California State Rail Plan provides an overview of the state's existing rail network, as well as plans for future infrastructure and operations. Currently, Amtrak funds and operates four long-distance routes in the state: the Coast Starlight, the California Zephyr, the Southwest Chief, and the Sunset Limited. The state funds three IPR - the Pacific Surfliner, the San Joaquin, and the Capital Corridor - which are operated by Amtrak.

Major Findings:

- The major source of transportation funding in California is general obligation bonds, which are issued and paid through operating revenues.
- The vision for passenger rail in California includes three goals: (1) provide a rail transportation alternative to other modes, (2) provide relief to highway and air transportation congestion, and (3) improve air quality, conserve fuel, and contribute to environmentally superior land use.
- Data indicate that passenger rail is more fuel-efficient than cars and that both CO_2 emissions and energy consumption are reduced.
- Potential improvements on existing routes include: wireless networks in stations and on-board, multi-modal connectivity, improved travel times, improved reliability and on-time performance, electronic train management systems, and automated ticket validation.
- The State Rail Plan identifies three potential inter-city routes for implementation over the short term. These include: San Francisco to San Luis Obispo, Sacramento to Reno, and Sacramento to Redding.
- Positive conditions for new routes identified include: prior existence of stations, congested/heavily traveled automobile routes, population/activity centers, tourist destinations, high existing bus ridership; local support and financial commitment.
- The State Rail Plan also identified three additional routes for which funding have not been identified over the 10-year analysis period. These include: Los Angeles to Indio, San Francisco to Monterey, and Los Angeles to Las Vegas.
- The California High Speed Rail Authority (CHSRA) was created in 1996 through the California High-Speed Rail Act. The act was modified to authorize the CHSRA to plan, construct, and operate HSR services with speeds exceeding 125 mph. The CHSRA has a nine member board with five members appointed by the governor, two appointed by the Senate Committee on Rules, and two appointed by the speaker of the Assembly.
- A statewide EIR/EIS identified preferred HSR alignments on six corridors.
- A 92 mile corridor in Southern California is being considered for Maglev development.
- A HSR corridor (up to 125 mph), DesertXpress, has been proposed from Victorville, CA to Las Vegas, NV.

Challenges:

- High freight volumes in California have prevented Union Pacific from considering additional passenger movements on freight-owned tracks.

Source: http://www.dot.ca.gov/rail/go/dor/california-state-rail-plan/index.cfm

California High Speed Train Project: Structuring a Project Development Process to Bring Very High-Speed Rail to the U.S.

Performed by: Duncan Watry, David Hilliard, and Sanford Statfeld

Summary: This paper provides a summary of the California High-Speed Train (HST) Project. This paper focuses on how the state is approaching technological challenges and discusses federal and state regulatory requirements.

Major Findings:

- For major infrastructure project to be successful, broad consensus among public and private officials must be reached.
- The technology must meet or exceed performance requirements; meet or exceed state and federal safety requirements; be interoperable with different train technologies and market strategies; and enable a competitive procurement process.
- Operating speeds for the California HST should meet or exceed those of existing worldwide systems (up to 220 mph).
- The system should operate on exclusive guideway, except in Orange County and the Bay Area, where it will share track with commuter rail.
- Stations should be designed to be state-of-the art.
- The HST Business Plan completed in 2000 found that project economic benefits would exceed costs.
- Major Costs include: infrastructure, rolling stock, stations, and supporting facilities.
- An HST system would concentrate future development and population around downtown stations.
- The HST system would reduce the need for future highway and airport construction.
- The HST project is being developed in phases: system definition, design development, and implementation.
- Three primary groups of stakeholders have been involved in project development: (1) the HST "Delivery Team" consisting of divisions within the CHSRA, design-build contractors, and partners, (2) regulatory agencies, and (3) industry.

Challenges:

- Sporadic funding has delayed progress.

Source: Conference Proceedings, 2008 American Public Transportation Association Rail Conference, June 1-4, 2008, San Francisco

Bay Area to Central Valley High Speed Train (HST) Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS)

Performed by: California High Speed Rail Authority and the Federal Railroad Administration

Summary: This report provides the results of the environmental review process completed for the Bay Area to Central Valley portion of the California HSR Project. Completion of this report required cooperation from 27 state and federal authorities, whose representatives made up the project working group. Specific areas of interest for the working group include: (1) identifying the project scope, (2) development of purpose and needs statements, (3) technical methods of analysis and study area definition, (4) identification of particular areas of concern, (5) sources of data and relevant information, (6) impact avoidance, minimization, and mitigation strategies, (7) identification of alternatives, and (8) necessary procedural requirements, such as permit approvals.

Major Findings:

- The primary purpose of this project was to provide HSR access from the Bay Area to the Central Valley, Sacramento, and Southern California.
- Statewide needs to be addressed through this project include: providing capacity for future demand, reducing existing and future congestion, improving travel time reliability, improving mobility, and reducing detrimental air quality impacts.
- Regional needs addressed include: reducing congestion and achieving associated environmental benefits.
- Steel-wheel on steel-rail technology was chosen for this project.
- Projected travel times would be designed to compete with air and auto.
- Major project objectives include: (1) maximize ridership and revenue potential, (2) maximize connectivity and accessibility, (3) maximize compatibility with existing and planned development, (4) avoid areas with geographic and soil constraints, (5) avoid hazmat areas, (6) minimize operating and capital costs, (7) minimize impacts on natural resources, (8) minimize impacts on social and economic resources, and (9) minimize impacts on cultural resources.
- Stations should be multi-modal transportation hubs.
- Proposed station locations must have potential to promote high density transit-oriented development.
- Parking should be provided at market rates, preferable in a garage.
- Public involvement included: scoping meetings, consultation with state and federal agencies, informational meetings, presentations to interest groups, distribution of informational materials, web site development, public meetings, and opportunities for public comments.

Challenges:

- Alignment, number, and location of stations are controversial in the Bay Area.
- Impacts on biological resources in two areas are a concern.
- Noise and visual impacts, community impacts, and property impacts are a particular concern in urban areas.

- Local governments are expected to finance pedestrian access to/around stations.

Source:
http://www.cahighspeedrail.ca.gov/images/chsr/20080602141914_Complete%20Volume%201%20wCover.pdf

High Speed Rail Choices in California's Central Valley

Performed by: Ken Jong and David Valenstein

Summary: This paper provides a description of the alignment and station selection process used in development of the California HSR Project. The process is discussed in relation to the Visalia-Tulare-Hanford Feasibility Study performed on one segment of the Central Valley Section.

Major Findings:

- Initial alternatives were based on stakeholder input and qualitative factors, as well as an *"engineering fatal flaw"* assessment.
- Eight major criteria were identified for alternative screening: (1) project performance (including, length, travel time, population, and employment impacts), (2) capital costs, (3) built environment impacts, (4) natural environment impacts, (5) speed, (6) station design (including, number of track, length, curve, and siding requirements), (7) proximity to other transportation corridor rights-of-way (using existing transportation right-of-way is desired), and (8)constructability (including, terrain, drainage, and environmental sensitivity).

Challenges:

- Initially, alignments were designed to parallel existing freight routes, but several challenges were encountered.
- To avoid bisection of cities, HSR would need to be grade separated.
- Freeways often paralleled freight railroads, requiring grade separation at ramps and crossings.
- Freight railroads were concerned about limitations on future expansions if HSR was constructed in their sidings.
- Freight railroads were concerned about impacts of a safety incident (derailment) on HSR impacting freight operations, and vice versa.
- HSR requires much larger curve radii because they operate at higher speeds.
- Station alternatives were severely limited by alignment and geometry requirements, station requirements, and local access requirements.
- Farmers were concerned about splitting fields diagonally, making some land inaccessible or harder to farm.
- Cities were concerned about noise and vibration impacts, as well as bisection.
- Wildlife refuges had to be avoided, and guideway had to be elevated through wetlands.

Source: Conference Proceedings, 2008 American Public Transportation Association Rail Conference, June 1-4, 2008, San Francisco

The California High Speed Rail Proposal: A Due Diligence Report

Prepared by: The Reason Foundation (Wendell Cox and Joseph Vranich)

Summary: This report identifies a number of potential concerns in California's Plan for its HSR system. The report questions cost projections, ridership estimates, speeds, safety, political and community acceptance, and environmental benefits identified in the CHSRA's Plans.

Major Findings:

- This report questions the assumption that operating and construction costs can be covered without subsidies. The authors asserted that the revenue bonds proposed to finance the system would not even cover the first Phase of the project, and that continued taxpayer support would be required to finance the project.
- The report questions the application of European and Asian operating conditions to California.
- Funding shortages could result in diversion of projected funds for existing track maintenance and improvements.
- To meet FRA safety requirements, trains operating on guideway shared with commuter routes will need to be heavier than existing worldwide systems. However, it has been projected that California's HSR system would reach speeds exceeding all existing systems.
- California urban areas lack local transit infrastructure currently operational in Europe and Asia.
- Ridership estimates were considered *"absurdly high"*.
- According to the California Air Resources Board (CARB), HSR will remove CO_2 emissions equal to 1.5% of projected state needs. The CHSRA claimed that HSR will remove almost 50% of the state needs.
- Little or no security assessment was included in the plan.
- Community opposition may be formidable.
- Diversion of air travelers is estimated using a *"static"* air network.

Source: http://reason.org/files/1b544eba6f1d5f9e8012a8c36676ea7e.pdf

High Speed Regional Transportation System Alternatives Analysis (2009)

Prepared by: Cambridge Systematics

Prepared for: Southern California Association of Governments

Summary: This study evaluated two technologies - Maglev and steel-wheel on steel-track - on two alignments - the I-10 alignment and the Union Pacific Alignment - for HSR service between West Los Angeles and Ontario Airport via Los Angeles Union Station. The study also examined a variety of alternatives for achieving needed ridership levels and revenue. The primary objectives of this study were: (1) to quantify capital and operating costs, (2) project ridership, and (3) determine financial feasibility.

Major Findings:

- Maglev can negotiate grades up to 10%, compared to 3.5% for steel-wheel.
- Maglev travel times were slightly faster than steel-wheel in this corridor, although neither technology reached its maximum operating speed.
- Maglev attracts slightly higher ridership due to higher speeds.
- Capital costs for Maglev were much higher (due to beam and vehicle costs, and traction power and distribution costs).
- Adding three stations increases ridership and revenue considerably, with small increases in travel time, operating, and capital costs. This alternative achieves an operating surplus large enough for issuing revenue bonds to reduce the capital funding gap.
- Non-operating revenue includes: station concession and advertising, airport contribution, sponsorship and naming rights, and station development.
- A more distance based fare achieved higher operating revenues while maintaining the same average fare.
- Capital costs could be reduced if the steel-wheel technology is implemented and the Los Angeles to San Diego Segment of the California HSR network is constructed using the same technology.

Challenges:

- By 2035, the end of the analysis period, the system is still projected to be operating at a deficit. This indicates that the system cannot be funded through revenue bonds.
- Extending the system to LAX doubles ridership, eliminating the operating deficit, but increase capital costs considerable.
- Use of express bus service to LAX improves ridership and reduces, but does not eliminate, the operating deficit.
- Non-operating revenues are not adequate to address existing funding gaps.

Source: http://www.scag.ca.gov/Maglev/pdf/FR1-SCAG-HSRT-AA.pdf

3. Florida

Florida High Speed Rail Authority Technical Report (2002)

Prepared for: Florida High Speed Rail Authority

Prepared by: HNTB Corporation with Transportation Economics and Management Systems, Public Financial Management, and Booz-Allen Hamilton.

Summary: This report presents the technologies considered, infrastructure requirements, projected capital costs, preliminary operating plans, predicted ridership, and financial analyses for implementation of HSR in Florida.

Major Findings:

- Primary HSR technologies identified in this study include diesel electric propulsion, gas-turbine, electric propulsion, and Maglev levitation.
- The ACELA trains used in the Northeast Corridor are gas-turbine locomotives.
- FRA safety standards are generally more stringent than European standards. The FRA requires much higher static strength requirements, and provides separate standards for low and high speed trains.
- Alignment should be determined considering basic physical science and existing natural and built-environmental constraints.
- Design of spiral transitions for rail must allow for gradual centripetal acceleration.
- Maglev can operate at much higher grades than other systems (up to 10%).
- The FRA requires passenger service exceeding 79 mph to operate with cab signaling/automatic train protection or stop technologies.
- The Tampa to Orlando HSR is projected to produce revenues in excess of operating costs.
- Benefits will include: reduced airport and highway delay and emissions savings.
- Other benefits include property development and job creation.

Challenges:

- Technologies considered in this study were limited by the legislative mandate to begin St. Petersburg to Orlando construction by 2003. This mandate has since been removed.
- Utilities may need to be relocated for construction.
- The FRA has not developed safety standards for HSR operating parallel to freight routes or in the highway median.
- Environmental (wetlands) and noise mitigation will likely be required.
- Speed and curve restrictions limit speeds, so travel times for the four speeds tested (120+ mph, 150+ mph, 180+ mph, and 250+ mph) vary only two to seven minutes.

Source:
http://www.floridahighspeedrail.org/uploaddocuments/p25/Feb%204%202002%20TechRpt.pdf

Florida High Speed Rail Authority Tampa to Orlando Final Environmental Impact Statement

Performed by: Federal Railroad Administration, U.S. Department of Transportation, Florida High Speed Rail Authority with the Federal Highway Administration, U.S. Army Corps of Engineers, and Hillsborough, Orange, Osceola, and Polk Counties.

Summary: This report provides the results of an environmental impact analysis performed for alternatives analyses in the Tampa to Orlando corridor. Design-Build-Operate-Maintain-Finance (DBOMF) proposals were requested and two were chosen for alternative analysis. Two technologies – gas turbine and electric powered locomotive systems - were examined over a total of eight alignments.

Major Findings:

- Because of plans for accelerated construction, a DBOMF process was used for project procurement.
- Increasing population, employment, and tourism in the region are increasing travel demands.
- Noise impacts can be mitigated with sound barriers.
- Elevated track can be use in floodplains.
- Emissions from a gas-turbine train are higher than emissions from an electric train. This is the result of strict controls required for power plants that produce electricity.
- Both technologies result in carbon monoxide reductions, as motor vehicles emit higher levels of CO than trains.
- Nitrous Oxide emissions increase under both technology alternatives, as both gas-turbines and electric trains emit NOx at higher rates than motor vehicles.
- Gas-turbine alternatives will slightly increase volatile organic compound (VOC) emissions, while electric trains will slightly decrease VOC emissions.
- Electric trains are much more energy efficient than gas-turbines, but net changes under either alternative are negligible compared to total state fuel consumption.
- The FRA was previously requested to develop safety guidelines for a high-speed electric train operation in Florida, but then the project was cancelled. No rule was established.
- The gas-turbine proposal included higher rolling stock costs, but lower operations and maintenance costs than the electric proposal.
- HSR was included in the Long Range Transportation Plans of the four Metropolitan Planning Organizations, whose regions are traversed by the corridor.
- Public involvement included meetings with agencies and interested parties, MPOs and local committees, elected officials, and non-governmental organizations. A *"Cultural Resources"* committee was also established to determine potential impacts and develop mitigation strategies.

Challenges:

- Potential areas of impact include: (1) wetlands, (2) wildlife and habitat, (3) floodplains and floodways, (4)contamination sites, (5) public parks and historic resources, (6)

community services, (7) noise, (8) vibration, (9) air quality, (10) energy consumption, (11) relocation, (12) transportation, (13) public safety, and (14) total cost of construction.

- No safety guidelines currently exist for electric locomotives.
- Concerns about wildlife crossings remain unresolved.
- Further coordination with the FAA is required.
- Further coordination with Walt Disney World concerning park access is required.
- Further coordination with local governments to ensure consistent planning is needed.

Source:
http://www.floridahighspeedrail.org/servlet/com.hntb.flhighspeedrail.web4be6.html?option=3&subheaderid=4

Florida High Speed Rail Authority Orlando-Miami Planning Study

Performed for: Florida High Speed Rail Authority

Performed by: HNTB Corporation with Transportation Economics and Management Systems, Inc.

Summary: This report discusses the results of a preliminary planning level study completed for Phase II of the Florida HSR Plan, which connects Orlando with Miami. Four potential alignments - two paralleling highways and two paralleling freight railroads - were examined. Travel times, capital costs, projected ridership, and environmental impacts were considered.

Major Finding:

- Similar to the Tampa to Orlando segment, revenues are projected to exceed operating costs on this segment.

Source:
http://www.floridahighspeedrail.org/uploaddocuments/p25/OrlandoMiami%20Final%20Planning%20Study.pdf

4. Midwest

Midwest Regional Rail System: Executive Report (2004)

Performed for: Illinois, Indian, Iowa, Michigan, Minnesota, Missouri, and Wisconsin Departments of Transportation, Nebraska Department of Roads, and Ohio Rail Development Commission.

Performed by: Transportation Economics & Management Systems, Inc., in association with HNTB, Inc.

Summary: This report provides the most recent vision for the Midwest Regional Rail System, a multi-state passenger rail network serving nine Midwestern states. The report examines the feasibility of a proposed system that would utilize existing freight and commuter right-of-way, as well as introduce new services. The proposed plan includes a 10-year phased approach for implementation.

Major Findings:

- A regional system provides the opportunity to take advantage of economies of scale.
- The system will connect rural, small urban, and major metropolitan areas.
- The system will provide a *"hub and spoke"* system to and through Chicago, to diverse points as far west as Omaha and as far east as Cleveland.
- Trains will operate at speeds up to 110 mph.
- Multi-modal connections will provide access to the system.
- The system will provide improvements in travel time and reliability over existing passenger rail options, and will introduce service to many areas not currently served by passenger rail.
- Revenues are projected to cover all operating expenses once fully implemented.
- Major capital investments will be made to improve both freight and passenger movements. Infrastructure improvements will include: track replacement and upgrades, new sidings, signal and communication systems, and highway grade crossing improvements.
- The system will support economic development in station areas.
- Fare rates are assumed to be about one and a half times existing Amtrak rates, but will provide improved levels of service, comfort, and convenience.
- The system will be served by a feeder bus system.
- System will provide access to smaller areas not served by commercial airlines.
- System can serve both business and leisure travelers.
- System offers connectivity between urban centers.
- System provides mobility for those unable to drive.
- Improved travel times are achieved through use of technologies that allow for quicker turnaround at endpoints and *"run through"* service in Chicago.
- Retail space, commercial advertising, and express package delivery services could provide additional non-operating revenue.
- Operating cost improvements are achieved through lower equipment maintenance requirements, faster maintenance turnaround, and better crew utilization.
- Additional benefits include: savings in automobile operating costs, airport and highway congestion relief, and improved air quality and energy consumption.

Challenges:

- The analysis assumes available funding during all phases of the project.
- The analysis also assumes that desired frequencies and schedules will be reached through agreements with freight railroads.
- Capital and operating subsidies will be required during project start-up. The proposed method of borrowing is a 35-year Federal TIFIA loan. Additional sources of funding anticipated include Federal Full Funding Agreements and Grant Anticipation notes, as well as an 80/20 state match. Private funding should also be leveraged where available.
- Corridor segments with high potential ridership should be built first, while branch lines should be constructed later. However, construction will be limited by availability of state funding.

Source: http://www.dot.state.wi.us/projects/state/docs/railmidwest.pdf

Memorandum of Understanding to Develop the Chicago Hub High Speed Rail Corridor

Performed by: Governors of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin, and the Mayor of Chicago

Summary: On July 27, 2009, a Memorandum of Understanding (MOU) was signed by eight governors and the mayor of Chicago to coordinate and document individual applications for American Recovery and Reinvestment Act (ARRA) funding to the FRA.

Source:
http://www.governor.iowa.gov/news/2009/07/attachments/MOU%20Multistate%20Rail.docx

Chicago to St. Louis High Speed Rail Corridor Study (2009)

Performed for: Midwest High Speed Rail Association

Performed by: TranSystems

Summary: This report provides the results or corridor analysis performed on the approved alternative route connecting Chicago and St. Louis via Decatur and Champaign, as well as on the existing Amtrak route connecting the same cities via Joliet and Springfield.

Major Findings:

- A *"fatal flaw"* analysis was used to eliminate unrealistic alternatives.
- In Illinois, railway alignments are extremely straight and level, creating favorable conditions for HSR.
- The proposed alignment will serve the Chicago region's third, yet to be constructed, airport in Peotone.
- Light and commuter rail have been studied to provide access to downtown Chicago.

Challenges:

- Construction of the new route will require the purchase of at least 50 ft of right-of-way.
- Speeds on the existing Amtrak network are constrained by horizontal curve radii.
- High speed trains are assumed to be built to European (UIC) safety standards, rather than the more stringent FRA requirements. European standards focus on collision avoidance, while US standards focus on collision safety.
- Use of European technologies not meeting FRA standards for shared guideway would require separate entry to existing stations, including Chicago and St. Louis. These requirements could be waived if existing standards are replaced with those focused on technologies for collision avoidance.
- The upper speed limit provided in FRA's safety standards is 200 mph - lower than the proposed 220 mph system.
- Future regulations may require the use of Positive Train Control technologies.
- At least 25 ft of ROW is required between high speed track and any other track to allow for maintenance without speed impacts.
- Grade separation is beneficial to communities, but extremely expensive.
- Changes in operating procedures to ensure quick loading/unloading and turnaround would be required at Chicago's Union Station. There are proposed plans for expansion into the West Loop Transportation Center to provide high-speed access to and through Union Station.
- Separate guideway into St. Louis could require construction of a new bridge over the Mississippi River.

Source: http://www.midwesthsr.org/docs/Chicago_StLouis_HSR_Study_June_2009.pdf

The Ohio and Lake Erie Regional Rail Ohio Hub Study

Performed for: The Ohio Rail Development Commission, Indiana Department of Transportation, Michigan Department of Transportation, New York Department of Transportation, and Pennsylvania Department of Transportation.

Performed by: Transportation Economics & Management Systems, Inc., in association with HNTB, Inc.

Summary: This report provides a vision for operating a HSR network with connects throughout Ohio and the Lake Erie region, as well as multi-modal connectivity to both the air and highway modes. This report provides a feasibility and business plan for seven proposed corridors connecting five states and Ontario, Canada.

Major Findings:

- Stations will be located in urban centers, near highways in suburban areas, and at major airports.
- Feeder bus services will serve smaller communities, colleges, and universities.
- Travel times, reliability, and service frequency will be competitive with other modes.
- Regional connectivity creates economies of scale in ridership and operating costs.
- The hub will provide connectivity to the Midwest Regional Rail System, Empire Corridor in New York, and Keystone Line in Pennsylvania, resulting in connectivity to the Northeast Corridor and Canadian VIA network.
- The proposed passenger network will use existing freight rail right-of-way to the extent possible. However, major capital investments will be required to relieve freight congestion and provide adequate capacity for both uses.
- Two freight railroads have been engaged in this study, but no right-of-way and track use negotiations have been initiated.
- Detailed analysis of two potential speeds – 79 mph and 110 mph - was performed.
- 110 mph travel times are competitive with automobile travel times.
- Fares will be competitive with air and have the potential to generate revenue exceeding operating costs.
- Increasing speeds from 79 to 110 mph increases ridership by 50% and more than doubles revenues. Faster routes are more attractive to business travelers.
- At full implementation, system revenues are expected to exceed costs.
- The highest priority corridor identified was the 3C corridor, connecting Cleveland, Columbus, Dayton, and Cincinnati.
- Positive corridor characteristics identified include: lack of competitive air travel, high shares of business travelers, and potential to serve multiple commuter markets.
- The study calculated a benefit cost ratio of over 2 to 1.
- Economic benefits include: job creation, increased regional income, development in station areas, increased land values, improved tourism, improved airport access, improved freight operations, and fuel savings.

Challenges:

- This region is not currently a federally designated rail corridor.

- The higher speed alternative would require use of Positive Train Control, which is very expensive on corridors with multiple at-grade crossings.
- Expensive capacity improvements will be required at endpoints and at-grade crossings.

Source:
http://www.dot.state.oh.us/Divisions/Rail/Programs/passenger/Pages/OhioHubOverview.aspx

5. Intercity Rail in the Southeast

Southeast High Speed Rail: Tier I Environmental Impact Statement (2002)

Performed by: North Carolina and Virginia Departments of Transportation, Federal Highway Administration, and Federal Railroad Administration.

Summary: This report details the system planning level Environmental Impact Statement (EIS) performed for the Southeast HSR Project connecting Washington, D.C. to Charlotte via Richmond and Raleigh. Nine alternatives were examined to minimize impacts to the natural and built environments.

Major Findings:

- Primary benefits identified for the project include: (1) provide mobility improvements with alternative mode choice, (2) ease existing and future congestion in the corridor, (3) improve safety, (4) improve energy efficiency, (5) reduce emissions, and (6) improve overall transportation system efficiency with minimum environmental impact.
- System utilizes existing rail and rights-of-way to minimize environmental impacts.
- Characteristics of the preferred alternative include: (1) minimizing potential impacts to wetlands and endangered species, (2) strong agency support, (3) highest projected ridership, (4) largest trip diversions from road and rail, (5) competitive travel times with alternative modes, (6) high emissions reductions, (7) best operating cost recovery, and (8) highest level of public support.
- A draft version of the EIS was distributed to federal, state, and local agencies, as well as the general public. Comments were considered in the ranking of alternatives.
- Alternatives were examined for air quality improvements.
- Future development around stations is anticipated that may limit urban sprawl. Secondary industrial development may also occur.
- Environmental effects are projected to be neutral or positive due to the use of existing right-of-way.
- The two DOTs worked with federal and state regulatory agencies, freight railroads, and the public in the development of this report.
- Inter-agency and public coordination included: (1) scoping studies, (2) information briefings and small group meetings, (3) written data requests, (4) formation of an Advisory Committee consisting of public and private stakeholders at the local, federal, and state levels, (5) a public involvement program, including opinion surveys, direct mailings, workshops, web and other outreach tools, research, and public hearings.

Challenges:

- Capital improvements will be required to accommodate high speed (110 mph) trains.
- Potential detrimental environmental impacts include: (1) federally protected species, (2) cultural resources, including historic districts, (3) noise and vision impacts, (4) vibrations, (5) community impacts, (6) superfund and hazardous waste sites, (7) wetlands, and (8) floodplains.
- In these states, parts of the rail infrastructure itself are historically protected.
- The most frequent community concern raised was safety.

Source: http://www.sehsr.org/reports/DEISes.pdf

Macon-Charlotte Southeast High Speed Rail Corridor Plan (2004)

Performed by: Georgia, South Carolina, and North Carolina Departments of Transportation, and Federal Railroad Administration

Summary: This study examined the feasibility and cost requirements for a proposed HSR service to operate on existing Norfolk Southern Rail between Macon and Charlotte via Atlanta, Greenville, and Spartanburg. This segment is part of the federally designated Southeast HSR Corridor. Speed alternatives of 79 mph, 90 mph, and 110 mph were examined.

Major Findings:

- An Atlanta to Macon commuter rail project will provide some needed infrastructure improvements.
- Stations served will include city centers, suburban regions, and major airports.
- Use of tilt rolling stock allows trains to traverse curves faster, considerably improving travel times at 79 mph.
- Infrastructure improvements allowing 90 mph trains would achieve considerable time savings, but additional savings for 110 mph trains are limited by curvature.
- Rail fares were set at rates between auto and air costs.
- Improved speed increases ridership, but increases in the number of trains have greater impact.
- Capital costs include: upgrading tracks, signals, and grade crossings, acquiring land for new alignments, upgrading track curves, and adding capacity for speed.
- In general, the higher the speed, the higher the share of operating costs recovered per trip.

Challenges:

- The study did not have adequate funding to examine new alignment alternatives.
- Track condition limits speeds on some part of the network to 25 mph.
- The current infrastructure does not allow for speeds high enough to recover operating costs. However, if funding is made available for new alignments, the *"market to produce an operating surplus"* is present.

Source: http://www.sehsr.org/reports/MACCLTexecsum2004.pdf

Evaluation of High Speed Rail Options in the Macon-Atlanta-Greenville-Charlotte Rail Corridor (2008)

Performed for: Georgia Department of Transportation

Performed by: Economic and Industry Analysis Division, RTV – 3A, Volpe National Transportation Systems Center

Summary: This preliminary planning and feasibility study of the Macon to Charlotte Corridor considers technology options to allow train speeds of 90, 110, 125, 150, and 200 mph. Six scenarios of station alternatives, ranging from 6 to 14 stations, located in urban centers, suburban regions, and at major airports were considered. Alternatives for existing Amtrak services and proposed HSR connections from Charlotte to Washington, DC were also considered.

Major Findings:

- The Georgia, North Carolina, and South Carolina DOTs signed a Memorandum of Understanding to cooperate in studying the corridor.
- Separating passenger services from freight is preferred for safety, as it reduces potential collisions. Also, freight traffic impacts tracks more than passenger rail.
- Track geometry and subgrade structure will be easier to control for passenger only track.
- 90 and 125 mph alternatives could operate on single tracks with long sidings approximately every 25 miles. Faster services require double tracks.
- Travel time could be considerably reduced through elimination of a stop and use of a shorter alignment.
- Elimination of stations reduces ridership and revenue. Access/egress times have a greater impact on demand than linehaul travel times.
- Ridership generally increases with speed.
- Ridership is relatively insensitive to train frequency, more sensitive to rail fare changes, and relatively insensitive to changes in auto costs and travel times.
- Connecting service to Washington considerable increases ridership.
- This study identified the 125-150 mph options as preferred alternatives.
- Freight railroads are potential supporters of the project, as it would shift existing passenger services off of freight rail.

Challenges:

- States need to develop a political consensus on approach moving forward.
- Operations to do not produce adequate operating surpluses to pay for capital and initial operating deficits. A dedicated source of funding may be required to cover these costs.
- Partnership with Amtrak should be considered as an alternative to the independent operator assumed in this study.
- Partnerships with neighboring states to achieve regional interconnectivity must be explored.

Source: http://www.sehsr.org/reports/hsr/eval_hsr_options.pdf

The Virginia State Rail Plan: A Multimodal Strategy to Meet the Commonwealth's Passenger and Freight Transportation Needs Through 2025 (2004)

Performed for: Virginia Department of Rail and Public Transportation

Performed by: Virginia Department of Rail and Public Transportation

Summary: The Virginia State Rail plan provides an overview of all rail operations and infrastructure in the state, including inter-city passenger, commuter, and freight rail. Currently, two passenger railroads operate in the state. Virginia Railway Express connects Washington, DC with Fredericksburg and Manassas. Local bus routes provide connection to this service. Amtrak's Northeast Regional Corridor operates through the state from Richmond/Newport News to Washington and points north. Seven other Amtrak services also serve stops in Virginia.

Major Findings:

- A number of plans are under development for expansion of IPR services in Virginia, including expansion of the Virginia Railway Express System, the Southeast HSR Corridor, the Richmond to Hampton Roads Study, the I-664 Route, the 164 Median Rail Proposal, and the TransDominion Express Service.
- Virginia successfully petitioned the U.S. DOT for designation of the Richmond to Hampton Roads Route as an extension of the Southeast HSR Corridor.
- Alternative studies for the Richmond to Hampton Roads Corridor recommended the use of double tracking, increased frequencies, and increased speeds up to 110 mph on the corridor.
- The proposal for the TransDominion Express route calls for improvements to existing Norfolk Southern tracks to accommodate a level of service similar to European HSR Systems.

Source: http://www.drpt.virginia.gov/studies/files/VSRP-Print-Version-Full-Report.pdf

6. Intercity Rail in the Gulf Coast Region

Deep South High Speed Rail Corridor Feasibility Study (1995)

Performed for: Southern Rapid Rail Transit Commission

Performed by: Morrison Knudsen Corporation in association with Frederic R. Harris, Inc. and Saizan and Associates, Inc.

Summary: This planning level feasibility study of new HSR services in the federally designated Gulf Coast High Speed Corridor focuses on Louisiana, Mississippi, and Alabama, with potential connections to major destinations in Texas, Georgia, and Florida. The specific corridor under evaluation connects Atmore, Alabama with Lake Charles, Louisiana via Mobile, Alabama, Pascagoula, Biloxi, and Gulfport, Mississippi, and New Orleans, Baton Rouge, and Opelousas, Louisiana. At the inception of the study, this corridor was served by the Amtrak Sunset Limited Line. Since Hurricane Katrina, however, service east of New Orleans has been discontinued.

Major Findings:

- The vast majority of the route would operate on freight owned rail.
- Upgrades and plant expansions would be required on all segments to accommodate HSR.
- FRA requires the use of automatic cab signal, automatic train stop, or automatic train control systems on any tracks serving HSR and passenger and freight vehicles operating on the same track.
- FRA requires elimination of all at-grade crossings for systems operating at speeds higher than 110 mph.
- Investments in this corridor are focused on incremental improvements to existing infrastructure. This approach allows for phasing out the costs over time.
- An incremental investment approach also allows investment to be tailored to demand.
- Environmental impacts should be lower in existing right-of-way than for *"Greenfield"* projects.
- Improvements to existing lines can better target major destinations than new alignments, which may be required to avoid built-up areas.
- Formerly unwilling freight railroads will consider changes to their infrastructure and operations that provide a *"win-win"* passenger/freight outcome.
- System-wide efficiency and individual convenience can be enhanced with multimodal solutions.
- Capacity improvements benefit freight by reducing potential conflicts with passenger trains.
- Economic benefits will be region-wide.
- Rail can serve growing tourism and gaming in the region.
- Ridership sensitivities to speed, connectivity, and frequency were examined. Connectivity to Jacksonville and Houston increased ridership considerably. Design speed and trip frequency had less of an impact.
- HSR service may *"reinvigorate"* downtown areas in older communities.
- Public, private, and quasi-private funding sources should be considered. Additional potential funding sources are gaming taxes and revenue bonds.

Challenges:

- Average speeds achieved through an incremental approach are generally lower than with new alignments.
- Capital funding is difficult to identify and procure.
- Environmental impacts must be considered.
- The region includes many bays, rivers, and bayous. There are limited bridge crossings and sensitive environmental areas.
- There are many at-grade crossings in the existing system with no warning system technologies. HSR implementation would require upgrades, including possible gate systems.
- Freight operations in urban areas are limited to speeds around 50 mph.
- Environmental impacts must be evaluated against a variety of federal laws governing emissions, water pollution, endangered species, and impacts on historically protected areas.
- Grade separations will be required to serve HSR, particularly in urban areas.
- Large freight growth is projected. Capacity must be increased to meet needs without major passenger freight conflicts.

Source: http://www.southernhsr.org/PDFs/DeepSouth.pdf

Lake Charles to Meridian Corridor Development Plan (2007)

Performed for: Southern Rapid Rail Transit Commission

Performed by: Burk-Kleinpeter, Inc. in association with Parsons Transportation Group, Aecom Consult, and DMJM Harris

Summary: This report provides a development plan for the Lake Charles to Meridian segment of the Gulf Coast HSR Corridor. This study performs simulation modeling and infrastructure analysis to determine operational and infrastructure needs for accommodating high-speed passenger trains on existing freight rail infrastructure.

Major Findings:

- All rail modes (i.e., high-speed, commuter, and freight) need to be considered in rail station design.
- Stretches of double track will be required not to impact the performance of freight operations.
- Additional improvements that will be required include improved paths through yard areas and turnout upgrades for higher operating speeds.
- Existing siding will need to be lengthened to serve passenger trains and reduce delays due to freight-passenger conflicts.
- Major terminal upgrades must be performed in New Orleans.
- Additional tracks to *"hold"* freight trains must be constructed along the Black Belt in the New Orleans Terminal to allow high speed trains to pass through.
- Operating restrictions should be reviewed in the New Orleans region to facilitate smoother operations.
- Long-term operations planning should be coordinated among all operators and sponsors of the corridor.

Challenges:

- Current track signal systems are insufficient to serve high-speed trains.
- The current size of freight yards and existing restrictions around these areas at several terminals will limit improvements to allow freight operations to continue while passenger trains pass through the terminal.

Source: http://www.southernhsr.org/PDFs/lk-chas-merid-07vol1.pdf

New Orleans to Mobile Corridor Development Plan (2006)

Performed for: Southern Rapid Rail Transit Commission

Performed by: Burk-Kleinpeter, Inc. in association with Parsons Transportation Group, AECOM Consult, and CSX.

Summary: This report provides a development plan for the New Orleans to Mobile segment of the Gulf Coast High Speed Rail Corridor. Most of this analysis was performed before Hurricane Katrina devastated the existing infrastructure. Amtrak services on the corridor have been interrupted, with Sunset Limited Services east of New Orleans discontinued indefinitely. The goal of this project is to introduce IPR service while maintaining existing excess capacity to ensure freight mobility in the corridor. The operations analysis was performed by CSX.

Major Findings:

- The study found that the service objectives are not achievable under existing conditions, resulting in only 61% reliability for high-speed trains.
- Train equipment exists to achieve service goals, but requirements include: (1) speeds up to 90 mph, (2) non-electric train sets, (3) alignment changes, and (4) changes in current *"open on demand"* bridge practices.
- Increased speeds would require changes in curve alignment and track superelevation, including modification of spirals.
- Speeds are limited on movable bridges.
- Infrastructure improvements will likely include: (1) upgrade of track structure, (2) upgrade of signal systems, (3) curve realignment, (4) reconfiguration, relocation, elimination, or installation of interlocking, (5) addition of track capacity, (6) upgrade of movable bridges, (7) improved safety at grade crossings, (8) installation of right-of-way fencing, and (9) station improvements.
- Infrastructure improvements will reduce yard delays in Mobile and New Orleans.
- A Mobile Beltway station should be located in an area with adequate space for parking and development, good highway access, and the ability to attract riders from a wide region.
- Services should be designed so that trains traveling in opposite directions "meet" in stations or "pass" in locations with minimal freight impacts.

Challenges:

- Currently, seven drawbridges in the corridor are required to *"open on demand"* for marine traffic, leading to considerable train delays.
- The current CSX main line is not equipped with FRA required automatic cab signal, automatic train stop, or continuous automatic train control systems, resulting in a maximum speed limit of 79 mph.
- A storage location for trains on layover in Mobile has not been identified.
- An additional platform will likely be required to accommodate high speed operations in Mobile.

Source: http://www.southernhsr.org/files/Vol_1_NO_to_Mobile.pdf

Gulf Coast High Speed Rail Feasibility Study (1999)

Performed for: Southern Rapid Rail Transit Commission

Major Findings:

A copy of this study could not be obtained in time for this draft. However, references to this study in the Alabama State Rail Plan (2008) indicate that the major findings of this report were:

- The Gulf Coast HSR Corridor was already capacity constraint. As a result, freight operators are concerned about additional passenger services in the corridor.
- Increasing service frequency will have a greater impact on increasing ridership than increasing speed.
- Connections to Atlanta and Houston are critical to the success of the corridor.

Source: http://www.dot.state.al.us/NR/rdonlyres/7019FAB7-2A63-4610-BBAA-9DE050EB508D/0/2008AlabamaRailPlanFinalPDF.pdf

INTER-CITY AND HIGH SPEED PASSENGER RAIL IN TEXAS: PAST AND PRESENT

Source: AP Images, 2005

CENTER FOR TRANSPORTATION RESEARCH

The University of Texas at Austin

August 2009

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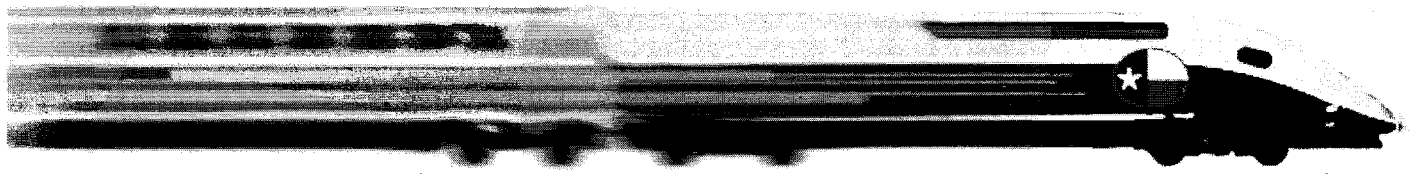
INTER-CITY AND HIGH SPEED PASSENGER RAIL IN TEXAS: PAST, PRESENT, AND FUTURE

The Texas TGV Experience



1982
A Texas Legislature Joint Committee recommended that feasibility studies examine the potential of high speed rail between Texas cities. Proposed legislation to enact the joint committee report recommendations failed.

1985
A German consortium reported that a high speed rail system would be viable from Dallas to Houston if the project obtained $500 million for startup contributions and was financed with tax exempt bonds.

1987
The German consortium unsuccessfully lobbied the Texas Legislature to undertake the proposal. Instead the Legislature enabled the Turnpike Authority to undertake their own HSR study.

1989
After the conclusion of the TTA study, the Texas Legislature created the Texas High Speed Rail Corporation (THSRA), which was charged to review private party applications objectively if found for the public convenience and necessity.

1991-1991
The THSRA issues requests for proposals - 2 of 3 applications were evaluated. The Texas TGV Corporation was ultimately granted the franchise. A MOU was signed to establish environmental review and other

1992
The THSRA and Texas TGV sign the franchise agreement and outline several responsibilities, most of the latter were time sensitive. Work began on the environmental review and ridership studies. However, the first portion of the public financing offering was delayed until 12/31/2003.

1993
Delays forced re-negotiation of franchise agreement and additional requirements were placed on the Texas TGV Corporation. Texas TGV issued its initial offering. A day before the pricing and the sale of the notes was scheduled to occur, Morrison Knudsen announced it was no longer going to provide the promised counter guaranty. The offering was withdrawn. TGV did not meet its deadline of 12/31/1993.

1994
Work was halted by the Texas TGV Corporation. Termination of the Franchise Agreement.

1995
The Texas Legislature terminated the THSRA.

Source: GAO (2008) & Burns (1995)

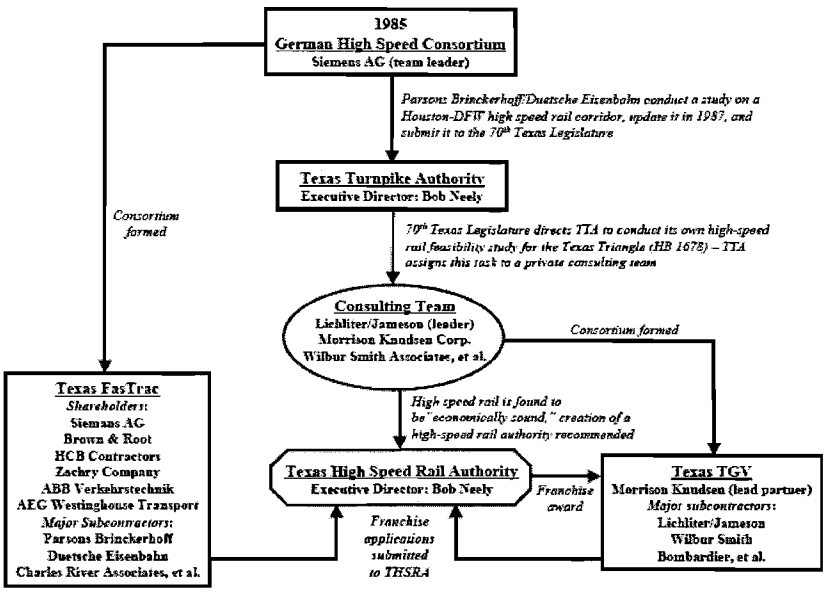
The idea of a HSR line linking Texas's major cities arose less out of the need to address foreseen bottlenecks, but more as a strategic market opportunity perceived by European companies. The U.S. was seen as a potentially lucrative, yet untapped market for HSR (Ng, 1995). A Texas HSR triangle discussion was therefore initiated in 1985 by a German consortium.

Early feasibility studies by the Texas Turnpike Authority (TTA) and the German consortium revealed the link between Dallas and Houston the most feasible (Ng, 1995). This was an important corridor and it was predicted that future demand in the corridor would exceed the capacity provided by the highway and air infrastructure. Additionally, the studies emphasized the social benefits of a Texas Triangle HSR service, i.e., job creation, fare revenues, environmental benefits, and reduced dependence on oil (Ng, 1995). Specifically, the 1989 TTA study that detailed the benefits from the implementation of HSR in Texas got the attention of the Texas Legislature. The study concluded that HSR would be a lucrative job generator and increase state

revenues. Encouraged by these results, the Texas Legislature enacted SB1190, creating the Texas High Speed Rail Authority (THSRA) in 1989. The THSRA was to (a) determine whether HSR in Texas was for *"public convenience and necessity"* and (b) if yes, select the applicant for the franchise to construct, operate, finance, and maintain a HSR facility in Texas. The THSRA was created as a separate agency overseen by a board of eleven 11 directors.

The THSRA solicited letters of intent from potential applicants. Non-solicited parties were also encouraged to submit letters. A notice inviting letters of intent was published in the Texas Register on June 26, 1990 (TARO, 2002). On July 19, 1990, two letters of intent were received from the Texas High-Speed Rail Joint Venture (later renamed Texas FasTrac) and the Texas TGV Consortium, respectively. January 16, 1991 was set as the deadline for receiving franchise applications and the required franchise fees (TARO, 2002). Both the Texas TGV Corporation and Texas FasTrac, Inc., submitted their franchise applications and fees by the deadline. Another company, the Texas Railroad Finance Corporation, submitted an application, but failed to pay the requested franchise fees by January 16, thereby making the application invalid (TARO, 2002).

A detailed analysis and comparison of the two proposals was conducted by Ng (1995) and the Texas Transportation Institute (2004). Both studies concluded that neither proposal was financially viable. Furthermore, in preliminary studies, the THSRA pointed to the need for public funding to improve the viability of the project. In 1991, the authority awarded a fifty-year franchise to a group that came to be known as the Texas TGV. The chart below illustrates the sequence of events between 1985 and the award of the HSR franchise in 1991.



Source: TTI, 2004

After the execution of the Franchise Agreement, Texas TGV suffered a series of setbacks that prevented it from meeting the December 1992 deadline for raising $170 million in equity capital. The main setbacks were delays in the environmental report and the requirement for a new ridership study (Ng, 1995). The studies involved a change in the alignment from the original proposed triangle to the T-Bone structure. In addition, a lack of legislative and White House support, as well as active opposition by Southwest Airlines and agricultural interests, severely

impeded progress (Ng, 1995). Unable to meet the 1992 deadline, Texas TGV was granted a one year extension.

In December 1993, Texas TGV, however, missed the deadline to raise the equity capital ($170 million). The official reason was that Texas TGV could not secure enough equity and that the three main partners – Morrison Knudsen, GEC- Alsthom, and Bombardier – did not want to expose their shareholders to the project risk. However, it was probably because the 100% private financing model for the implementation of HSR in Texas was not realistic and some form of public funding was required (Ng, 1995). In May, 1994, the THSRA filed a formal request for terminating the franchise and franchise agreement. In August of the same year, the franchise was thus revoked.

Main Obstacles to the Texas TGV Project

THSRA Mandate

The THSRA's mandate to determine if HSR was of public necessity was seized upon by project opponents. Rather than the Texas Legislature making this determination, as would be the norm for other state supported transportation projects and programs, this responsibility and the debate surrounding such a finding, was delegated to the THSRA (Perl, 2002). The legislature, however, specified that THSRA apply the traditional regulatory standard of *"public convenience and necessity"* in making this determination. Organized opponents would later claim that the case for proceeding with passenger rail was not made, pointing to a finding in an advisory report to THSRA stating that *"neither applicant has shown that award of a franchise would be of public necessity"* (Perl, 2002).

Mere Private Investment

The THSRA's independence was questioned by the required $500,000 *"user fee"* that was to be paid by Texas TGV for support of the THSRA's activities. However, prospective franchisees viewed that this lack of public funding would result in fewer constraints on project development. In particular, the environmental and planning requirements initially appeared less stringent in a business-friendly state like Texas (Perl, 2002). This ensured the participation of the French and German consortia – both with ties to HSR manufacturers and technology developers – to participate in the bidding process. Thus, initially, the complete lack of public funding was seen to bring with it fewer constraints on project development (TARO, 2002).

The Texas TGV's application thus outlined a pure privately funded model to meet the equity financing commitment and other financial obligations of the agreement. This meant that the Texas TGV had to have available for inspection by the end of 1992, fully-executed subscription agreements from one or more entities prepared to make equity investments of at least $170 million. The Texas TGV, however, encountered a number of challenges that had financial implications (Perl, 2002):

- Texas TGV had to pay for the THSRA operations.
- The Texas HSR project required new safety regulations from the FRA, which created a separate set of administrative procedures and policy norms for the Texas rail passenger renewal initiative.
- A new study under the National Environmental Policy Act was to be conducted at Texas TGV's expense. A review of the environmental and safety concerns plus detailed

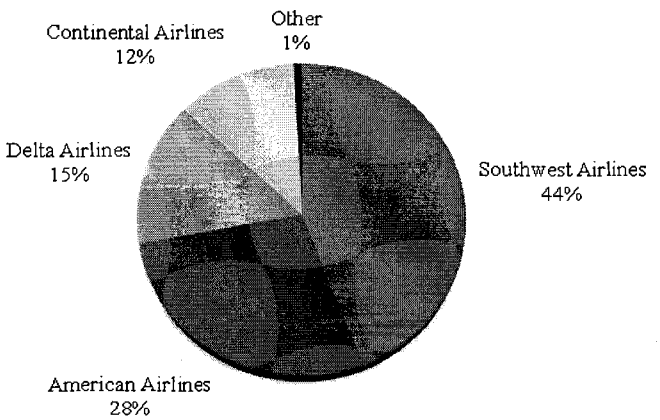
engineering and scientific assessments about the Texas TGV had to be assembled into a complete environmental impact statement that would be reviewed by state and federal regulators. Public hearings were also required to obtain input from communities about the project's full range of impacts.

In the end, it was calculated that Texas TGV incurred total costs of $40 million that covered franchise acquisition, planning, and various assessments (Perl, 2002). Texas TGV also had to pay for the THSRA's operating costs in FY 1995 and repay the state treasury all revenues that remained outstanding from previous general revenue advances. In return for these payments plus the transfer of all nonproprietary information about the project to the state, the THSRA forfeited the right to collect a $2.5 million abandonment bond from Texas TGV.

Airlines

Texas TGV's Ridership Forecast, performed by Charles River Associates, predicted that HSR would divert between 21 and 31% of Texas Triangle riders to the rail mode (Cline, 2005). At that time, Texas-based Southwest Airlines had the largest market share serving the Texas Triangle Routes (see Figure below). Southwest Airlines thus launched three lawsuits against the THSRA. Southwest Airlines was attacking the proposal in a public forum.

1992 Market Share for Airlines Serving the Texas Triangle Routes



Source: Perl, 2002

Although Southwest's legal claims were rejected before both trial and appeal judges, the lawsuits did impact Texas TGV's financing negatively (Perl, 2002). The legal actions delayed Texas TGV's fundraising schedule. Also, when Texas TGV sought federal support to provide confidence to potential investors, Southwest Airlines lobbied severely to prevent policy action (Perl, 2002). Congressional pressure finally ensured that the federal subsidy for Texas TGV was denied, because it was allegedly damaging to Boeing and Southwest (Ng, 1995).

Grassroots Confrontations

Although Southwest Airlines contributed greatly to the failure of the Texas TGV, grassroots and political opposition in addition to the "EIS" process also contributed to the failure. Almost 40 public hearings were organized, and besides the metropolitan hearings, a number of counties through which the TGV would pass were opposed to the initiative (Perl, 2002). These

counties were concerned about the infrastructure costs, noise, and land intrusion that would impact them, but without them receiving the mobility benefits.

Politics

As per the THSRA's invitation in 1992, the Comptroller of Public Accounts at that time and former member of the Texas Railroad Commission (TRRC) – John Sharp - conducted and published a performance review of the THSRA. The report's findings were negative and damaging. It recommended that the THSRA's operations and personnel be transferred to the TRRC before the 1995 deadline. The report recommended that the goal date for the transfer should be September 1993. It was argued that there is no compelling logistical or policy reason for a delay. The overlap between the TRRC's and THSRA's functions may explain some of the tension between the agencies. In addition, the report depicted a bureaucratic *"capture"* of the THSRA by industrial interests and questioned THSRA's role as a facilitator of private enterprise in transportation (Perl, 2002). The report also referenced relatively minor accounts of waste and mismanagement. Finally, however, discovered "lies" on the resume of THSRA's Chair, Lena Guerrero, regarding her educational background and subsequent resignation only added to the negative perception the public already had of the agency.

Present and Potential Future Efforts

FRA has emphasized the importance of partnerships among states in the development of HSR corridors. FRA has specifically stated that the success of these corridors and initiatives is tied to the willingness of states to work together. Texas is thus regarded an important stakeholder in three proposed HSR corridors, i.e. Gulf Coast Corridor, South Central Corridor, and the El Paso-Denver initiative.

Gulf Coast Corridor

One of the proposed designated HSR corridors – the Gulf Coast Corridor - covers 719 miles from Houston through New Orleans to Birmingham (Fisher & Nice, 2007). The states - Alabama, Louisiana, Mississippi, and Texas – through which this corridor traverse are thus eligible to receive federal funds, which combined possibly with state and local funds could finance the development of HSR in the corridor. In 2004, the U.S. DOT dedicated a $1.5 million appropriation to the four states to work with the private railroads, while the federal government would gradually upgrade existing ROW to achieve higher speeds.

Louisiana, Mississippi, and Alabama have a history of working together to obtain funding for HSR development (Fisher & Nice, 2007). The designation of the Gulf Coast Corridor is the result of 20 years of work by these three states. In 1982, Louisiana, Mississippi, and Alabama created the Southern Rapid Rail Transit Commission (SRRTC) to evaluate options for enhancing passenger rail service in the Gulf Coast. In 2001, the states developed a HSR corridor plan to indentify the scope, costs, and benefits of potential rail upgrades in the corridor. Two years later, the SRRTC began a preliminary engineering analysis. However, this corridor does not seem to have adequate political support

Texas is not a member of the SRRTC[1] and thereby has not partaken in coordination efforts with the other Gulf Coast states. Alabama, on the other hand, has had an important role in

[1] The 81st Texas Legislature approved HB646, which amends the Transportation Code to approve and ratify the Southern High-Speed Rail Compact. The bill authorizes the governor to execute the compact with the

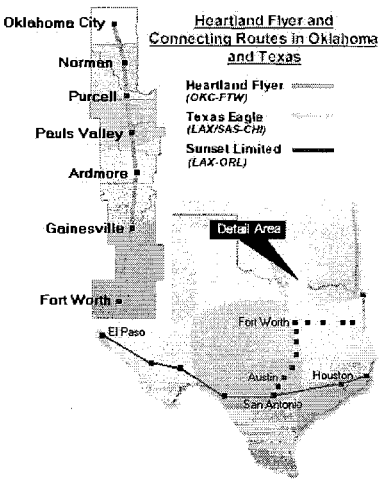
the development of HSR corridors, because of its strategic location in the Gulf Coast corridor and Southeast Corridor (Fisher & Nice, 2007). However, past regulations have established at least a 50% state match to federal grants, which as impacted Alabama DOT's support for HSR development.

South Central Corridor – The Heartland Flyer

After a 20-year absence of passenger train service between Oklahoma and North Texas, the Amtrak Heartland Flyer was inaugurated on June 14, 1999. This service was made possible by federal funds to the Oklahoma DOT (ODOT) to provide passenger rail service in areas not served by Amtrak.

TxDOT thus entered into a joint-venture with Oklahoma and Amtrak in 2006. On June 14, 2009 – the 10th anniversary of the Heartland Flyer – the service has moved more than 625,000 passengers (Amtrak, 2009). Amtrak operates the Heartland Flyer under contract with ODOT and TxDOT, and with the support of the Heartland Flyer Coalition, a grass-roots organization representing the communities along the 206-mile route.

The Heartland Flyer has scheduled stops in Oklahoma City, Norman, Purcell, Pauls Valley, and Ardmore in Oklahoma and in Gainesville and Fort Worth in Texas (see Figure below).



Source: Heartland Flyer Coalition, 2009

El Paso – Denver Initiative

In July 2009, the Colorado Governor's Office issued a press release announcing that Colorado in partnership with New Mexico and Texas is applying for a HSR corridor designation between El Paso and Denver, passing through New Mexico (Gov. Ritter, 2009).

Texas, New Mexico, and Colorado submitted a joint application for $5 million on July 10, 2009 to the FRA to fund a feasibility study of a HSR corridor between El Paso and Denver. If approved, the study could result in the El Paso-Denver line becoming the 11th designated HSR corridor to be eligible for receiving federal funding to implement HSR in the region.

states of Mississippi, Louisiana, and Alabama. The purpose of the compact is to implement Pub. L. No. 97-213, including conducting a feasibility study of a rapid rail transit service between the states of Mississippi, Louisiana, Alabama, and Texas and to establish a joint interstate commission to assist in this effort.

San Antonio/Monterrey HSR Initiative

Following U.S. DOT's designation of the San Antonio – Laredo rail corridor as an international HSR corridor in August 1992, TxDOT submitted an application to the U.S. DOT that analyzed and provided data regarding the feasibility of the project. In 1981, the San Antonio-Bexar Metropolitan Planning Organization (MPO) Railroad Task Force (RRTF) began to pursue the establishment of a first class passenger rail service between Mexico City and San Antonio (TxDOT, 1992). In 1982, Amtrak and National Railways of Mexico (NdeM) entered into discussions – facilitated by RRTF - on the potential initiation of passenger rail service. However, in June 1982 the project was put on hold (TxDOT, 1992).

In 1987, NdeM's interest in establishing passenger rail service between Mexico City and San Antonio was revived (TxDOT, 1992). After several meetings and workshops in 1987, the project was again delayed in 1988 because of a lack of financial resources. In June 1990, discussions resumed and in 1991, a ridership study was funded by the Departments of Tourism of Mexico and Texas and NdeM (TxDOT, 1992). A positive outcome resulted in letters of commitment from the Mayors of San Antonio, Laredo, Nuevo Laredo, and Monterrey in August 1992. Although the project was strongly supported by the THSRA, Amtrak's Vice-President stated in 1992 that Amtrak did not support the project (TxDOT, 1992). However, in 1999, Amtrak tried to implement the *"Aztec Eagle"* on that route as part of its Network Growth Strategy.

As of July 2009, this corridor is not part of President Obama's HSR vision. The corridor does, however, represent a noteworthy cooperative effort between Texas and the Government of Mexico.

PASSENGER RAIL AND THE 81ST LEGISLATIVE SESSION

During the 81st Legislative Session held in Spring 2009, several bills regarding the improvement of passenger rail or implementation of HSR were submitted for legislative approval. The Table below summarizes the steps for bill implementation in Texas whether the bill was filed in the Senate or the House, respectively.

Submitted to the Senate	Submitted to the House
Stage 1: Bill filed	Stage 1: Bill filed
Stage 2: Out of Senate Committee	Stage 2: Out of House Committee
Stage 3: Voted by Senate	Stage 3: Voted by House
Stage 4: Out of House Committee	Stage 4: Out of Senate Committee
Stage 5: Voted by House Committee	Stage 5: Voted by Senate Committee
Stage 6: Sent to Governor	Stage 6: Sent to Governor
State 7: Bill becomes law	State 7: Bill becomes law

Source: Texas Legislature Online, 2009

The following passenger rail related bills were presented to the 81st Legislature for its approval.

Bill	Related Bill Descriptions & Contents	Final Status
SB 581	Other political sub-divisions, besides counties and municipalities, may join an inter-municipal commuter rail district.	Became law
SB 612	Authorizes TxDOT to plan and make policies for the location, construction, maintenance, and operation of rail facilities or systems, and to acquire finance, construct, reconstruct, relocate, maintain, and operate publicly or privately owned passenger or freight rail facilities.	Stage 2
SB 855 **HB 9**	Ability to raise funds through fee assessments or fee increases authorized by voter approval for mass transit systems (i.e., passenger rail) and other projects.	Stage 4 Stage 2
SB 858	A *transportation reinvestment zone* for rail facilities will allow metropolitan areas that already operate a freight or passenger rail facility to diversify their funding options and ensure the success of their rail systems. A municipality may operate a *transportation reinvestment zone*.	Became law
SB 1272 **HB 2420**	Ad valorem and use tax exemptions for HSR facilities. The sale, storage, or use of HSR facilities is exempted from taxes.	Stage 1 Stage 1
SB 1283 **HB 2434**	Provides more independence to inter-municipal commuter rail districts, commuter rail districts, and freight rail districts to manage their funds –normally authorized and managed by TxDOT and the Commission.	Stage 2 Became law
SB 1382 **HB 2418** **HB 2244**	Coordination of the planning, construction, operation, and maintenance of a statewide passenger rail system by TxDOT. This bill requires TxDOT to coordinate activities regarding passenger rail and to develop and annually update a statewide passenger rail system plan.	Became law Stage 1 Stage 1
SB 1540	No substantive changes – just rearranges the Transportation Code.	Became law
SB 1570	This bill creates a HSR corporation	Stage 4

Bill	Related Bill Descriptions & Contents	Final Status
SB 2096	Creation of a multimodal urban transportation authority (UTA) – *comprehensive advanced transportation* includes commuter rail and intercity municipal rail.	Stage 5
HB 4335		Stage 1
HJR 82	Joint resolution proposing a constitutional amendment authorizing the legislature to exempt a HSR facility from ad valorem taxation. The period of this exemption might be limited.	Stage 1
SJR 16	Joint resolution proposing a constitutional amendment authorizing the legislature to exempt a HSR facility from ad valorem taxation.	Stage 1
HB 9	Authorizes certain counties to call an election to impose a tax and/or fees to produce local revenue for mobility or transportation improvement projects, including passenger rail and freight rail projects.	Stage 2
HB 646	Amends the Transportation Code to approve and ratify the Southern High-Speed Rail Compact. The bill authorizes the governor to execute the compact with the states of Mississippi, Louisiana, and Alabama. The purpose of the compact is to implement Pub. L. No. 97-213, including conducting a feasibility study of a rapid rail transit service between the states of Mississippi, Louisiana, Alabama, and Texas and to establish a joint interstate commission to assist in this effort.	Became law
HB 2433	Authorizes freight rail districts to exercise the powers related to a commuter rail facility, including the power to establish intercity and passenger rail services. Also related to the funding received by the rail districts, the bill lifts past limitations applicable to local government funds received by the rail district. Now, the district may use the local government funds outside the territory of the latter.	Became law
HB 2589	Transportation planning and the creation and membership of planning organizations and funding allocations for transportation projects. Mentions that a transportation official means officials from other state agencies and political sub-divisions that have responsibility for HSR, among other responsibilities.	Stage 2
HB 2692	Creation of affordable housing opportunities near commuter rail stations (does not include property up to ½ a mile of a commuter rail station).	Stage 6 (Vetoed)
HB 3448	Local options regarding transportation and mobility improvement projects in certain counties. Counties may call an election to authorize more mobility or transportation improvement projects.	Stage 1
HB 3650	Creation, administration, powers, duties, operations, and financing of a border region higher-speed rail authority for the Texas-Louisiana and the Texas-Mexico regions. Grant power to issue bonds, impose a tax; grant power of eminent domain, and ability to solicit federal funding to authority.	Stage 4

Source: Texas Legislature Online, 2009

CURRENT TEXAS ACTIVITIES AND INITIATIVES

Group	Concept/Support for IPR & HSR	Service	Funding Vision
San Antonio Mobility Coalition (Mr. Victor Boyer)	The San Antonio Mobility Coalition is mostly involved in providing lobbying support for transportation projects. They mostly provide support for funding activities. Current focus is: • on relocating freight rail lines carrying hazardous materials in Bexar County, and • on capitalizing the rail relocation fund.	Serve communities through HSR, IPR, or commuter rail. Analysis of costs to determine what is *"doable"* is necessary.	Funding could be achieved through a combination of: • ARRA funding ($8 billion) • Federal reauthorization bill • Rail Relocation Fund • (iv) TIFs around stations
Texas Transit Association (Mr. Ben Herr)	Does not support any specific HSR/IPR project or route directly. However, supports any transit related issue by promoting information sharing. Support endeavors that promote transit. Thus, any passenger rail initiative (e.g., HSR, IPR, or commuter rail) requires transit serve the improved passenger rail service. High potential IPR corridors include: • San Antonio – Austin – Georgetown (the planned commuter rail), • the T-Bone route for HSR, and • Dallas to Houston route for HSR (or at least some type of service)	Commuter rail seen as more viable.	PPPs are seen as critical for implementation. A combination of federal, state and local funding is critical. States also need to obtain community support.
Triangle Railroad Holding Company (Messrs. Cooper and Mangelsdorf)	In priority order, the routes supported are: • Houston to Dallas Fort Worth (DFW) – currently there is no passenger rail service between these two large cities. • Houston to Austin – implementation through abandoned ROW. • DFW to San Antonio – very problematic and expensive, especially the Austin to San Antonio section. • Freight line from DFW to Laredo.	Service of 200 mph Double track corridor Total grade separation - no grade crossings until the train arrives to cities or suburbs.	PPPs are necessary for implementation. Both federal and state government support is essential, but not a major component. Public funding necessary for: grade separations, acquiring the land, planning and environmental issues. 20-25% from state and federal funds 75 - 80% from debt financing, loans, bonds,

Group	Concept/Support for IPR & HSR	Service	Funding Vision
			private equity investments, etc.
Greater Austin San Antonio Corridor Council (Messrs. Milloy and Bingham)	The routes supported are: • San Antonio to Georgetown – with stops in New Braunfels, San Marcos, and Austin • San Antonio to DFW • Dallas to Houston • Houston to San Antonio • Freight line from DFW to Laredo *However*, interested in completely re-routing freight rail to new ROW and accommodating passenger rail service on existing freight lines. Conducted at least 15 in-depth studies on these routes.	By relocating freight rail in stages, the speed of passenger rail service should increase incrementally. Initially, may be up to 79 mph, then 100 mph, and then higher. However, need to double track corridors. Track sharing increases safety risks.	PPP is seen as the only rational way to develop IPR. Capital costs should be funded by State and federal agencies. Recommended TxDOT devote more funding to IPR, and rail in general.

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Cooper, H. & Mangelsdorf, P., Triangle Railroad Holding Company, interview conducted on Wednesday, July 29th, 2009

Herr, B., Texas Transit Association, interview conducted on Wednesday, July 29th, 2009.

Milloy, R. & Bingham, W., Greater Austin-San Antonio Corridor Council, interview conducted on Thursday, July 30th, 2009.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: FREIGHT CORRIDOR STUDY

AUTHOR/SPONSOR: TXDOT – TEXAS TURNPIKE AUTHORITY DIVISION

SUBJECT: PLANNING FOR CONCEPTUAL FREIGHT MOVEMENT/TRANSPORT FACILITY(IES) GENERALLY PARALLELING EXISTING I-35 CORRIDOR

DATE: N/A – IN PROGRESS

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: N/A

SYSTEM LIMITS: GENERALLY PARALLELING EXISTING I-35 FROM TEXAS/MEXICO BORDER TO TEXAS OKLAHOMA BORDER

SYSTEM LENGTH: STUDY AREA = APPROX. 640 MILES

NEW SYSTEM: YES **TRACK TYPE:** DEDICATED OR SHARED

STAKEHOLDERS: TXDOT, RAILROADS

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

As a component of TTC-35, the Freight Corridor Study (FCS) is being conducted to examine the potential for creating a new multimodal freight corridor facility as part of the proposed north-south transportation corridor (generally paralleling existing I-35) extending from the Texas/Mexico border to the Texas/Oklahoma state line. The ultimate goal of study is to identify a 2,500 ft. wide preferred freight corridor. Currently, the study has screened 109 Draft Preliminary Corridor Alternatives (Draft PCA's) and identified 37 PCA's to carry into the next step of further refinement and Reasonable Corridor Alternative (RCA) development and identification. The report is supported by a Freight Corridor Model Report (FCMR) which establishes the modeling approach, development strategies, quality procedures, analysis and results for completing the FCS.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: I-35 EXISTING ENVRIONMENTAL CONDITIONS

AUTHOR/SPONSOR: TXDOT – TEXAS TURNPIKE AUTHORITY DIVISION (TTC-35 CET)

SUBJECT: ENVIRONMENTAL CONSTRAINT MAPPING ALONG EXISTING I-35 CORRIDOR

DATE: N/A – IN PROGRESS

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: N/A

SYSTEM LIMITS: I-35 IN TEXAS (LAREDO TO OKLAHOMA)

SYSTEM LENGTH: APPROX 592 MILES

NEW SYSTEM: NO **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This study is currently underway, and is examining and reporting the abundance of typical environmental constraints present in the existing I-35 corridor, as a supplement to the I-35 Expansion Options report. The final document will include a socioeconomic examination and report constraint abundance within a 2400-foot-wide corridor centered on the existing I-35 transportation facility.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: SAN ANTONIO RAIL BYPASS PRELIMINARY PLANNING STUDY

AUTHOR/SPONSOR: TXDOT – TEXAS TURNPIKE AUTHORITY DIVISION

SUBJECT: PRELIMINARY PLANNING AND CONSTRAINT MAPPING FOR PROPOSED RAIL BYPASS IN SAN ANTONIO REGION

DATE: OCTOBER 2008

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: N/A

SYSTEM LIMITS: WESTERN TERMINI – UP DEL RIO SUBDIVISION IN EASTERN MEDINA (C1, C2) AND SOUTHWESTERN BEXAR COUNTY (C3, C4); EASTERN TERMINUS – NORTHEAST OF SEGUIN ON UP GLIDDEN SUBDIVISION (C1-C4)

SYSTEM LENGTH: RANGING FROM 67.0 – 91.6 MILES (4 ALTERNATIVE CORRIDORS)

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, UNION PACIFIC RAILROAD

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This study is a preliminary planning study regarding the feasibility of constructing a through-freight rail bypass around the San Antonio metropolitan area. The study quantifies the abundance of selected resources (land cover, demographics, cultural resources, environmental resources, infrastructure resources) and potential constraints in four alternative corridor alignments.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: REGIONAL COMMUTER RAIL CONNECTIVITY STUDY

AUTHOR/SPONSOR: KIMLEY-HORN & ASSOC. / HOUSTON-GALVESTON AREA COUNCIL (H-GAC)

SUBJECT: ASSESS CONCEPTUAL (VISIONING-LEVEL) FEASIBILITY OF A HOUSTON-GALVESTON AREA REGIONAL COMMUTER RAIL SYSTEM

DATE: SEPTEMBER 5, 2008

NATIONAL HSR CORRIDOR SUPPORTED: GULF COAST

IMPROVEMENT COST: TOTAL ESTIMATED COST FOR 5 PRINCIPAL CORRIDORS = 2.9B ($2008)

SYSTEM LIMITS: N/A - CONCEPTUAL

SYSTEM LENGTH: N/A - CONCEPTUAL

NEW SYSTEM: NO **TRACK TYPE:** SHARED

STAKEHOLDERS: H-GAC, TXDOT, RAILROADS

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO – CONCEPTUAL (QUALITATIVE) DISCUSSION OF POTENTIAL FUNDING SOURCES

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

The purpose of this study was to establish a conceptual vision for a regional long-distance commuter rail system in the Houston-Galveston Region, and envision how such a system could serve the surrounding metropolitan areas. Also, the study sought to conceptually define the connectivity solutions needed within the Urban Districts to serve commuter rail. The report identifies five "Principal Corridors", which represent a mature long-distance commuter rail system that could operate on existing or revitalized freight rail ROW, which was used as a baseline to model ridership, preliminarily assess freight railroad operational impacts, and analyze prospect for connectivity with the multimodal transportation infrastructure of the region (and is not necessarily the "recommended" system for design and construction). The study concluded that an FRA compliant, long-distance rail system is feasible to develop in the Houston-Galveston metropolitan region. Additionally, it could be compatible with the existing freight rail system and could be implemented in a way that does not unreasonably hinder the necessary growth of the freight rail system. Among others, the study recommends moving the study of commuter rail from conceptual into advanced planning in order to establish a plan for a comprehensive freight and passenger rail system.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: SAN ANTONIO REGION FREIGHT STUDY

AUTHOR/SPONSOR: TXDOT

SUBJECT: ANALYSIS OF FREIGHT MOVEMENTS AND OPERATIONS IN THE SAN ANTONIO REGION

DATE: JULY 29, 2008

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: OPERATIONAL IMPROVEMENTS RANGING FROM $9.26M - $35.13M; ULTIMATE CONSTRUCTION OF BYPASS ROUTES RANGING FROM $1.37B - $2.42B ($2007)

SYSTEM LIMITS: SAN ANTONIO REGION

SYSTEM LENGTH: N/A

NEW SYSTEM: YES **TRACK TYPE:** NEW BYPASS AND SHARED (UP)

STAKEHOLDERS: TXDOT, UP, BNSF, BEXAR COUNTY, CITY OF SAN ANTONIO, VIA

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This study provides description of regional freight movements in San Antonio Region Study Area (12-county TxDOT San Antonio District, and Hays, Travis, and Williamson Counties of Austin District) and examination of alternatives to accommodate and capitalize on present and future (rail and truck) freight movements. The overall concept of the study is envisioned to evaluate freight movements and operations within the region, to identify opportunities to increase freight movement efficiency, determine the physical and financial viability of potential improvements, and include an analysis of potential freight corridor connections to the Trans-Texas Corridor. Authors anticipate that report will establish basis for development of a regional freight plan. Report provides evaluations and recommendations for near term, mid-range, and long term improvements and/or activities that may facilitate freight mobility within the region. Study also includes a detailed public/private sector benefit-cost analysis for each scenario. Next steps to continue review and analysis of current and projected freight flows related to conceptual TTC routes and modal shift (truck to rail) in the region. Future steps include proceeding to an environmental impact study and selecting route.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: CENTRAL TEXAS RAIL RELOCATION STUDY

AUTHOR/SPONSOR: TXDOT TP&P DIVISION – MULTIMODAL SECTION

SUBJECT: ASSESS FEASIBILITY OF RELOCATING UNION PACIFIC THROUGH-FREIGHT RAIL OPERATIONS IN CENTRAL TEXAS AWAY FROM URBAN AREAS

DATE: JULY 2008

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: TOTAL COST RANGING FROM $2.26B – $2.42B ($2007)

SYSTEM LIMITS: MACDONA (SOUTH OF SAN ANTONIO) TO TAYLOR

SYSTEM LENGTH: EXISTING ROUTE (ASML 1 AND DEL RIO SUB) – 127 MILES; PROPOSED BYPASS ROUTES – 145 MILES

NEW SYSTEM: YES **TRACK TYPE:** NEW LOCATION OR UPGRADE TO EXISTING UP TRACK

STAKEHOLDERS: TXDOT, UNION PACIFIC RAILROAD

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? ORDER OF MAGNITUDE ESTIMATES FOR CONCEPTUAL ALTERNATIVES

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

The report examined the feasibility of relocating Union Pacific's (UP) rail operations in central Texas away from the Austin Subdivision route which runs from Taylor through Austin to San Macros and San Antonio. The purpose of the report was to identify potential alternative alignments for UP's through-freight services in central Texas region that could provide both public and private sector benefits. The report concluded that the relocation was feasible through the construction of an entirely new freight rail facility for relocating UP's freight onto an alternative alignment, or through upgrades to UP's existing Waco, Lockhart, and Giddings Subdivisions.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: ECONOMIC FEASIBILITY OF RELOCATING HAZARDOUS MATERIALS TRANSPORTED BY FREIGHT RAIL

AUTHOR/SPONSOR: TXDOT

SUBJECT: EXAMINE ECONOMIC FEASIBILITY OF RELOCATING FREIGHT TRAINS THAT CARRY HAZMAT AWAY FROM MAJOR POPULATION CENTERS

DATE: MARCH 1, 2008

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL AND GULF COAST

IMPROVEMENT COST: HOUSTON – $526.7M; SAN ANTONIO – $2.01B; DFW - $1.51B

SYSTEM LIMITS: HOUSTON, SAN ANTONIO, DFW METROPLEX REGIONAL RAIL SYSTEMS

SYSTEM LENGTH: 757 MILES (HOU – 247 MILES; SA - 120 MILES; DFW – 390 MILES)

NEW SYSTEM: BOTH **TRACK TYPE:** DEDICATED OR SHARED OPTIONS

STAKEHOLDERS: TXDOT, METRO AREAS, RAILROADS

FUNDING APPROACH SUPPORTED: PROJECT OR CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: DETAILED IMPROVEMENT COST ESTIMATE SHEETS INCLUDED IN APPENDIX A

SUMMARY

The report examined the economic feasibility of relocating freight trains that carry hazardous materials away from residential areas of the state in municipalities with a population of more than 1.2 million residents (Houston, San Antonio [including Austin], DFW Metroplex), as directed by House Bill 160 (HB 160) signed during the 80th Texas Legislature (2007). The study presents several recommended system improvements and estimated costs to limit metropolitan hazardous materials exposure for the Houston, San Antonio, and DFW Regions.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: HOUSTON REGION FREIGHT STUDY

AUTHOR/SPONSOR: TXDOT

SUBJECT: IDENTIFICATION/QUANTIFICATION OF DEFICIENCIES IN HOUSTON REGIONAL FREIGHT NETWORK (ROADS, PORTS, RAILROADS)

DATE: 2007

NATIONAL HSR CORRIDOR SUPPORTED: GULF COAST

IMPROVEMENT COST: REPORT IDENTIFIES $3.4B IN ULTIMATE IMPROVEMENTS

SYSTEM LIMITS: 8-COUNTY HOUSTON REGION (HARRIS, FORT BEND, MONTGOMERY, GALVESTON, WALLER, BRAZORIA, LIBERTY, CHAMBERS COUNTIES)

SYSTEM LENGTH: N/A

NEW SYSTEM: BOTH **TRACK TYPE:** DEDICATED AND IMPROVEMENTS TO EXISTING SHARED

STAKEHOLDERS: TXDOT, TEXAS TRANSPORTATION COMMISSION, GULF COAST FREIGHT RAIL DISTRICT, PORTS OF HOUSTON, GALVESTON, BEAUMONT, AND FREEPORT, THE H-GAC, FREIGHT RAILROADS

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

The report was commissioned by the Texas Transportation Commission to help understand the extent of the state's rail infrastructure needs and the associated investment required, as part of a Statewide Freight Corridor study program to assist TxDOT in the development of a master plan for improving the movement of freight throughout the state. The report examines Houston region's existing freight network and identifies improvements that may provide benefits to the public and identifies alternatives that may improve regional freight rail capacity by enhancing the efficiency and operations of the railroads. The report identifies nearly $3.4 billion in improvements for the eight-county Houston region, categorized in the following areas:

- Grade separations - $808 million;
- Grade crossing closures - $5.2 million;
- Improvements to existing railroad infrastructure – $1.4 billion;
- New railroad corridors $1.1 billion

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: I-35 EXPANSION OPTIONS – COST ESTIMATES AND ANALYSIS

AUTHOR/SPONSOR: TXDOT – TEXAS TURNPIKE AUTHORITY DIVISION (TTC-35 CORRIDOR ENGINEERING TEAM)

SUBJECT: GENERALIZED COST ESTIMATES FOR EXPANDING EXISTING I-35 FACILITY TO ACCOMMODATE FUTURE PROJECTED TRAFFIC DEMAND

DATE: MARCH 22, 2007

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: EXPAND I-35 TO REQUIRED BY 2025 - $36.5B ($????); CONSTRUCT CONCEPTUAL FREIGHT RAIL FACILITY - $11.7B ($2006)

SYSTEM LIMITS: I-35 IN TEXAS (LAREDO TO OKLAHOMA)

SYSTEM LENGTH: 592.1 MILES (HIGHWAY); 637.1 MILES (FREIGHT RAIL)

NEW SYSTEM: YES **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, TEXAS SENATE TRANSPORTATION AND HOMELAND SECURITY COMMITTEE

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM OR PLANNING

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: COST ESTIMATES INCLUDED FOR 1 LANE EXPANSION, 2 LANE EXPANSION, 2025 NEEDS, IMPACTS TO TAX BASE, SEVERAL URBAN BYPASS ALTERNATIVES, AND CONCEPTUAL FREIGHT RAIL FACILITY (FROM TTC-35 MDP)

SUMMARY

At request of Texas Senate Transportation & Homeland Security Committee, TxDOT prepared report to examine economic and business impacts of expanding existing I-35 to accommodate future projected travel demand. Report examined costs associated with adding lanes to I-35, constructing urban bypass routes and conceptual freight rail facility, and examined anticipated impacts to development and losses to local tax base associated with expanding I-35. Report concluded that expansion of existing I-35 facility would be more costly, more damaging to existing businesses and developed property, more harmful to the tax base, and more disruptive to motorists than construction of TTC-35.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TEXAS NAFTA STUDY UPDATE – EXISTING CONDITIONS, RAIL (FINAL TECHNICAL MEMORANDUM 2)

AUTHOR/SPONSOR: CAMBRIDGE SYSTEMATICS / TXDOT

SUBJECT: SUMMARY OF EXISTING NAFTA RAIL TRADE CONDITIONS IN TEXAS

DATE: FEBRUARY 2007

NATIONAL HSR CORRIDOR SUPPORTED: N/A

IMPROVEMENT COST: N/A

SYSTEM LIMITS: TEXAS NAFTA RAIL SYSTEM

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, FREIGHT RAILROADS

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This report is a high-level examination of NAFTA-related trade and international/intermodal freight movements in Texas. The report provides a narrative detailing the challenges of accommodating future NAFTA growth without significant investment in the State's freight rail system. The report includes commodity import/export values, international crossing statistics, rail carrier overviews, bottlenecks and capacity constraints on the NAFTA system and projected growth in future NAFTA rail traffic as justification. The report concludes that without investment in key corridor and resolution of bottlenecks to raise service levels, an increasing share of NAFTA freight will utilize Texas highways.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TTC-35 MASTER DEVELOPMENT PLAN

AUTHOR/SPONSOR: CINTRA ZACHRY (CZ)/ TXDOT – TEXAS TURNPIKE AUTHORITY DIVISION

SUBJECT: DEVELOPMENT STRATEGY AND PLANNING OF THE TTC-35 CORRIDOR

DATE: SEPTEMBER 22, 2006

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: $8.8B ($2006) DOES NOT INCLUDE RIGHT OF WAY

SYSTEM LIMITS: DFW TO SAN ANTONIO

SYSTEM LENGTH: 325 MILES

NEW SYSTEM: YES **TRACK TYPE:** DEDICATED

STAKEHOLDERS: CZ, TXDOT

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? YES

FINANCIAL PLAN COMMENTS: Only cost and revenue estimates are presented. No detailed financial analysis is provided

SUMMARY

The TTC-35 MDP has several sections dedicated to discussion of developing a HSR program in Texas. Volume I generally uses the "Texas Triangle High Speed Rail Study" published in 1989 as the basis of the discussion and used the roadway facility growth models to calculate the 2015 to 2060 projections that were outside of the initial 1989 study.

Volume II of the MDP contains sections on the detailed cost and revenue estimates of the DFW to Austin to San Antonio HSR facility. Additionally, Appendix 9 contains information on international HSR experience of CZ. Appendix 10, discusses the application of the international experience to the TTC-35 corridor. The various configurations linking San Antonio, Austin, DFW, and Houston are presented as alternatives, including "I", "Y", and "Triangle" connections. However, no recommendation is given as a preferred alternative. Appendix 10 also discusses potential demand of the facility and capture rates from air and automobile travel.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TTC-35 WHITE PAPER ON PASSENGER SERVICE OPPORTUNITIES – EXECUTIVE SUMMARY AND FULL REPORT (DRAFT)

AUTHOR/SPONSOR: TXDOT – TTA

SUBJECT: HIGH-LEVEL DISCUSSION OF INTERCITY PASSENGER SERVICE OPPORTUNITIES IN THE TTC-35 HIGH PRIORITY CORRIDOR

DATE: JULY 2006

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: GENERALIZED IMPLEMENTATION COSTS (PER MILE) BY SEGMENT AND TECHNOLOGY PRESENTED IN TABLES B AND C ($2006)

SYSTEM LIMITS: NA

SYSTEM LENGTH: NA

NEW SYSTEM: NA **TRACK TYPE:** NA

STAKEHOLDERS: TXDOT

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: includes forecasted ridership estimates (2030), generalized implementation cost estimates for passenger rail services by service segment and rail technology, and generalized 50-year profit potential

SUMMARY

The report provides an overview of High Speed Rail in Texas. It presents discussion of multiple passenger service options (BRT, commuter rail, HSR, very-HSR). It provides a history of a private sector partnership called the Texas TGV established to develop the Texas Triangle High Speed Rail system. The Texas High Speed Rail Authority (THSRA) awarded a 50-year franchise to Texas TGV in 1991.

The report discusses several changes that have occurred in Texas since the Texas TGV was established, including: 1) TxDOT ability to enter into CDA for rail; 2) Growth in intercity rail ridership (142,000 in 1992 increasing to 289,000 in 2004); 3) Growth in intracity rail services, 4) Change in airport security; 5) Fuel costs and conservation; 6) Growth in the elderly population; 7) Population growth in Texas; 8) New rail technology (tilt-train, maglev, and bus rapid transit). Estimates of the market demand for HSR based on diversion from other modes of travel are provided.

Other discussion items that the report briefly discusses are: 1) benefits and shortcomings; 2) operational characteristics; 3) economic viability; 4) obstacles; 5) best options; and 6) next steps.

The paper concludes with a high-level discussion of implementation strategy and of four possible options moving forward: (1) Do Nothing; (2) Bus Rapid Transit; (3) Existing Rail Corridor; and (4) New Alignment. If decision is made to move forward, paper suggests refining ridership, cost, and financial studies with input from developer. [Note: report is marked "Preliminary Draft" and "Confidential – Not for General Distribution"]

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TTC-35 TIER ONE DRAFT ENVIRONMENTAL IMPACT STATEMENT

AUTHOR/SPONSOR: TXDOT – TEXAS TURNPIKE AUTHORITY DIVISION

SUBJECT: TIER ONE ENVIRONMENTAL IMPACT STUDY FOR MULTIMODAL TRAVEL CORRIDOR PARALLELING EXISTING I-35

DATE: APRIL 4, 2006

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: N/A

SYSTEM LIMITS: TEXAS/MEXICO BORDER TO TEXAS/OKLAHOMA BORDER, GENERALLY PARALLELING EXISTING I-35

SYSTEM LENGTH: N/A

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, FHWA, USACE, STB, EPA

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM OR PLANNING

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

The TTC-35 Tier One Draft Environmental Impact Statement (DEIS) sought to identify a preferred multimodal corridor, generally paralleling existing I-35 that will improve the international, interstate and intrastate movement of goods and people; address the anticipated transportation needs of Texas from the Texas/Oklahoma state line to the Texas/Mexico border and/or the Texas Gulf Coast along the I-35 corridor for the next 20 to 50 years; and, sustain and enhance the economic vitality of the State of Texas. The study examined 12 corridor alternatives (ranging from 4 to 18 miles wide) and a no-action alternative, and selected a Preferred Alternative (RCA 5), which would serve as the initial study area for subsequent Tier Two environmental processes of potential alignments for TTC-35 facility(ies), should the selection be finalized in FEIS and ROD by FHWA. Currently, Tier One FEIS is under review by FHWA.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: COMPREHENSIVE LAND USE PLANNING OPTIONS FOR TTC-35 (DRAFT)
AUTHOR/SPONSOR: TXDOT – TEXAS TURNPIKE AUTHORITY DIVISION
SUBJECT: LONG-RANGE LAND USE AND COMMUNITY PLANNING IMPLICATIONS OF TTC-35
DATE: OCTOBER 24, 2005

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL
IMPROVEMENT COST: N/A
SYSTEM LIMITS: N/A
SYSTEM LENGTH: N/A
NEW SYSTEM: N/A **TRACK TYPE:** N/A
STAKEHOLDERS: TXDOT, LOCAL GOVERNMENTS/COMMUNITIES ALONG I-35 CORRIDOR

FUNDING APPROACH SUPPORTED: PLANNING
FINANCIAL PLAN INCLUDED? NO
FINANCIAL PLAN COMMENTS: N/A

SUMMARY

Report provides high-level discussion of historical impacts and interactions between land use and transportation infrastructure and the potential impact of a TTC-35 facility on local land use and communities. Includes case study of Interstate 69 development in Indiana as model for integrating and coordinating major transportation infrastructure investments and future development patterns. [Note: report is marked "Draft and Preliminary" and "Confidential"]

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: FREIGHT RAIL FEASIBILITY STUDY – SH 130 SEGMENTS 2 - 5

AUTHOR/SPONSOR: TXDOT – TEXAS TURNPIKE AUTHORITY DIVISION AND MULTIMODAL SECTION

SUBJECT: FEASIBILITY OF INCLUDING FREIGHT RAIL MOVEMENTS IN THE SH 130 SEGMENTS 2 – 5 CORRIDOR

DATE: OCTOBER 21, 2005

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: RANGING FROM $583M TO $631M (5 ALTERNATIVES)

SYSTEM LIMITS: SH-130 SEGMENTS 2 TO 5

SYSTEM LENGTH: 59 MILES

NEW SYSTEM: YES **TRACK TYPE:** DEDICATED

STAKEHOLDERS: TXDOT, UP

FUNDING APPROACH SUPPORTED: PROJECT OR CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: GENERALIZED COST ESTIMATES PROVIDED FOR 5 ALTERNATIVE SCENARIOS PROVIDED

SUMMARY

The report evaluated various options for including freight rail traffic adjacent to proposed SH 130 Segment 2 through Segment 5. A conceptual analysis reviewing five alternatives was conducted, each of which assumed a grade-separated alignment throughout the rail corridor. Study determined that Alternative 3 would be the most desirable route by Class I Freight Railroad.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TEXAS RAIL SYSTEM PLAN

AUTHOR/SPONSOR: TXDOT – TRANSPORTATION PLANNING AND PROGRAMMING DIVISION

SUBJECT: ANALYSIS OF STATEWIDE RAIL SYSTEM IN TEXAS AND FUTURE INFRASTRUCTURE/CAPACITY NEEDS

DATE: OCTOBER 2005

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL AND GULF COAST

IMPROVEMENT COST: ESTIMATED COSTS PROVIDED FOR SPECIFIC POTENTIAL FREIGHT AND PASSENGER RAIL IMPROVEMENT PROJECTS (SECTIONS 5.5-5.7)

SYSTEM LIMITS: TEXAS STATEWIDE RAIL SYSTEM

SYSTEM LENGTH: N/A

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, RAILROADS, PORTS

FUNDING APPROACH SUPPORTED: CORRIDOR

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: INCLUDES PRELIMINARY COST ESTIMATES FOR POTENTIAL FREIGHT AND PASSENGER RAIL IMPROVEMENT PROJECTS; HIGH-LEVEL DISCUSSION OF POTENTIAL RAIL FUNDING SOURCES (LOCAL/STATE/FEDERAL)

SUMMARY

The Texas Rail System Plan (TRSP) was initiated in response to the increasing involvement by the state of Texas in freight and passenger rail issues, and to provide a baseline analysis of the current rail system in Texas. Specific purposes of the TRSP will be to:

- Implement statewide rail transportation elements of TxDOT's annual operating budget;
- Provide documentation of the Texas rail planning process to various branches of the Federal DOT when national resources are sought for Texas rail projects;
- Serve to help identify transportation public-private-partnership opportunities; and
- Assist transportation planners in understanding the railroad system's role in moving people and goods, and the impact it has on the transportation system as a whole.

In addition, the TRSP includes:

- Background information on the Texas rail system, TxDOT's rail planning process and objectives, and program delivery methods for freight and passenger rail improvements;
- In-depth analysis of state freight rail issues and infrastructure needs;
- Overview of Texas' passenger rail systems, describing current and proposed intercity and commuter rail services, and their connectivity with light rail operations;
- Description of the state rail safety issues;
- Description of studies and proposed project around the state with potential to improve both the Texas rail system and the overall transportation system;
- Identification of potential funding sources available for rail improvements.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: DEVELOPMENT OF THE RAIL COMPONENT OF TTC-35 (DRAFT)

AUTHOR/SPONSOR: TXDOT – TTA

SUBJECT: WORKPLAN AND STRATEGIES RELATED TO DEVELOPMENT AND IMPLEMENTATION OF A TTC-35 RAIL FACILITY

DATE: JULY 14, 2005

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: N/A

SYSTEM LENGTH: N/A

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, RAILROADS

FUNDING APPROACH SUPPORTED: NONE

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This document appears to be high-level discussion of strategies related to data collection, freight traffic, and alternative screening for a TTC-35 rail facility. Additionally, Appendix B includes strategic tactics for "dealing with the railroads."

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: CENTRAL TEXAS RAIL NETWORK – DUE-DILIGENCE AND ALTERNATIVE ANALYSIS

AUTHOR/SPONSOR: TXDOT – TURNPIKE AUTHORITY DIVISION (ITC-35 CET)

SUBJECT: COMPREHENSIVE DUE-DILIGENCE ANALYSIS OF UP'S STUDY DOCUMENT "AUSTIN CORRIDOR RELOCATION (SH130) PRELIMINARY DESIGN SUMMARY"

DATE: DECEMBER 5, 2004

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: ~$1.1B

SYSTEM LIMITS: SEGUIN TO SOUTH OF SAN ANTONIO

SYSTEM LENGTH: [LENGTH IN MILES]

NEW SYSTEM: YES, RELOCATION OF EXISTING SERVICE **TRACK TYPE:** DEDICATED FREIGHT

STAKEHOLDERS: UNION PACIFIC RR, TXDOT

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: Several cost estimates are included for the various alternatives

SUMMARY

This study was performed prior to the Central Texas Rail Relocation Feasibility Study (April 2007). The main purpose of this report was to perform a comprehensive due-diligence analysis of the UP report "Austin Corridor Relocation (SH 130) Preliminary Design Summary" dated February 2004. The study analyzed various alternatives for re-routing train traffic between Austin/Taylor and San Antonio, west of IH-35. The study concluded that there were expensive, but potentially feasible alternatives available to allow for the diversion of freight rail traffic outside of the urban areas.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: AUSTIN-SAN ANTONIO COMMUTER RAIL PROJECT 2004 FEASIBILITY STUDY UPDATE

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT

SUBJECT: POTENTIAL COMMUTER RAIL LINE BETWEEN AUSTIN AND SAN ANTONIO

DATE: 2004

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: $394M INTERIM AND $608M ULTIMATE ($2004)

SYSTEM LIMITS: GEORGETOWN TO SOUTH SAN ANTONIO

SYSTEM LENGTH: 110 MILES

NEW SYSTEM: YES **TRACK TYPE:** MOSTLY DEDICATED, SOME SHARED WITH LOCAL FREIGHT

STAKEHOLDERS: UNION PACIFIC, CITY OF SAN ANTONIO, CAMPO, CITY OF AUSTIN, BEXAR AND TRAVIS COUNTIES, CAPITAL METRO, ARTS, CARTS, VIA SAN ANTONIO

FUNDING APPROACH SUPPORTED: PROJECT OR CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: Financial plan appears to be one of the next tasks for the project.

SUMMARY

The Austin – San Antonio Commuter Rail Study published in 1999, is comprised two volumes: the Feasibility Report and the Final Report. This 2004 Feasibility Study Update is an update of the 1999 Feasibility Report document only. The project is anticipating using the MoKan corridor from Georgetown to Round Rock and the Union Pacific corridor from Round Rock to San Antonio to provide intercity commuter rail between Austin and San Antonio.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: FREIGHT RAIL FEASIBILITY STUDY SH130 – SEGMENT 6 (DRAFT)

AUTHOR/SPONSOR: TXDOT – TURNPIKE AUTHORITY DIVISION AND MULTIMODAL SECTION

SUBJECT: FEASIBILITY OF INCLUDING FREIGHT RAIL TRAFFIC WITHIN THE PROPOSED SH 130 SEGMENT 6 CORRIDOR

DATE: JULY 29, 2004

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: ULTIMATE COST RANGING FROM $368M - $417M ($????)

SYSTEM LIMITS: SH130 SEGMENT 6 – LOCKHART TO SEGUIN

SYSTEM LENGTH: 24 MILES

NEW SYSTEM: YES **TRACK TYPE:** DEDICATED (RELOCATION OF UP)

STAKEHOLDERS: TXDOT, UP

FUNDING APPROACH SUPPORTED: PROJECT OR CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

The report assesses the feasibility of including freight rail traffic within the proposed SH 130 Segment 6 Corridor, and attempts to identify scenarios that would be compatible with relocating UP's through-freight away from the Austin Subdivision route, which runs from San Marcos through Austin to Taylor. The report evaluates and compares several alternatives and identifies a recommended alternative as the most desirable (e.g., rail-friendly) and most likely to be supported by Union Pacific. [Note: report marked Draft]

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TTC AUSTIN RAIL REROUTE

AUTHOR/SPONSOR: TXDOT – TEXAS TURNPIKE AUTHORITY (TTC-35 CET) [DRAFT]

SUBJECT: EXAMINATION OF SEVERAL RE-ROUTE OPTIONS FOR THROUGH-FREIGHT TRAFFIC TRAVELING IN AUSTIN (AUSTIN RAIL BYPASS STUDY)

DATE: DECEMBER 12, 2003

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: ULTIMATE COST RANGING FROM $484.8M TO $893.5M ($????)

SYSTEM LIMITS: AUSTIN RAIL BYPASS ALTERNATIVES

SYSTEM LENGTH: ALTERNATIVES RANGING FROM 77.3 MILES TO 189.7 MILES IN LENGTH

NEW SYSTEM: YES **TRACK TYPE:** DEDICATED AND SHARED OPTIONS (UP)

STAKEHOLDERS: TXDOT, UP

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: COST ESTIMATES PROVIDED FOR EACH ALTERNATIVE

SUMMARY

This report examines 4 alternate scenarios for relocating through-freight traffic away from the existing UP corridor, bypassing the Austin metropolitan area. Report provides generalized cost estimates for implementation of each alternative. Report does not deal with connectivity and interchange requirements. Report cites further analysis necessary to identify connection options for access to and from shortline operations and for the BNSF.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: AUSTIN CORRIDOR RELOCATION (SH 130) PRELIMINARY DESIGN SUMMARY

AUTHOR/SPONSOR: UNION PACIFIC RAILROAD

SUBJECT: RELOCATING UP RAILROAD AROUND AUSTIN

DATE: DECEMBER 11, 2003

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: $478M ($2004)

SYSTEM LIMITS: TAYLOR TO SAN MARCOS

SYSTEM LENGTH: 77 MILES

NEW SYSTEM: NO, RELOCATION **TRACK TYPE:** N/A – RELOCATION OF UP LINE

STAKEHOLDERS: UNION PACIFIC

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: n/a

SUMMARY

This report is a very high level and what appears to be rough estimate on relocating existing Union Pacific Railroad tracks around Austin. There is very little narrative provided to explain the analysis.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: I-35 TRADE CORRIDOR STUDY

AUTHOR/SPONSOR: FHWA, 6 STATE DOT'S (TX, OK, KS, MI, IO, MN)

SUBJECT: COORDINATED TRANSPORTATION PLANNING, INVESTMENT ANALYSIS, AND STRATEGY DOCUMENT FOR I-35 CORRIDOR FROM LAREDO, TX TO DULUTH, MINNESOTA

DATE: 1999

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: TRADE FOCUS STRATEGY – ULTIMATE COST $10.9B ($1996)

SYSTEM LIMITS: I-35 FROM LAREDO, TX TO DULUTH, MINNESOTA

SYSTEM LENGTH: 1,568 MILES

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: FHWA, 6 STATE DOT'S

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: COST ESTIMATES INCLUDED

SUMMARY

The study sought to assess the need for improved local, intrastate, interstate, and international service on I-35 (from Laredo, TX to Duluth, MN) and clearly define a general feasible improvement plan to assess those needs to the year 2025. The study was conceptually broken down into the following steps:

- Existing conditions and planned improvements
- Public involvement
- Current and future travel demand
- Evaluate adequacy of existing facilities and institutional arrangements
- Potential corridor strategies – emerging technologies
- Potential corridor strategies – innovative financing
- Identify investment strategy options
- Evaluate investment strategies
- Recommended corridor investment strategy

The recommended investment strategy (the "Trade Focus Strategy") included a combination of several alternatives, including a partial NAFTA Truckway between DFW and Laredo; relief routes and/or double-decking I-35 where deficiencies exist; comprehensive ITS for commercial vehicles and in urban areas; and other strategies such as increased transit, TDM, and land-use planning efforts.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: HIGH SPEED RAIL IN THE REAR VIEW MIRROR: A FINAL REPORT OF THE TEXAS HIGH-SPEED RAIL AUTHORITY

AUTHOR/SPONSOR: MARK BURNS
TEXAS HIGH SPEED RAIL AUTHORITY

SUBJECT: OVERVIEW OF THE WORK PERFORMED BY THE TEXAS HIGH SPEED RAIL AUTHORITY IN THE LATE 1980S AND EARLY 1990S REGARDING HIGH SPEED RAIL

DATE: 1995

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL
IMPROVEMENT COST: N/A
SYSTEM LIMITS: SAN ANTONIO, AUSTIN, DFW, HOUSTON
SYSTEM LENGTH: N/A
NEW SYSTEM: N/A **TRACK TYPE:** N/A
STAKEHOLDERS: TXDOT, PRIVATE DEVELOPERS

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM
FINANCIAL PLAN INCLUDED? NO
FINANCIAL PLAN COMMENTS:

SUMMARY

This report is a complete history of the work performed on high speed rail in Texas to 1995. It includes a discussion of the work performed by the Texas TGV and the TTA in determining feasible HSR alternatives. It also discusses the highlights and shortcomings of the plans, lessons learned, and provides recommendations for future HSR initiatives.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TEXAS TRIANGLE HIGH SPEED RAIL STUDY (EXEC. SUMMARY AND FULL REPORT)

AUTHOR/SPONSOR: LICHLITER/JAMESON & ASSOC. WITH VARIOUS OTHER CONSULTANTS
TEXAS TURNPIKE AUTHORITY

SUBJECT: HIGH SPEED PASSENGER RAIL FEASIBILITY BETWEEN SAN ANTONIO, AUSTIN, DFW, AND HOUSTON

DATE: FEBRUARY 1989

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL AND GULF COAST

IMPROVEMENT COST: $4.3B TO $5.1B ($1988)

SYSTEM LIMITS: SAN ANTONIO, AUSTIN, DFW, HOUSTON

SYSTEM LENGTH: 618 TO 686 MILES

NEW SYSTEM: NEW AND EXIST. WERE CONSIDERED, NEW SYSTEM WAS RECOMMENDED
TRACK TYPE: DEDICATED

STAKEHOLDERS: TTA, STATE LEGISLATORS, CITY GOVERNMENTS

FUNDING APPROACH SUPPORTED: PROJECT OR CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? YES

FINANCIAL PLAN COMMENTS: Financial plan extends from 1991 to 2031

SUMMARY

The study was very comprehensive and concluded that a high speed rail system in Texas is an economically sound project. Public-Private-Partnerships are envisioned to be necessary for implementation of the plan. The study notes the following benefits of creation of the HSR system:

- Creation of new jobs
  - 111,000 person years of employment for initial construction
  - 9,000 permanent jobs during operations
- Growth in industry and tourism
  - $560m in expenditures, $180m in earnings, 10,000 new jobs by 2015
- Tax revenues = $28m in 1998 increasing to $52m in 2015

Three high speed rail technologies were analyzed: HSR (80–125 mph); Very HSR (125-200 mph); and Ultra HSR (over 200 mph). The recommended system would utilize Very HSR. The study resulted in the following recommendations:

- The Legislature enact necessary legislation to recognize the importance of HSR
- The Legislature designate TTA as the interim executing agency for HSR until a HSR authority is created
- The Legislature appropriate funding for the planning, and management of HSR
- The staged development of a Very HSR system on a dedicated independent alignment

This report is supported by a collection of technical memorandums which describe the processes and procedures used to compile the data and results for this study. [See separate summary sheet]

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TEXAS TRIANGLE HIGH SPEED RAIL STUDY TECHNICAL MEMORANDUMS

AUTHOR/SPONSOR: TEXAS TURNPIKE AUTHORITY

SUBJECT: TEXAS TRIANGLE HIGH SPEED RAIL FEASIBILITY

DATE: FEBRUARY 1989

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL AND GULF COAST

IMPROVEMENT COST: N/A

SYSTEM LIMITS: DFW, AUSTIN, SAN ANTONIO, HOUSTON

SYSTEM LENGTH: N/A

NEW SYSTEM: YES **TRACK TYPE:** DEDICATED AND SHARED (UNION PACIFIC, SOUTHERN PACIFIC, BNSF, MISSOURI-KANSAS-TEXAS SYSTEM

STAKEHOLDERS: TTA, STATE LEGISLATORS, CITY GOVERNMENTS

FUNDING APPROACH SUPPORTED: PROJECT OR CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? YES

FINANCIAL PLAN COMMENTS: Mainly focused on revenues. Does not provide a year-by-year outlay.

SUMMARY

The report is a compilation of working papers prepared on various subjects in support of the Texas Triangle High Speed Rail Feasibility Study sponsored by the TTA in the late 1980s. Memoranda pertaining to the following subjects are included:

- Travel survey procedure manuals
- Travel Demand Methodology
- Technology Evaluation Criteria and Weight
- Economic condition, outlook, and linkages in Texas Major urban areas
- Inventory – Rail facilities and operations
- Review of HSR Studies and Existing systems
- Criteria for generic classes of HSR technology
- Conceptual engineering
- Use of highway medians for HSR systems
- Review of German HSR study reports
- Capital and O&M costs
- Ridership and revenue forecast for Texas HSR
- Evaluation of alternative LOS and rail tech.
- Environmental regulations and impacts
- Financial Analysis
- Economic Impacts
- Analysis of current state legislation
- Implementation plan and schedules
- Marketing Strategy

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TEXAS HIGH SPEED RAIL TECHNICAL REPORT – FEASIBILITY STUDY 1987

AUTHOR/SPONSOR: TEXAS TURNPIKE AUTHORITY (THE GERMAN HIGH SPEED CONSORTIUM)

SUBJECT: TECHNICAL FEASIBILITY STUDY FOR HIGH SPEED RAIL IN TEXAS

DATE: FEBRUARY 1987

NATIONAL HSR CORRIDOR SUPPORTED: GULF COAST AND SOUTH CENTRAL

IMPROVEMENT COST: ULTIMATE COST $1.73 B – $1.79 B ($1986)

SYSTEM LIMITS: FROM DOWNTOWN HOUSTON NORTH TO DALLAS AND FORT WORTH

SYSTEM LENGTH: 273 MILES

NEW SYSTEM: YES **TRACK TYPE:** DEDICATED

STAKEHOLDERS: TEXAS TURNPIKE AUTHORITY, GERMAN HIGH SPEED CONSORTIUM, RAILROADS

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? YES

FINANCIAL PLAN COMMENTS: INCLUDES RIDERSHIP AND FAREBOX REVENUE FORECASTS AND CAPTIAL COST ESTIMATES

SUMMARY

Report is high-level feasibility study related to HSR in Texas and sets forth capital cost estimates for and the revenue potential of the initial link of a high-speed intercity rail system, which would provide service between Houston, Dallas, and Fort Worth. The report includes generalized descriptions of HSR technology, safety, ridership, cost, system characteristics and operations.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: ENHANCING INTERMODAL SERVICE THROUGH PUBLIC-PRIVATE PARTNERSHIPS IN TEXAS

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE
TEXAS DEPARTMENT OF TRANSPORTATION

SUBJECT: IMPROVING INTERMODAL SERVICES IN TEXAS

DATE: OCTOBER 2003

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: $100 MILLION (2003$) FOR BNSF HOUSTON TO DALLAS; $279 MILLION (2003$) FOR UP LAREDO TO DALLAS

SYSTEM LIMITS: WITHIN TEXAS STATE

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** DEDICATED

STAKEHOLDERS: TEXAS RAILROAD COMMISSION, BURLINGTON NORTHERN SANTA FE, UNION PACIFIC, KANSAS CITY SOUTHERN

FUNDING APPROACH SUPPORTED: PROJECT OR CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This study examines the current intermodal system and tries to come up with strategies to try to implement new improvements and enhancements. This study advocates the use of public-private partnerships, like that of a government agency partnering with a private rail company such as Union Pacific, to improve certain corridors within the state of Texas. The study examines the needs and services of intermodal freight as well as examining the needs of various rail corridors around the state of Texas. The study aims to seek mutually beneficial solutions for both the public sector and the private sectors of the Texas railroad industry.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: IMPORTANCE OF SHORT LINE RAILROADS TO TEXAS

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SUBJECT: SHORT LINE RAILROADS IN TEXAS

DATE: OCTOBER 2006

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: WITHIN TEXAS STATE

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** SHARED BY DIFFERENT RAILROAD COMPANIES

STAKEHOLDERS: TEXAS RAILROAD COMMISSION, SHORT LINE RAILROAD COMPANIES

FUNDING APPROACH SUPPORTED: PROJECT PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

With 41 railroads operating on more than 2,600 miles of track, short line railroads currently consist of 20 percent of Texas's state rail infrastructure. The big rail companies such as BNSF operate on the Class I railroads which then spin off into the short line railroads, and now it seems like the role that short line railroads play in the state's rail infrastructure will increase as some of the Class I railroads become more and more unprofitable. This study examines the current role that short line railroads play within Texas's rail infrastructure, while also contrasting it with other classes of railroads such as Class I. This study also examines the challenges that the short line railroads face before taking a look at their feasibility and public perception.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TEXAS RURAL RAIL TRANSPORTATION DISTRICTS: SUMMARY REPORT
CHARACTERISTICS AND CASE STUDIES
GIS INFORMATION MANUAL
INFORMATIONAL GUIDEBOOK FOR FORMATION AND EVALUATION
NEW ROLES AND RELATIONSHIPS

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE
TEXAS DEPARTMENT OF TRANSPORTATION

SUBJECT: TEXAS RURAL RAIL TRANSPORTATION DISTRICTS

DATE: JULY 2003

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: WITHIN STATE OF TEXAS

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** SHARED

STAKEHOLDERS: TEXAS RAILROAD COMMISSION, RAILROAD COMPANIES THAT OPERATE RURAL RAIL

FUNDING APPROACH SUPPORTED: PROJECT PLAN

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This was a 2 year study undertaken to better understand rural rail districts and the role they play within the state rail infrastructure of Texas. In the first year, case studies were done to examine the various existing Rural Rail Transportation Districts (RRTD) in the state, how and why they were formed, and what their current statuses are now. Year 2 of the study examines the various challenges and issues that exist currently for the RRTDs and seeks to make recommendations for improvement of these issues.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: PROTECTING AND PRESERVING RAIL CORRIDORS AGAINST ENCROACHMENT OF INCOMPATIBLE USES

AUTHOR/SPONSOR: CENTER OF TRANSPORTATION RESEARCH
THE UNIVERSITY OF TEXAS AT AUSTIN
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER
TEXAS TRANSPORTATION INSTITUTE

SUBJECT: RAIL CORRIDOR PRESERVATION IN TEXAS

DATE: 2008

NATIONAL HSR CORRIDOR SUPPORTED: NONE SPECIFICALLY MENTIONED

IMPROVEMENT COST: $161 MILLION FOR UPGRADE, 265 MILLION FOR RELOCATION

SYSTEM LIMITS: TEXAS CURRENT EXISTING RAIL CORRIDORS

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** SHARED

STAKEHOLDERS: TEXAS RAILROAD COMMISSION AND VARIOUS COMPANIES THAT OWN RIGHT OF WAYS

FUNDING APPROACH SUPPORTED: CORRIDOR PLAN

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This study examines how to best preserve the various rail corridors within the state of Texas and upkeep them so that they could still be used and reused. It looks at corridor planning and preservation with mitigation against encroachment and also looks at other states to see how it's implemented. The study also pays special attention to cases so that the rail tracks can host both passenger and freight rail together while also reviewing the costs of the projects.

HIGH SPEED RAIL – DOCUMENT SUMMARY

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

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SUBJECT: ANALYSIS OF THE VIABILITY OF IMPLEMENTING HIGH-SPEED PASSENGER RAIL IN TEXAS

DATE: 2004

NATIONAL HSR CORRIDOR SUPPORTED: N/A

IMPROVEMENT COST: N/A

SYSTEM LIMITS: N/A

SYSTEM LENGTH: N/A

NEW SYSTEM: HSR **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, RAILROADS

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: A METHODOLOGY TO EVALUATE FUTURE FINANCIAL PLANS INCLUDED

SUMMARY

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

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: FINANCIAL FEASIBILITY OF MAGLEV SYSTEMS IN TEXAS

AUTHOR/SPONSOR: UNIVERSITY OF TEXAS, ARLINGTON
TEXAS DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SUBJECT: ANALYSIS OF THE VIABILITY OF MAGNETIC LEVITATION HIGH SPEED TRAIN SYSTEMS IS EVALUATED FOR THE I35 CORRIDOR

DATE: 2004

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST: N/A

SYSTEM LIMITS:

SYSTEM LENGTH: APPROX. 435 MILES (LAREDO TO DFW)

NEW SYSTEM: YES **TRACK TYPE:** DEDICATED

STAKEHOLDERS: TXDOT, RAILROADS

FUNDING APPROACH SUPPORTED: CORRIDOR

FINANCIAL PLAN INCLUDED? A SURVEY OF FINANCIAL ALTERNATIVES IS PRESENTED

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

A brief description of different modes possible in the proposed TransTexas Corridor (TTC) is initiated. The main modal alternatives, which include highway, high speed rail, and maglev are discussed in detail. Alternatives for financing the TTC infrastructure are discussed. A detailed financial feasibility of a maglev system along a hypothetical corridor between Dallas-Fort Worth (DFW) and San Antonio is conducted for different cost and ridership assumptions. Conclusions are provided regarding viable financing options for building and operating a maglev system along the TTC.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: RAIL RELOCATION PROJECTS IN THE U.S.: CASE STUDIES AND LESSONS FOR TEXAS RAIL PLANNING

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE
TEXAS DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SUBJECT: DETERMINE, THROUGH COMPARATIVE CASE STUDY ANALYSIS, THE LESSONS TO BE LEARNT ABOUT OTHER RAIL RELOCATIONS

DATE: 2007

NATIONAL HSR CORRIDOR SUPPORTED: N/A

IMPROVEMENT COST: N/A

SYSTEM LIMITS: N/A

SYSTEM LENGTH: N/A

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? N/A

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

Freight transportation is a major component of the transportation activity in metropolitan areas of Texas where both highway and rail routes converge. Traffic conflicts in urban areas are especially acute in areas surrounding urban rail facilities. Rail operations are also greatly hindered in urban rail facilities, which are often surrounded by incompatible land-use activities. One approach to addressing urban vehicle-rail conflicts and urban rail operations issues is to consider the relocation of train operations to new rail corridors located outside urban boundaries.

This project examines rail relocation projects in the United States to determine best practices, document project costs and expected benefits, and develop recommended policies for Texas Department of Transportation (TxDOT) use in assessing potential urban rail relocation projects throughout the state. Case studies deliver information on a broad variety of issues to be considered in railroad relocation projects including example project costs, impacts upon urban and outlying communities, potential funding mechanisms, and how potential rail relocation projects may be integrated with planning for other transportation improvements.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: INTERNATIONAL RAIL FREIGHT TRANSPORTATION IN SOUTH TEXAS: DECREASING FUEL CONSUMPTION, ROADWAY DAMAGE, AND HAZARDOUS MATERIALS MOVEMENT ON TEXAS ROADWAYS

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE
SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

SUBJECT: ANALYSIS OF THE CHALLENGES TO OVERCOME WHEN INCREASING MULTIMODAL TRANSPORTATION

DATE: 1995(?)

NATIONAL HSR CORRIDOR SUPPORTED: N/A

IMPROVEMENT COST: N/A

SYSTEM LIMITS: N/A

SYSTEM LENGTH: N/A

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, RAILROADS

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? N/A

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

The objectives of this research were to examine impediments to the greater use of rail in freight transportation, and to document projected reduction in congestion, roadway damage, hazards, and energy usage resulting from such a modal shift. In pursuing these objectives, an examination was made of the roles that are performed by decision-making agencies at the federal, state, and local levels.

The findings of this examination are discussed in terms of how these roles interfere with the adoption of increased use of intermodal transportation. Additionally, the logistics associated with cross-border freight transportation are described, documenting the institutional and governmental inefficiencies hindering smooth flow of trade across the border. The balance of the research concerns itself with the potential of rail transportation to mitigate the negative impacts associated with truck transportation.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: POTENTIAL DEVELOPMENT OF AN INTERCITY PASSENGER TRANSIT SYSTEM IN TEXAS (REPORT ON TASKS 1-5)

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE
TXDOT
FEDERAL HIGHWAY ADMINISTRATION

SUBJECT: ANALYSIS OF DIFFERENT CORRIDOR OPTIONS APPLICABLE TO DIFFERENT REGIONS IN TEXAS TO IMPLEMENT A TRANSIT SYSTEM IN THE TEXAS TRIANGLE

DATE: N/A – IN PROGRESS

NATIONAL HSR CORRIDOR SUPPORTED: N/A

IMPROVEMENT COST: N/A

SYSTEM LIMITS: N/A

SYSTEM LENGTH: DEPENDS ON EACH PRESENTED CORRIDOR

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, RAILROADS, TRANSIT AGENCIES

FUNDING APPROACH SUPPORTED: PLANNING / CORRIDOR APPROACH

FINANCIAL PLAN INCLUDED? N/A

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

Rather than focus on any regional commuter or light rail systems within or radiating from individual urban areas, this project aims to determine which longer intercity and interregional corridors are most likely to need additional intercity travel capacity in the coming decades. Using these tools, the state of Texas could determine in which corridors to most appropriately invest its resources to connect different regions of the state to create an interregional, statewide transit system. The underlying analysis is based upon several factors related to:

- Current and future population and demographic projections along 18 intercity corridors in the state;
- Projected future demand based upon forecasts by the Texas State Demographer and other state agencies; and
- Current network capacity and routes for intercity highway, bus, air and rail travel.

The concept plan produced in Task 5 will be further explored in the remaining months of the project to determine potential costs and benefits of implementing the concept plan or individual components.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: INDEPENDENT RIDERSHIP AND PASSENGER REVENUE PROJECTIONS FOR TEXAS TGV CORPORATION HIGH SPEED RAIL SYSTEM IN TEXAS

AUTHOR/SPONSOR: TEXAS TGV CORPORATION
CHARLES RIVER ASSOCIATES INCORPORATED

SUBJECT: RIDERSHIP FORECASTS FOR HIGH SPEED RAIL CORRIDORS IN TEXAS

DATE: 1993

NATIONAL HSR CORRIDOR SUPPORTED: TEXAS TRIANGLE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: N/A

SYSTEM LENGTH: TEXAS TRIANGLE

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, PRIVATE DEVELOPERS

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? N/A

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This study presents projections for providing high speed rail service between the major Texas of Houston, Dallas-Fort Worth (DFW), Austin and San Antonio. The report presents independent forecasts of ridership and passenger revenue through five scenarios involving the potential services:

- Service DFW International Airport to provide connecting service for passengers on American Airlines and Delta Airlines within the Texas Triangle
- Service on two different alignments within the Texas Triangle: the "Modified Application" (Triangle) alignment and the "Corporation Preferred" (T-Bone) alignment.
- Service to Waco and Bryan/College Station

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: EAST TEXAS FREIGHT STUDY

AUTHOR/SPONSOR: TXDOT

SUBJECT: FREIGHT STUDY FOR PARIS, ATLANTA, TYLER, LUFKIN & DALLAS DISTRICTS IN TEXAS

DATE: ?

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST: N/A

SYSTEM LIMITS: N/A

SYSTEM LENGTH: N/A

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: TXDOT, RAILROADS

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? YES

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This report is the beginning of an analysis of the East Texas region's freight network (roads, railroads, and intermodal facilities) and the process of developing ways to accommodate and capitalize on future freight movements. It identifies improvements that may provide relief to residents and the traveling public adversely affected by delays, interruptions, and noise attributed to the movement of freight within the region. It also identifies alternatives that may improve regional freight capacity by enhancing the efficiency and operations of the freight transportation network.

For example, the East Texas Region Freight Study identifies existing and projected truck and freight rail transportation operations, bottlenecks, and constraints with the goal of establishing a slate of potential infrastructure improvements geared toward providing solutions that may resolve the problems associated with rising congestion levels and the expected growth of commodity movements.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: US90A CORRIDOR RAIL FEASIBILITY STUDY

AUTHOR/SPONSOR: HOUSTON-GALVESTON AREA COUNCIL (H-GAC)
EDWARDS AND KELCEY

SUBJECT: FEASIBILITY OF A REGIONAL COMMUTER RAIL SYSTEM

DATE: APRIL, 2004

NATIONAL HSR CORRIDOR SUPPORTED: N/A

IMPROVEMENT COST: N/A

SYSTEM LIMITS: US90A AND US59/SOUTHWEST FREEWAY

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** SHARED

STAKEHOLDERS: H-GAC, TXDOT, RAILROADS

FUNDING APPROACH SUPPORTED: CORRIDOR PROGRAM

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

The US90A Rail Study examined the feasibility of a variety of different types of passenger rail services in an existing rail corridor currently used exclusively for freight rail transportation. This corridor is being examined for possible passenger rail service in response to growing interest for options to automobile travel on the increasingly congested roadways between Houston and Fort Bend County, particularly on major thoroughfares such as US90A and US59/Southwest Freeway.

The study offers five alternatives for the implementation of passenger rail service in that corridor:

- Alternative 1: Commuter Rail – Exclusive Operation
- Alternative 2: Diesel Multiple Unit – Exclusive Operation
- Alternative 3: Light Rail Transit – Exclusive Operation
- Alternative 4: Commuter Rail - Shared Operation
- Alternative 5: Diesel Multiple Unit - Shared Operation

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: THE IMPACT OF MEXICAN RAIL PRIVATIZATION ON THE TEXAS TRANSPORTATION SYSTEM

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE

SUBJECT: (SEE TITLE)

DATE: 2001

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: TEXAS AND MEXICO

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** N/A

STAKEHOLDERS: N/A

FUNDING APPROACH SUPPORTED: PLANNING

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This study examines what are the effects that the privatization of rail in Mexico will have upon the transportation system in Texas. It looks at how the rail crossings of Texas-Mexico are being improved and investigates how that will affect the freight industry in Texas and Mexico as well as the truck industry.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: TEXAS HIGHWAY-RAIL INTERSECTION FIELD REFERENCE GUIDE. FINAL REPORT

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE
TEXAS DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SUBJECT: HIGHWAY-RAIL INTERSECTION

DATE: MAY 1994

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: TEXAS

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** SHARED/DEDICATED

STAKEHOLDERS: TEXAS DEPARTMENT OF TRANSPORTATION, FEDERAL HIGWAY ADMINISTRATION, RAILROAD COMPANIES

FUNDING APPROACH SUPPORTED: N/A

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This is the final report on the study of designing highway and rail intersections. This field guide is designed to help with the design of such intersections, and covers the planning, construction, operation, maintenance, and safety issues that the designing agencies are likely to run into and guides them through such issues.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: INVESTIGATION OF RAIL FACILITIES RELOCATION IN THE U.S. AND POTENTIAL LESSONS FOR TEXAS RAIL PLANNING INITIATIVES

AUTHOR/SPONSOR: TEXAS TRANSPORTATION INSTITUTE
TEXAS DEPARTMENT OF TRANSPORTATION

SUBJECT: RAIL RELOCATION

DATE: AUGUST 2006

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: TEXAS

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** SHARED/DEDICATED

STAKEHOLDERS: TEXAS RAILROAD COMPANIES

FUNDING APPROACH SUPPORTED: PROJECT PLAN

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This study done by TTI studies rail relocation projects in the United States, much like a previous study they did, and suggests lessons that can be learned as Texas prepares to do the same.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: STATE RAIL POLICIES, PLANS, AND PROGRAMS: A REPORT
AUTHOR/SPONSOR: THE UNIVERSITY OF TEXAS AT AUSTIN
SUBJECT: SEE TITLE
DATE: 1997

NATIONAL HSR CORRIDOR SUPPORTED: NONE
IMPROVEMENT COST: N/A
SYSTEM LIMITS: TEXAS
SYSTEM LENGTH: N/A
NEW SYSTEM: NO **TRACK TYPE:** N/A
STAKEHOLDERS: TEXAS STATE GOVERNMENT, TEXAS DEPARTMENT OF TRANSPORTATION

FUNDING APPROACH SUPPORTED: N/A
FINANCIAL PLAN INCLUDED? NO
FINANCIAL PLAN COMMENTS: NO

SUMMARY

This report provides an overview and examination of state rail policies, plans, and programs. Chapter 1 provides a summary of the key findings of the report. Chapter 2 describes the diversity of state involvement in railroad transportation in terms of staffing levels, agency organizational structures, budgets, freight and passenger assistance programs, relationships with the private sector, types of planning activities, and the like. Most of the information contained in the first chapter is drawn from state rail profiles appearing in the appendices. Chapter 3 addresses exemplary state rail freight programs and the manner in which those programs are financed. Similarly, Chapter 4 focuses on exemplary state passenger rail service programs. The final chapter examines the efforts of three states--Florida, Oregon, and Washington--to integrate rail planning into a larger intermodal/multimodal transportation planning process.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: FREIGHT AND HAZARDOUS MATERIALS MOVEMENT STUDY (EXECUTIVE SUMMARY)

AUTHOR/SPONSOR: CORPUS CHRISTI MPO
TXDOT
OLIVARRI & ASSOCIATES, INC.

SUBJECT: RISKS OF HAZMAT, DEVELOPMENT OF NEW FREIGHT INFRASTUCTURE

DATE: 2004

NATIONAL HSR CORRIDOR SUPPORTED: N/A

IMPROVEMENT COST: N/A

SYSTEM LIMITS: CORPUS CHRISTI

SYSTEM LENGTH: N/A

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS: TXDOT, CORPUS CHRISTI MPO

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

The study was conducted in order to assist area decision makers in developing a freight transportation infrastructure that enhances safety, security, efficiency, and economy within the Corpus Christi metropolitan planning area. Funding for the study was provided by the Texas Department of Transportation as part of the regional Texas Metropolitan Mobility Plan project.

While the results do not represent a scientific survey, the individuals and organizations contacted provided a wealth of information about local freight practices and issues. Interviews were conducted with various elected and appointed officials, freight haulers, distributors, shipping agents, emergency responders, transportation officials, manufacturers, representatives of state and national trucking and transport associations, agricultural interests, local businesses and industries, and other freight interests.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: ORIGIN-DESTINATION SURVEY AND MULTIMODAL ASSESSMENT OF THE AUSTIN SAN ANTONIO CORRIDOR

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
TEXAS TRANSPORTATION INSTITUTE

SUBJECT: COMMUTER RAIL

DATE: MARCH 1997

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: AUSTIN-SAN ANTONIO COMMUTER RAIL STUDY (FEASIBILITY & FINAL REPORTS)

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS

SUBJECT: COMMUTER RAIL

DATE: 1999

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

The Austin – San Antonio Commuter Rail Study published in 1999, is comprised two volumes: the Feasibility Report and the Final Report. Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: PUBLIC INVOLVEMENT PLAN

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
PBS&J
CARTER & BURGESS

SUBJECT: COMMUTER RAIL

DATE: FEBRUARY 2004

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: PROGRAM WORK PLAN

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
PBS&J
CARTER & BURGESS

SUBJECT: COMMUTER RAIL

DATE: MARCH 2004

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: STATION DESIGN REPORT, FINAL DRAFT

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS

SUBJECT: COMMUTER RAIL

DATE: MARCH 2006

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: ECONOMIC IMPACT ANALYSIS, PASSENGER RAIL STATION AREAS, EXECUTIVE SUMMARY

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS
CAPITAL MARKET RESEARCH

SUBJECT: COMMUTER RAIL

DATE: APRIL 2006

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: PHASE 2 TRAVEL DEMAND MODEL REPORT

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS
AECOM

SUBJECT: COMMUTER RAIL

DATE: JUNE 2006

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: PHASE 3 TRAVEL DEMAND MODEL REPORT

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS
AECOM

SUBJECT: COMMUTER RAIL

DATE: JUNE 2006

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: 2006 CONCEPTUAL ENGINEERING DESIGN REPORT

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS

SUBJECT: COMMUTER RAIL

DATE: DECEMBER 2006

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: SEAHOLM STATION STUDY

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS

SUBJECT: COMMUTER RAIL

DATE: DECEMBER 2006

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: FINANCIAL AND ECONOMIC BENEFITS STUDY

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS
CAMBRIDGE SYSTEMATICS

SUBJECT: COMMUTER RAIL

DATE: MARCH 2007

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: EXISTING CONDITIONS REPORT

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS

SUBJECT: COMMUTER RAIL

DATE: APRIL 2007

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: ALTERNATIVES ANALYSIS

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS

SUBJECT: COMMUTER RAIL

DATE: DECEMBER 2007

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: REPORT ON RAIL & TRANSIT OPTIONS IN THE SH 130 CORRIDOR, FATAL FLAW ANALYSIS

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CARTER & BURGESS

SUBJECT: COMMUTER RAIL

DATE: SEPTEMBER 2008

NATIONAL HSR CORRIDOR SUPPORTED:

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: PASSENGER RAIL STATION ECONOMIC IMPACT ANALYSIS (EIA)

AUTHOR/SPONSOR: AUSTIN – SAN ANTONIO INTERMUNICIPAL COMMUTER RAIL DISTRICT
CAPITAL MARKET RESEARCH

SUBJECT: COMMUTER RAIL (ANALYSES 15 PRELIMINARY STATION LOCATIONS)

DATE: JUNE 2005 – DECEMBER 2005

NATIONAL HSR CORRIDOR SUPPORTED: SOUTH CENTRAL

IMPROVEMENT COST:

SYSTEM LIMITS:

SYSTEM LENGTH:

NEW SYSTEM: **TRACK TYPE:**

STAKEHOLDERS:

FUNDING APPROACH SUPPORTED: CORRIDOR

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

Abstract requested - summary forthcoming. The 15 preliminary station locations are listed in geographic order, north to south:

- Georgetown Passenger Rail Station Economic Impact Analysis (EIA)
- Round Rock Passenger Rail Station EIA
- McNeil Road Passenger Rail Station EIA (North Travis County)
- Braker Lane Passenger Rail Station EIA (North Austin)
- 35th Street Passenger Rail Station EIA (Central Austin)
- Austin CBD/Seaholm Passenger Rail Station EIA (Downtown Austin)
- Slaughter Lane Passenger Rail Station EIA (South Austin)
- Kyle-Buda Passenger Rail Station EIA
- San Marcos Passenger Rail Station EIA
- New Braunfels Passenger Rail Station EIA
- Schertz-Garden Ridge Passenger Rail Station EIA
- Loop 1604 Passenger Rail Station EIA (Far North San Antonio)
- Loop 410 Passenger Rail Station EIA (North-Central San Antonio)
- San Antonio CBD Passenger Rail Station EIA (Downtown San Antonio)
- Kelly USA Passenger Rail Station EIA (South San Antonio)

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: OFF THE TRACK: RAIL TRANSPORTATION PLANNING IN TEXAS STATE GOVERNMENT

AUTHOR/SPONSOR: UNIVERSITY OF TEXAS AT AUSTIN (LBJ PROFESSIONAL REPORT)
CURTIS, MORGAN

SUBJECT: RAIL PLANNING IN TEXAS (PROCESSES)

DATE: 2001

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: TEXAS

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** N/A

STAKEHOLDERS: N/A

FUNDING APPROACH SUPPORTED: N/A

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

This report studies the current state of rail transportation planning and the processes in the Texas state government. It looks at the rail planning programs & efforts in other states and compares them with the planning efforts within Texas. Additionally it identifies the shortcomings in Texas's structure and presents policy options for improvement.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: RAIL CORRIDOR PROTECTION IN TEXAS: A POLICY RECOMMENDATION

AUTHOR/SPONSOR: THE UNIVERSITY OF TEXAS AT AUSTIN (LBJ PROFESSIONAL REPORT)
LARSON, ERIC

SUBJECT: RAIL CORRIDOR PROTECTION

DATE: 2007

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: TEXAS

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** SHARED/DEDICATED

STAKEHOLDERS: TEXAS

FUNDING APPROACH SUPPORTED: PROJECT PLAN

FINANCIAL PLAN INCLUDED? NO

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

In this professional report, the author examines what is being done in terms of the protection of rail corridors in Texas. The report provides recommendations for the current policies in rail corridor protection in Texas.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: A COMPARISON OF INNER CITY RAIL TRANSPORTATION IN PARIS AND LYON, FRANCE, TO DALLAS, TEXAS, AND PHILADELPHIA, PENNSYLVANIA

AUTHOR/SPONSOR: UNIVERSITY OF TEXAS AT AUSTIN (HONORS THESIS, GEOGRAPHY)
ABDULLAHA, NICOLE

SUBJECT: STREET RAILROADS

DATE: 2002

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: FRANCE, DALLAS, PHILADELPHIA

SYSTEM LENGTH: N/A

NEW SYSTEM: NO **TRACK TYPE:** N/A

STAKEHOLDERS: N/A

FUNDING APPROACH SUPPORTED:

FINANCIAL PLAN INCLUDED?

FINANCIAL PLAN COMMENTS:

SUMMARY

In her senior thesis, the author takes a look at the inner city rail transportation system in Paris and Lyon of France, and attempts to compare them to the systems that of Dallas, Texas and Philadelphia, Pennsylvania within the United States.

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: THE TEXAS HIGH SPEED RAIL ACT OF 1989 AND ITS PROSPECTS FOR IMPLEMENTATION WITHIN THE "TEXAS TRIANGLE"

AUTHOR/SPONSOR: THE UNIVERSITY OF TEXAS AT AUSTIN (LBJ – PROFESSIONAL REPORT)
BALDWIN, EARNEST

SUBJECT: HIGH SPEED RAIL REGULATION

DATE: 1990

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: AUSTIN, TEXAS

SYSTEM LENGTH: N/A

NEW SYSTEM: N/A **TRACK TYPE:** N/A

STAKEHOLDERS: N/A

FUNDING APPROACH SUPPORTED: N/A

FINANCIAL PLAN INCLUDED? N/A

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

The report investigates the prospects for the implementation and evaluation of HSR in the Texas Triangle. The author examines:

- the Texas Triangle area
- the HSR efforts in Europe, Japan and North American experiences
- the events leading to the implementation of enabling regulation for HSR in Texas
- the advantages of the proposed system, its economic consequences, environmental considerations and safety concerns
- the prospects for a successful venture of HSR in major Texas metropolitan areas

HIGH SPEED RAIL – DOCUMENT SUMMARY

TITLE: A HIGH SPEED RAIL REVOLUTION IN THE U.S.? LESSONS FROM THE FRENCH AND THE TEXAS TGV

AUTHOR/SPONSOR: MASSACHUSETTS INSTITUTE OF TECHNOLOGY (SLOAN – PROFESSIONAL REPORT)

NG, HELEN

SUBJECT: HIGH SPEED RAIL

DATE: 1995

NATIONAL HSR CORRIDOR SUPPORTED: NONE

IMPROVEMENT COST: N/A

SYSTEM LIMITS: TEXAS, FRANCE

SYSTEM LENGTH: N/A

NEW SYSTEM: YES **TRACK TYPE:** DEDICATED

STAKEHOLDERS: N/A

FUNDING APPROACH SUPPORTED: N/A

FINANCIAL PLAN INCLUDED? N/A

FINANCIAL PLAN COMMENTS: N/A

SUMMARY

The purpose of the professional report is twofold: to understand the cultural and institutional reasons why high speed rail has flourished in Europe but not in North America and to suggest lesson which may help the U.S. to tailor high speed rail development to its national framework. Specifically the document compares the processes behind the first TGV line in France with the foiled efforts to adopt the same technology in Texas. Its primary approach focuses in the nations' different approaches to public and private financing of high speed rail.

FINANCING PASSENGER RAIL

Source: AP Images, 2005

CENTER FOR TRANSPORTATION RESEARCH

The University of Texas at Austin

September 2009

Contents

Introduction

Rail was originally built through private initiatives and funding: a process characterized by bankruptcy and rail line abandonments (Greengauge, 2006). On the other hand, road infrastructure have been funded from user fees, primarily gas taxes and to a limited extend tolls, general fund receipts, bond issues, and designated property and other taxes.

Ultimate, public sector policy determines the amount of public funding (or subsidy) each transportation mode receives – thereby implicitly or explicitly influencing the role of each transportation mode (Lynch, 1995). The amount of public funding (or subsidy) typically varies among modes, nations, and financial models adopted. However, IPR/HSR is inherently candidates for receiving public funding due to the high upfront costs and considerable risk involved (Lynch, 1995). The Obama Administration has thus called for public investments to develop passenger rail and has accordingly appropriated Federal funding to initiate the improvement and development of a U.S. IPR/HSR network. The Federal Railroad Administration (FRA) – responsible for managing these federal funds - has left it to the states to decide how to implement, improve, and finance IPR/HSR initiatives at the state level. To date, the FRA has published rules applicable to the eligibility requirements of the grantees for these Federal funding. The latter focuses on the stages of progress of the competing projects.

This document delineates various IPR/HSR financing models, provides international examples of how HSR had been financed, and highlights a number of public and private funding sources for the implementation of IPR/HSR in Texas.

IPR/HSR Finance Models

The basic models for financing large infrastructure transportation projects, such as HSR, are public, private, and a combination of public and private funding (i.e., public-private partnerships or PPPs). Given diminishing public resources, the private sector's role in financing and developing a variety of large infrastructure projects have increased worldwide. Typically, the public sector is responsible for obtaining the required permits and regulatory requirements, but the business and commercial risks involved can be shared (see Appendix I for a short description of a number of general contract types that have been applied to transportation).

It is generally agreed that HSR/IPR in the U.S. will be funded through PPPs. PPPs present a unique and flexible solution to supplement government budgets while improving the quality and delivery of public infrastructure and services. The private sector is believed to improve efficiency and to respond more effectively to user demands. At the same time, Governments can leverage government funding for additional projects as private sector capital are used to implement or expand transportation capacity. Figure 1 illustrates various PPP scenarios in terms of responsibility for the development and operation of HSR services.

Table 1: Models for Development and Operation of HSR/IPR

Model type	Models for development and operation: Full concession	Construction finance	Infra PFI/PPP	Operating concession	Infra PPP/hybrid
Civil Infrastructure	Design–build–fund–operate/ maintain concession	Design–Build–Transfer	Traditional procurement by Govt. / Design–build–maintain	Traditional procurement by government	Design–build/supply–maintain
Systems					
Rolling stock		Design–build/supply operate/maintain	Design build/supply–operate/ maintain	Design–build/supply–operate/maintain	
Operations					Operation by government

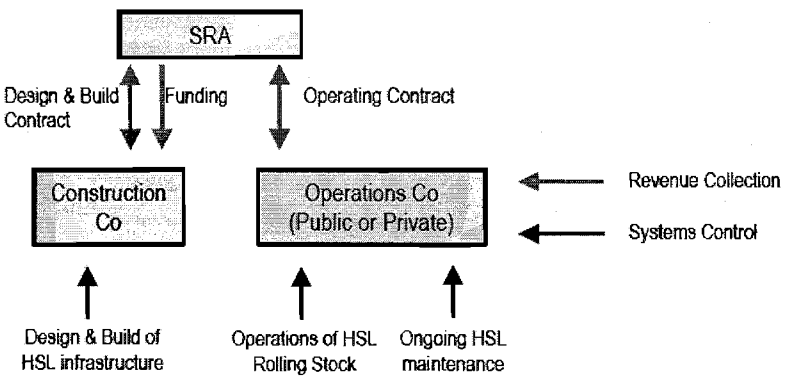
Source: Halcrow, undated

The following sections of the document discuss four potential structures for the financing and implementation of IPR/HSR networks that have been applied successfully in the United Kingdom.

Design & Build with Separation of Operations (DB&O)

The DB&O model represents a traditional structure for the procurement of infrastructure projects with separate contracts for the construction and operations of the HSR/IPR project. Construction risk could be transferred to the private sector under the design & build contract, who could be paid on a milestone basis. However, as payments are made during construction the rail authority will retain an element of construction risk (Ernst & Young, 2003).

The operations component of the project is typically provided by an operator who would be responsible for maintaining the infrastructure in addition to the procurement of the rolling stock, the operation, and maintenance of the rolling stock, and the collection and retention of fare box revenue (Ernst & Young, 2003). The rail authority remains responsible for providing the contractual/ regulatory framework in which the design and build contractor, the maintenance contractor, and the operator interact.



Source: Ernst & Young, 2003

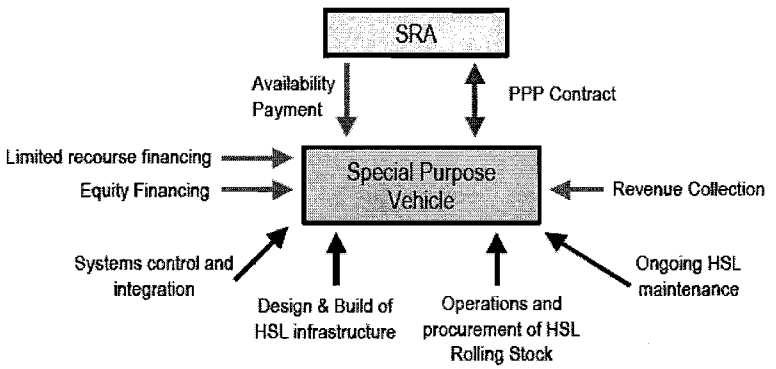
Design, Build, Finance & Operate (DBFO)

The DBFO structure involves a single contract with the private sector to provide the financing for the project in addition to designing, building, maintaining the infrastructure asset, and operating the service. The private sector would typically incur the majority of the risks associated with the project, including revenue risk. The financing of the project is normally

provided by third party debt providers on a limited recourse basis over the construction phase with additional risk or equity capital from the main contractors (Ernst & Young, 2003).

Although full revenue risk may be transferred, it is unlikely that the fare box revenues generated from the project would be sufficient to meet the debt service obligations of the Special Purpose Vehicle (SPV). A fixed fee would therefore be paid by the rail authority to the private sector during the operational phase to cover the funding deficit (Ernst & Young, 2003). This fixed fee could be based on performance to provide the private sector operator with an incentive to provide the desired levels of service.

DBFO is not the most efficient structure if the rail network is to be implemented in phases and if it is desired to have a single operator for the whole network (Ernst & Young, 2003). The latter would require the termination of the DBFO concession, which could involve significant compensation costs to the existing concession company if the contract is breached.

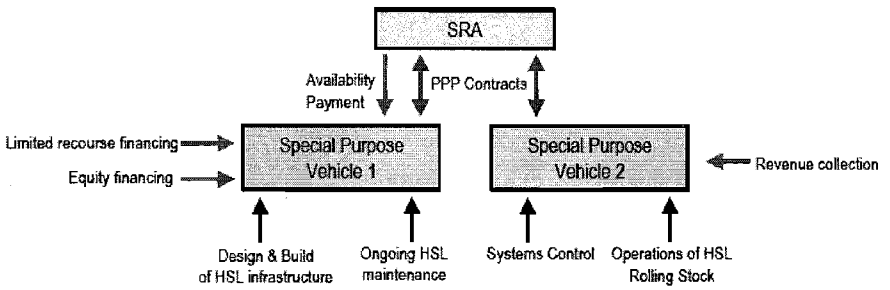


Source: Ernst & Young, 2003

Design, Build, Finance & Maintain with Separation of Operations (DBFM&O)

The DBFM&O structure differs from DBFO in that the operations of the service are contracted separately from the contract for the provision and maintenance of the infrastructure. The infrastructure component can be delivered by through a separate SPV, where the contractor would be paid a fixed fee for the availability of the asset. In addition, performance can be ensured by making abatements to the fee for poor performance. The operational component of the project, including the operation and procurement of the rolling stock and the collection of the revenues, may be contracted to the private sector through a separate SPV (Ernst & Young, 2003).

Assuming a phased development of the IPR/HSR service, this structure is attractive in that phases of infrastructure can be let as separate DBFM concessions, while the existing operator would be allowed to provide services over the extended network.



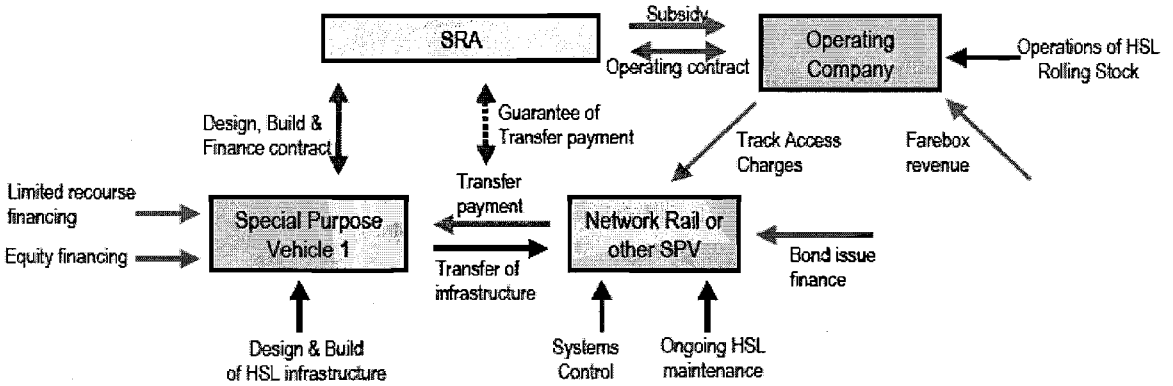
Source: Ernst & Young, 2003

Design, Build, Finance & Transfer with Separation of Operation (DBFT&O)

Under a DBFT&O structure, a SPV would develop the project, procure the financing and construct the HSR infrastructure. Upon completion of the capital works a rail infrastructure owner and operator, such as Network Rail in the UK, (or another party) would be obligated to purchase the asset from the SPV for a predetermined price, subject to the assets meeting certain technical and safety criteria (Ernst & Young, 2003).

Funding for purchasing the HSR infrastructure can be through securitization of the long term track access charges levied by the infrastructure owner to the HSR operating companies, but an additional guarantee from the rail authority may be required. Responsibility for rail operations and infrastructure maintenance remain separate (Ernst & Young, 2003).

DBFT&O could facilitate a phased development of a HSR network as infrastructure is transferred to a "rail infrastructure owner and operator" upon satisfactory completion and commissioning of the asset. A separate operation contract could be entered into with a private sector operator of the IPR/HSR service. The operator would be charged an access fee for use of the asset. The operating company would collect the fare box revenues, but it is anticipated that an operating subsidy would be required from the rail authority (Ernst & Young, 2003).



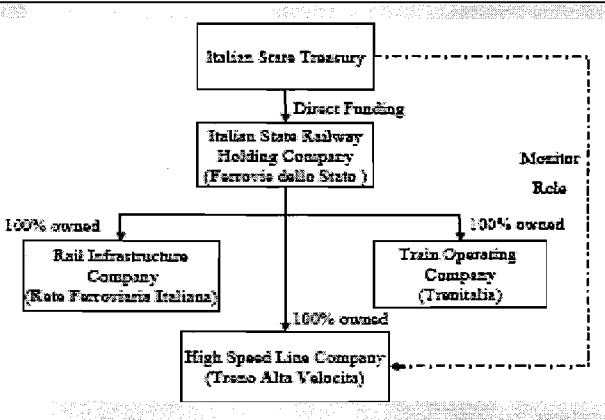
Source: Ernst & Young, 2003

International Financing of HSR Services

The world's first HSR service began commercial operations in Japan in 1964. Since then, several countries have developed HSR using comparable technology (Ernst & Young, 2003). Table 2 provides a number of examples of how international HSR networks were financed. As is evident, in most cases the public sector had a major role in funding the construction of these projects. This is typical of transportation infrastructure projects that require a high initial capital investment and a revenue stream that is not anticipated to cover all costs (GAO, 2009). These projects therefore require substantial government support to proceed (Ernst & Young, 2003).

Table 2: Financing of Selected International HSR Networks

Japan 1964	Before 1987, the construction of HSR in Japan was funded through debt incurred by the national government and Japan National Railways (JNR) – although the World Bank contributed a minor percentage of the funding. Following the successful introduction of this system, the Japan Railway Construction Public Corporation (JRCC) was established to procure future HSR services on behalf of the state. Historically, the funding model for the development of the Japanese HSR network was thus to use JNR funds provided by the Japanese state. After 1987, following privatization, the state progressively scaled back funding for the JNR, which resulted in the requirement for more private funding in successive projects. Upon privatization of the heavily indebted JNR, the new entity, Japanese Railways (JR Group) bought the existing four HSR lines from the national government in 1991. The JR Group consists of six private regional passenger railway companies. These companies have to pay an annual fee to the national government for 60 years. Currently, the national government funds 2/3 of the construction cost, and local government's fund 1/3 of the construction costs of new infrastructure – a small percentage also comes from allocated track access charges (3%). The national government funding is derived from the revenues from the sale of the rail lines to private companies and the national public works budget. For HSR lines built after 1987, private companies pay a lease payment to the Japan Railway Construction, Transportation and Technology Agency for the use of the HSR lines. The payment is based on projected ridership. The national government does not provide operating subsidies.
France 1981	Before 1997, the major stakeholders in the French rail industry were Societe Nationale des Chemins de Fer de France (SNCF) – the national rail operator – and Reseau Ferre de France (RFF) – the owner of France's rail infrastructure. Most of the funding for HSR lines came from the national government through SNCF - mainly from bank borrowings. Rolling stock was also financed by bank borrowing and, whenever possible, SNCF utilized leaseback arrangements for rail cars upon delivery. RFF was separated from SNCF in 1997 in response to a European Union directive, which required the separation of passenger operations and infrastructure management. The French government, however, retained ownership of both SNCF and RFF. Both SNCF and RFF also remain involved with the existing rail and HSR networks in France. Recently, funding for HSR construction in France has been derived from a variety of sources, including the national government, regional governments, RFF, SNCF, and the European Union. RFF, as the infrastructure provider, can borrow money in the international markets to undertake major projects, such as the construction of new HSR lines. The funding borrowed is guaranteed by the government and the amount is restricted to what RFF can repay from the access fees. RFF typically does not borrow to fund a specific project, but rather to meet its overall financial needs. In addition to borrowings, the TGV lines have also been developed with grant funding from local sources. Grant funding is dependent on local government support, which is partly influenced by the redevelopment and regeneration that a new TGV line is anticipated to deliver. The TGV rolling stock is procured by SNCF and is funded through lease commitments.
Italy 1992	In 1992, the State railway, Ferrovie dello Stato (FS), was converted into private company with the Ministry of Economy and Finance as the sole shareholder. In accordance with the 1997 EU directive, Italy separated FS into two divisions: RFI, which owns and maintains the existing rail network, and Trenitalia, the operating company (see diagram below).



In 1991, however, FS awarded a 50 year concession to Treno Alta Velocita (TAV) - a public (40%) - private (60%) consortium at the time. The concession was to develop, design, finance, and construct a series of HSR lines throughout Italy. In addition, FS awarded construction contracts to general contractors for sections of individual HSR lines. In 1997, FS bought out the private sector shareholders in TAV, resulting in a publicly owned HSR company.

Today, TAV is 60% funded through interest free loans from FS and 40% through capital market issues underwritten by explicit government guarantees. Upon completion of the projects, ownership is transferred to RFI, although TAV retains the right to charge a usage fee. RFI in turn charges Trentalia or other train operating companies who use the HSR infrastructure.

Spain

1992

The majority of the Madrid to Seville HSR line was funded by the national government. The construction costs of the HSR lines built since have been funded by the national government, the European Union, and Adif. It is planned that funding for future expansions will come from the national government, local governments, Adif, and loans from the European Investment Bank. Funding for international HSR networks could potentially come from the European Union.

Korea

2004

A business plan and funding options for the Korea Train Express (KTX) first appeared in 1990 and in the early 1990s a special task force was established by the Ministry of Construction and Transport (MOCT) to advance the HSR project in cooperation and coordination with other government agencies.

The costs for developing the network were initially estimated at $11billion, but the actual costs ($17 billion) exceeded the original estimate. Funding for the current network comprised:

- Government funds: 45% (contribution: 35%, guaranteed loans: 10%)
- Korea High Speed Rail Corporation: 55% (foreign loans: 24%, bonds: 29%, private capital: 2%)

Taiwan

2007

Initial Project: The Taiwan North-South HSR Project was initially planned to be built as a public sector project with government bearing full responsibility. Increased public fiscal burdens, however, resulted in Congress withdrawing the budget allocated to the HSR Project. Subsequently, government decided to have the HSR Project built by the private sector through a Build-Operate-Transfer (BOT) model. The Korean government issued a tender for the private construction and operation of Taiwan North-South HSR Project on October 29, 1996.

BOT model: Taiwan HSR Consortium (THSRC) was formed in 1996 to bid on the HSR BOT Project. The THSRC was selected in May 1998 as the concessionaire to build and operate the HSR service. In 1998, the agreements were signed between the Ministry of Transport and Communications (MOTC), representing the Taiwanese Government, and the THSRC that granted THSRC a concession to finance, construct, and operate the HSR System for a period of 35 years and a concession for HSR station area development for a period of 50 years.

The construction costs were estimated at $18 billion and it was originally envisioned that the private sector would build and finance the project without any government assistance. The THSRC

was selected because its proposal did not include any request for government support. However, lenders to THSRC demanded and eventually received a wide range of government guarantees in the event that the THSRC could not meet its financial obligations.

Thus, although approximately 70% - 80% of the total project cost was funded through bank debt, a significant proportion of the funds were guaranteed by the government. The nation's postal savings account and certain public pension funds have been used to provide such guarantees.

In the two years since opening, the HSR project has incurred losses equivalent to two-thirds of its equity capital. On July 13, 2009 the MOTC announced that it had signed a memorandum of understanding with THSRC and the Bank of Taiwan, laying the groundwork for refinancing the THSRC project by the end of this year.

Sources: GAO, 2009; Ernst & Young, 2003; Shin, 2005; THSRC, 2009; Railway Gazette, 2009

From Table 2, it is evident that some type of government support (direct loans – guarantees) was required in all cases - even in the case of Taiwan. Although the private sector has played an increasing role in financing and achieving more efficient operations, the public sector thus continues to be responsible for providing the regulatory framework within which all these projects are planned, designed and implemented and managing all of the permits, as well as provide some form of financial support.

Public and Private Funding Sources

Historically, federal funding for IPR/HSR has came from general revenues, rather than a dedicated funding source (GAO, 2009). Consequently, IPR/HSR projects had to compete with other non-transportation demands on federal funds, such as national defense, education or health care, as opposed to alternative transportation investments. In contrast, some transportation modes are funded from federal programs – such as the federal-aid highways, the Federal Transit Administration's (FTA's) New Starts Program, and the Federal Airport Improvement Program – which benefit from a (GAO, 2009):

- dedicated funding source based on receipts from user fees and taxes,
- a format for allocating funds to states, and
- in some cases, a structure for identifying priority projects to be funded.

Given the lack of dedicated Federal grant funding available for IPR/HSR projects, and the restrictions placed on States for using gasoline tax revenues for IPR/HSR projects, project sponsors are exploring other federal financing mechanisms for HSR projects (GAO, 2009). For example, in lieu of a dedicated source of state funding, some project sponsors have sought funding directly through appropriations of state revenue or bond measures. These funding sources are, however, also used for numerous other state budgetary needs. Also, bonding could cost more than using appropriations of general revenues.

The choice of a financing mechanism can have serious implications for states and local governments as they progressively face broader fiscal challenges given an increasing gap between revenues and expenditures. This section explores different potential funding sources for the development of IPR/HSR in the U.S. and Texas. In addition, Appendix 2 summarizes the enabling legislation that provides TxDOT with the authority to implement and finance IPR/HSR in Texas.

Federal Funding Sources

Passenger Rail Investment and Improvement Act of 2008 (PRIIA)

PRIIA reauthorized the National Railroad Passenger Corporation (Amtrak) and strengthened the US passenger rail network by tasking Amtrak, the U.S. Department of Transportation (US DOT), FRA, States, and other stakeholders to improve service, operations, and facilities. PRIIA focuses on IPR, including Amtrak's long-distance routes and the Northeast Corridor, state-sponsored corridors throughout the Nation, and the development of HSR corridors (FRA, 2009).

PRIIA authorizes three new Federal intercity rail capital assistance programs (FRA, 2009):

- *Intercity Passenger Rail Service Corridor Capital Assistance Program,* which provides the framework for the new IPR rail service corridor capital assistance program (§301).
- *High-Speed Rail Corridor Development,* which authorizes the appropriation of funds to US DOT for establishing and implementing a HSR corridor development program (§501).
- *Congestion Relief,* which authorizes the appropriation of funds to US DOT to grant to States or Amtrak in cooperation with States for financing the capital costs of facilities, infrastructure, and equipment for high priority rail corridor projects necessary to reduce congestion or facilitate IPR ridership growth (§302).

Appropriations Act of 2009

On March 11, 2009, President Obama signed the 2009 Omnibus Appropriations Act (H.R. 1105), which appropriated unobligated funds from the FY 2009 federal budget. The $410 billion bill includes $1.8 billion to be allocated to the FRA as follows (VDOT, 2009):

- *Safety and Operations* - $159.45 million (available until all allocated funding is expended),
- *Railroad Research and Development* - $33.95 million (available until all allocated funding is expended).
- *Capital Assistance for Intercity Rail* - $90 million (project selection criteria to be published no later than eight months after the passage of the Appropriations Bill). Priority to be given to projects that improve the safety and reliability of IPR trains, involve commitments from freight rail operators to enforceable passenger rail on-time performance, involve financial commitments from freight railroads equal to the expected benefit to their operations, improve or extend service on a route that requires little or no federal assistance, or involve commitments from states or railroads to improve grade crossings over which passenger rail service operates.
- *Rail Line Relocation and Improvement Program* - $25 million (available until all allocated funding is expended).

- *Amtrak Operating Grants and Capital Debt Service* - $1.49 billion (no more than $285 million available for debt service and funding is subject to Amtrak's submittal of a comprehensive business plan for FY09).

Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA)

TIFIA established a Federal credit program for eligible transportation projects of national or regional significance under which the US DOT may provide three forms of credit assistance: secured (direct) loans, loan guarantees, and standby lines of credit (US DOT, 2009). The program's goal is to leverage Federal funds with private and other non-Federal funds for critical improvements to the nation's surface transportation system.

The US DOT awards credit assistance to eligible applicants, which include state DOTs, transit operators, special authorities, local governments, and private entities (US DOT, 2009). Thus, a state could potentially apply for credit under TIFIA to implement IPR/HSR (GAO, 2009) since TIFIA may be used to finance passenger rail vehicles and facilities.

Under SAFETEA-LU, Congress authorized $122 million for TIFIA for each Federal fiscal year from 2005 through 2009 (US DOT, 2007). These funds cover the cost of the Federal Government for providing credit assistance, and are available until expended by the DOT or reprogrammed by Congress. Based on experience, this TIFIA funding can leverage more than $2 billion of average annual credit assistance.

TIFIA assistance can, however, not exceed 33% of a project's construction costs (GAO, 2009). Thus, other sources of funding must be secured to construct a project – the latter has proven difficult. Also, the TIFIA loans and guarantees need to be repaid, which could limit the program's value in funding HSR projects.

State Funding Sources

General Revenues

General revenues are collected from the general public in the form of property taxes, sales, and income taxes. General revenue funds used for transportation investments, including IPR/HSR, are motivated based on the argument that citizens benefit indirectly from the economic and social returns generated by the transportation investment (Center for Transportation Studies, 2009a). The relationship between who pays and who benefits is less clear. Also, as indicated earlier, transportation projects compete with other non-transportation state and local demands for funding, such as education or health care.

Municipal Bonds[1]

There are two main types of municipal bonds: general obligation bonds (GO) and revenue bonds (RVB). GO bonds are backed by the full-faith-and-credit (FF&C) of the issuing jurisdiction. GO bonds are typically issued for capital improvements for terms up to twenty years and place the burden of financing over the entire jurisdiction's tax base. RVB's pledge the revenue from a specific tax or fee and places the burden of financing the project on the end-users. Both GO and RVB's contain tax exempt provisions for investors. Thus, the interest paid to bondholders is not subject to federal income taxes. This tax-exempt status remains throughout

[1] For a more detailed discussion of municipal bonds, the reader is referred to Appendix 3.

the life of the bonds (IRS, 2005). The benefits of tax-exempt bond financing can apply to the many different types of municipal debt financing arrangements through which governments obligate themselves, including notes, loans, lease purchase contracts, lines of credit, and commercial paper.

Some jurisdictions require the bonds to be authorized by the voters. This is especially the case for GO bonds, which under the FF&C provisions obligate the jurisdictions future tax revenues. If the bond goes into default the bondholders will thus be able to garnish general revenues, request property tax rises, or appoint a financial control board.

On November 6, 2007, Texas voters approved a constitutional amendment (Proposition 12), which authorizes the Texas Transportation Commission to issue GO bonds in an amount not to exceed $5 billion to fund highway improvement projects. The bonds are to be backed from the state's general revenues rather than from gasoline taxes (SAMCo, 2008).

However, before any bonds can be issued and funding allocated to transportation projects, authorization is required by the Texas Legislature (HRO, 2007). In this regard, H.B. 1 for the biennium 2010-2011, Chapter VII, allocates $400 million for FY 2010 and $1.6 billion for FY 2011 to fund Proposition 12.

Tax-Exempt Private Activity Bonds

According to Section 142 of the Internal Revenue Code, qualified private activity bonds are tax-exempt bonds of which the proceeds can be used to finance various types of facilities (such as, HSR facilities) owned and used by private entities (IRS, 2005). Private activity bonds have, however, several requirements related to their issuance, including:

- *Volume cap limit,* which limits an issuing authority to a maximum amount of tax-exempt bonds that can be issued to finance a particular qualified purpose during a calendar year (IRS, 2005). Regarding the latter,
  - 25% of the bond proceeds for privately owned HSR facilities are subject to this restriction.
  - government owned HSR facilities and the remaining 75% of privately owned HSR facilities are exempt.
- *Public approval requirement* – Prior to issuance, qualified private activity bonds must be approved by the government entity issuing the bonds and, in some cases, each government entity having jurisdiction over the area in which the bond-financed facility is to be located (IRS, 2005). Public approval can be obtained by voter referendum or by an applicable elected representative of the government entity after a public hearing following reasonable notice to the public.
- *Registration requirement* – Can be issued in registered form if the bonds are of a type offered publicly or issued with a maturity exceeding one year at the date of issue (IRS, 2005).

Prior to the passage of the American Recovery and Reinvestment Act (ARRA), *certain* HSR facilities that operate in excess of 150 mph were eligible for financing through tax-exempt private activity bonds (GAO, 2009). Under the ARRA, HSR facilities only need to demonstrate a capability of attaining a maximum speed in excess of 150 mph to be eligible. This provision applies only to obligations issued after the enactment of ARRA (GAO, 2009).

Texas Pass-through Program

The objective of Texas's pass-through program is to leverage traditional state funding with local project funding (SAMCo, 2008). The program was thus created to provide highway capacity sooner by allowing local communities to contribute to the upfront costs of constructing a state highway. TxDOT subsequently reimburses the portion of the project cost to the community over time through the payment of a fee for each vehicle that uses the new highway (TxDOT, 2009b). Projects must be on the state highway system to be eligible for funding under this program.

Texas Transportation Code, §91.075(b) also authorizes TxDOT to enter into an agreement with a public or private entity by which the agency will pay pass-through fares to the public or private entity as reimbursement for the acquisition, design, development, financing, construction, relocation, maintenance, or operation of a passenger railway facility or a freight railway facility by the public or private entity.

On February 26, 2009, the Texas Transportation Commission approved a call for projects under this program. Funding for this program call is, however, limited. Depending on the proposals received and negotiated, the Commission could select up to $300 million in pass-through projects (TxDOT, 2009a).

Rail Relocation and Improvement Fund

The initial version of S.B. 1 Chapter VII submitted to and approved by the House, provided for the appropriation of $91 million for the Rail Relocation and Improvement Fund in FY 2010 *and* FY 2011. However, in its final version, the Senate included the appropriation provision in the Contingency Provisions section of the Bill. The provision establishes that the allocations may only be made if the Comptroller finds that state highway revenues increased by $182 million in the 2010-2011 state fiscal biennium compared to the 2008-2009 state fiscal biennium (S.B. 1).

Other Funding Sources

Besides user fees/ fare box revenues, paid directly by the users of the rail service, a number of other potential funding sources are discussed in this section of the document. These include various value capture mechanisms and potential advertising revenues.

Value Capture

Large public investments in transportation infrastructure can increase the value of adjacent private land - sometimes substantially. For example, transportation networks and urban land value are closely linked. A transportation improvement typically increases accessibility to desirable destinations, such as jobs or schools (Center for Transportation Studies, 2009b). Locations with higher accessibility tend to have higher land prices. Landowners and developers benefit from this increased value and a mechanism can be applied to capture a part of this created value. The revenue can help finance the transportation improvement, or it can go toward further transportation investments, spurring additional increased accessibility and land value.

Value capture mechanisms thus target a restricted set of beneficiaries from the transportation investment: landowners and developers who benefit from the increased land value that follows a transportation improvement. Different ways to measure the value gains give rise to

a range of different instruments of value capture (Center for Transportation Studies, 2009b). Table 3 presents the various benefit measurements and associated financing instruments that have been used to share in the increased land values from transportation infrastructure investments. Each of these financing instruments is discussed in more detail below.

Table 3: Value Capture Beneficiaries, Benefits, and Finance Instruments

Beneficiaries	Measurement of Benefit	Finance Instrument
Landowners	Land value growth	Land value taxes
	Property tax growth	Tax increment financing
	Assessed special benefits	Special assessments
	Transportation utility	Transportation utility fees
Developers	Off-site development opportunities	Development impact fees
	Off-site access benefits	Negotiated exactions
	Development privileges	Joint development
	On-site development opportunities	Air rights

Source: Center for Transportation Studies, 2009a

Land Value Tax

The land value tax captures the general increase in the price of land due to improved accessibility from transportation networks - not only from a specific project. A "pure" land value tax is rarely levied. The most common land value tax - i.e., the split-rate property tax - taxes land at a higher rate than buildings. In comparison, conventional property taxes apply the same tax rate to land and buildings. Higher tax rates on buildings create disincentives for development, but because the supply of land is fixed, taxing land at a higher rate results in little economic distortion. Use of the land value tax has been limited in the U.S. (Center for Transportation Studies, 2009a).

Tax Increment Financing

Tax increment financing (TIF) levies taxes on the future increment in property value due to a development (or redevelopment) project. The tax revenues are then used to finance development-related costs, including infrastructure improvements. TIF districts can be expanded beyond the site of an improvement project to encompass a small district. The mechanism is often used by local governments to promote housing, economic development, and redevelopment in established neighborhoods. TIF has rarely been used for transportation improvements with the exception of small-scale investments in urban rail transit networks (Center for Transportation Studies, 2009a).

Special Assessments

Special assessments impose special charges on properties close to a new facility. The assessment is thus levied only against those parcels that receive a direct benefit from the public investment. The benefits must be clearly identified and measured. This mechanism is widely used across the U.S., typically for local infrastructure improvement projects (Center for Transportation Studies, 2009a).

Transportation Utility Fees

Transportation utility fees (TUF) consider transportation networks a utility, similar to other local services, such as water and wastewater treatment, that are financed primarily from

user charges. TUF rates can be set considering a number of factors that are more closely related to transportation demand, such as housing units, number of parking spaces, square footage or gross floor area, and the trip generation rate for a given property type. This mechanism has encountered legal challenges in the U.S., most often on the grounds that it resembles a tax, thus requiring a referendum in some local jurisdictions (Center for Transportation Studies, 2009a).

Development Impact Fees

Development impact fees (DIF) are one-time charges levied on new development. These fees are similar to negotiated exactions (see below) in that they are primarily levied on new developments to help recover growth-related public service costs. However, they differ in that DIF can be levied to provide off-site services, such as local roads, schools, or parks. DIF are also typically determined from formal calculations of the public service costs of new development as opposed to the less-formal negotiation process typically used with negotiated exactions. DIF are widely used throughout the U.S. (Center for Transportation Studies, 2009a).

Negotiated Exactions

Negotiated exactions are similar to DIF with the exception that they are typically determined through a less formal negotiation process and are typically not applied to off-site infrastructure provision. As a condition of development approval, negotiated exactions can take the form of in-kind contributions for the development of local roads, parks, or other public goods or can be requested in the form of in-lieu fees (Center for Transportation Studies, 2009a).

Joint Development

Joint development (JD) refers to the simultaneous development of a transportation facility and adjacent private real estate. There are two types of JD: revenue-sharing arrangements and cost-sharing arrangements. In the former, the infrastructure provider - typically a public entity - retains a share of the generated revenues from new development near the improved facility. In the latter, the private sector directly shares in the costs of providing or maintaining the transportation facility. JD is more common abroad, especially in Asia (Center for Transportation Studies, 2009a).

Air Rights

Air right agreements establish development rights above (or below) a transportation facility in exchange for a financial contribution or future additional property and/or income taxes. Certain types of facilities –e.g., subways - can generate substantial increases in land values near access points that may induce developers to build at much higher densities. The public sector can sell or lease the air rights above these facilities. This mechanism has been widely used in the U.S. (Center for Transportation Studies, 2009a).

Advertising

Advertising on rail systems is an easy way for companies to reach a large potential customer base in a very short amount of time. For an advertising agency, trains might be considered *"moving billboards"*. Since 1989, there has been a tremendous increase in advertising on transit systems. The Chicago Transit Authority in Illinois, for example, uses advertising on its bus transit systems to raise revenue. A major benefit of these advertising programs is that they are a very low maintenance revenue source for the agencies. Although, the

revenue from rail advertising is thus typically lower compared to other funding sources, it remains fairly easy to maintain and collect (Ernzen & Ernzen, 2007).

To conclude, a number of funding sources are available for implementing IPR/HSR in Texas. It is, however, clear that a single funding source would be inadequate for the development of IPR/HSR in the U.S. or Texas – rather a "package" of different funding sources would be required. Funding for California's anticipated HSR project provides an example of how different funding sources are foreseen to be used in implementing a HSR project in the state (see next section).

Case Study: Funding California's HSR Project

The California HSR Authority (CHSRA) is responsible for the development of a plan for the construction, operation, and financing of a state-wide intercity HSR system. In May 2007, a document entitled *"High-Speed Train Preliminary Funding Strategy and Financing Plan"* was published by the Authority. The plan concluded that the project's funding will likely comprise of private and public sources. However, support from local, state and federal sources is regarded of particular importance during the early development of the project. The CHSRA is thus actively pursuing a multi-track financing strategy for the planning, design, and construction phases of the project, including three tiers: state and local funding (1/3), federal funding (1/3) and PPPs (1/3). The cost of the project is estimated at $45 billion (CHSRA, 2008).

State and Local Funding

A $9.95 billion GO bond was approved in a November 2008 ballot. This bond measure is within the Administration's current debt capacity guidelines and would fund the state's portion of the construction cost of the project from Anaheim/Los Angeles through the Central Valley to San Francisco (CHSRA, 2008). The bond will also result in local transportation agencies spending nearly $1 billion on improvements to local and regional passenger rail projects that complement and connect with the HSR system. Local funds are anticipated where the HSR system shares corridors with existing services (such as Caltrain between San Francisco and San Jose and Metrolink between Los Angeles and Anaheim), and to help finance the development of HSR station areas.

Federal Funding

Federal matching funds are expected to finance a significant portion of the construction cost. The targeted federal funding would come in part from existing program funding sources, but would also require the creation of new grant allocation programs designed specifically for HSR (CHSRA, 2008).

Private Funding

The Authority's finance team anticipates that the commitment of state and federal dollars will attract private sector funding through PPPs. In March 2008, the CHSRA released a document entitled *"Request for Expressions of Interest (REFI) for Private Participation in the Development of a High-Speed Train System in California"*. Through the responses to the REFI, the authority gained a better understanding of how the Project and State can benefit from private sector participation while also garnering an appreciation for key considerations that may encourage or dissuade private sector participation, such as phasing, timing, and risk (CHSRA,

2008). Additionally, the CHSRA sought input from respondents as to potential interest in participating in the development aspects of a HSR system, including perspectives on project delivery methods and private project financing.

Concluding Remarks

This document provides a preliminary review of IPR/HSR financing models, provides international examples of how HSR had been financed, and highlights a number of public and private funding sources for the implementation of IPR/HSR in Texas. Over the next months, a more detailed and focused review of the literature will be conducted in terms of different financing models to identify international best practices for consideration by TxDOT, as well as a more detailed delineation of potential funding sources for implementing IPR/HSR in Texas.

Appendix 1 - General Contract Types Applicable To Transportation

Programs/Performance Contracts are generally an agreement between an autonomous public enterprise and the ministry or agency with which it is affiliated. The managers of the public enterprise commit to specific objectives - generally output targets, such as productivity gains or cost cuts - within a specific period of time. The contracts tend to be shorter – two to five years – and renewable. Payments to the public enterprise are generally through subsidies to finance infrastructure investments, seldom to operations. In general these contracts have failed to reach their goal in the medium to long term. Their use is declining in developing countries since they might be subject to political interference in the management of public enterprises in sensitive sectors (Estache & de Rus, 2000).

In Management Contracts, the assets of the transportation company typically continue to be public, but operational management becomes private. The private operator is paid a fee (generally a fixed component plus a fee that depends on the revenue from the business) and is not responsible for either investment or commercial risk. This has the advantage of bringing in private management skills, and any associated innovations, for a period of two to five years (Estache & de Rus, 2000). This could also be seen as a transitional solution, because from a fiscal point of view, it is not attractive as the government continues to incur all risk and finances all investment.

In Concessions/Licenses/Franchises, the assets continue to be public and are leased to the private operator for the duration of the contract period. The concessionaire is responsible for all operations and investment, as well as commercial risk, during the contracting period. The latter typically varies from 10 to 99 years. Government subsidies can be part of the agreement, particularly when demand is uncertain, implying high commercial risks (Estache & de Rus, 2000). Subsidies can also be required in the cases of higher required service obligations than warranted by anticipated demand. This is the most common form of contract.

Service Contracts are common in transportation delivery and deserve to be separated from the concession/license/franchise contracts, despite their strong contractual similarities. The main differences are the scope and duration – both tend to be smaller than for concessions/licenses/franchises. The government bids out the right to deliver a specific service and sometimes provides the assets needed. The successful bidder can be responsible only for the costs. These are gross costs service contracts in which the government pays for the service rather than allowing the operator to collect revenue directly. The main disadvantage is that the provider is not responsible for the demand, because public payment is guaranteed. This is why many governments prefer net costs contracts in which the winner is responsible for all revenue collection and costs (net cost service contracts). The main risk here is the temptation on the part of the winner to render the integration of a network difficult when it results in more competitive provision of services (Estache & de Rus, 2000).

Appendix 2 - Texas Enabling Legislation

Table 1 - Authorizations for Rail Finance (Texas Transportation Code)

Rail Facility, Stations **Sec. 91.001**	"Rail facility" refers to real or personal property, or any interest in that property, that is determined necessary or convenient for the provision of a freight or passenger rail facility or system, including commuter rail, intercity rail, HSR, and tri-track. The term includes all property or interests necessary or convenient for the acquiring, providing, using, or equipping of a rail facility or system, including rights-of-way, track work, train controls, stations, and maintenance facilities. "Station" refers to a passenger or freight service building, terminal, station, ticketing facility, waiting area, platform, concession, elevator, escalator, facility for handicapped access, access road, parking facility for passengers, baggage handling facility, or local maintenance facility, together with any interest in real property necessary or convenient for those items.
Sources **Sec. 91.071** **Sec. 91.073**	TxDOT may use any available funds for the financing of rail facilities, including funds from the State Infrastructure Bank. However, TxDOT is limited to spend money from the general revenue fund except pursuant to appropriations according to H.B. 1. TxDOT may apply, accept, and expend money from grants, loans, or reimbursements, including paying for the cost of the acquisition, construction, maintenance, and operation of a rail facility or system.
Powers **Sec. 91.001** **Sec. 91.072** **Sec. 361.308** **Sec. 431.003**	The Texas Transportation Commission (TTC) and TxDOT can: • authorize the issuance of bonds to pay all or part of the cost of acquiring, constructing, maintaining, or operating a rail facility or system; • maintain separate accounts for bond proceeds and the revenues of a rail facility or system, and pledge those revenues and proceeds to the payment of bonds or other obligations issued or entered into with respect to the facility or system; • impose fees, rents, and other charges for the use of a rail facility or system; and • obtain from another source the fees and other revenue necessary to pay all or part of the principal and interest on bonds issued under this chapter. TxDOT can receive revenue, such as a charge, toll, rent, payment, user fee, franchise fee, license fee, fare, tariff, and other consideration: • received in return for the use of a rail facility; or a service offered in connection with the operation of a rail facility, or • resulting from a sale or conveyance of a rail facility Any local government (i.e., a county, municipality, special district, or other political subdivision or a combination of two or more, or a corporation acting on behalf of a local government) may enter into an agreement with TxDOT or a private entity to assist in the financing of the construction, maintenance, and operation of a rail facility located in the government's jurisdiction in return for a percentage of the revenue from

	the project. The local government: • may use any revenue available for road purposes, including bond and tax proceeds, to provide financing for the project. • needs to have TxDOT's approval before executing an agreement with a private entity.
Fees **Sec. 91.074**	TxDOT may: • require a public or private entity to pay a fee as a condition of using any part of a rail facility or system, but it may not require an entity to pay a fee in connection with the placement, maintenance, or other use of a public utility facility. • contract with a person - for the use of all or part of a rail facility or system. - to lease or sell all or part of a rail facility or system, including all or any part of the right-of-way adjoining track work, for any purpose, including placing on the adjoining right-of-way a storage or transfer facility, warehouse, garage, parking facility, telecommunication line or facility, restaurant, or gas station. Any portion of a rail facility or system that is used or leased by a private person for a commercial purpose is not exempt from ad valorem taxation and is subject to local zoning regulations and building standards.
Pass-through Program **Sec. 91.075**	A pass-through fare is a: • per passenger fee or a per passenger mile fee that is determined by the number of passengers using a passenger rail facility or • fee that is determined based on the number of carloads or commodity tonnage shipped using a freight rail facility. TxDOT may: • enter into an agreement with a public or private entity that provides for the payment of pass-through fares to the public or private entity as reimbursement for the acquisition, design, development, financing, construction, relocation, maintenance, or operation of a passenger or freight rail facility by the entity. • use any available funds for the purpose of making a pass-through fare payment, including funds from the state infrastructure bank. The commission needs to adopt rules to implement this program. These should: • determine the amount of pass-through fares to be paid under this section, and • allocate the risk that ridership on a passenger rail facility or carloads or commodity tonnage shipped on a freight rail facility will be higher or lower than the parties anticipated in entering into the agreement.

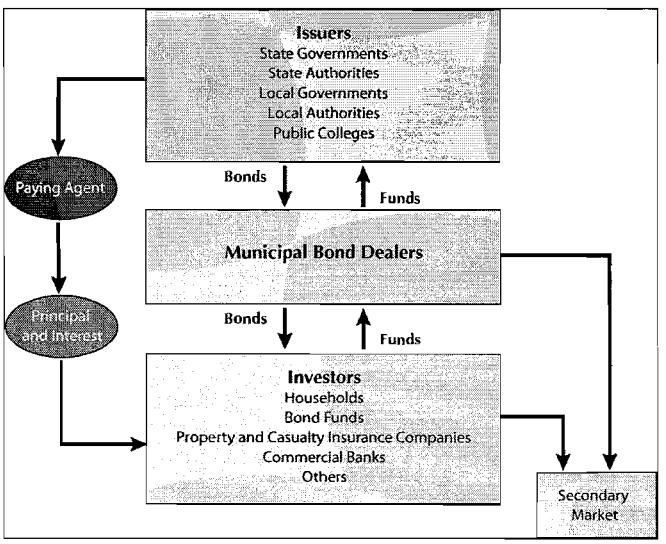
Source: Texas Transportation Code

Appendix 3 – Primer on Municipal Bonds

The use of debt to finance infrastructure is not a new phenomenon. There are accounts of borrowing and defaults by ancient cities. In the U.S., bonds were first issued by cities in the early seventeenth century. In 1843 careful recording of U.S. municipal bond data was started (Moak, 1982).

So why are bonds used?

Within the U.S. municipal debt is used to finance large ticket infrastructure items identified in capital improvement programs. This is because pay-as-you go financing – preferred by some jurisdictions – is often cost prohibitive for certain types of infrastructure. Because of the time value of money "saving up" to buy the large ticket items takes too long. In many instances it is cheaper to issue bonds to construct much needed infrastructure. Earlier procurement also has a political edge. States and local governments stress that the use of bonds to finance capital projects stimulates local economic growth - construction and operational related growth - and therefore generates tax revenues, which can be used to continue to pay for new projects. For the prudent jurisdiction, bonds should only be issued for capital projects, and not for general day-to-day operating costs. Figure 1 shows the flow of funds in the primary market.



Source: Sherri Greenberg

Figure 1: The Flow of Funds in the Primary Bond Market

What are the types of municipal bonds?

There are two main types of bonds: General Obligation Bonds (GO) and Revenue Bonds (RVB). GO bonds are backed with the full-faith-and-credit (FF&C) of the issuing jurisdiction. GO bonds are typically issued for capital improvement work and usually are issued for terms up to twenty years. GO bonds place the burden of financing over the entire jurisdiction's tax base. RVB's pledge the revenue from a specific tax or fee and places the burden of financing the

project on the end-users. Both GO and RVB's contain tax exempt provisions for the investors. Interest earned on the bonds is not subject to federal income taxes.[2] However, the Tax Reform Act of 1984 imposed limitations on the types and amounts of tax exempt securities that could be issued: most notably it cut out the tax exempt provisions for private activity bonds.

Some jurisdictions require the bonds to be authorized by the voters. This is especially the case for GO bonds, which under the FF&C provisions obligate the jurisdictions future tax revenues. If the bond goes into default the bondholders will be able to garnish general revenues, request property tax rises, or appoint a financial control board. Notable default examples include the New York and Orange County bankruptcies in 1973 and 1994, respectively. Both jurisdictions came close to bankruptcy as a result of borrowing through GO bonds to meet operating budget requirements. New York was spared bankruptcy, but was put under the supervision of a financial control board. Orange County, however, filed for Bankruptcy under Chapter 9 of the U.S. Bankruptcy Code and sued its auditor KPMG and the investor that managed its derivatives, Merrill Lynch. As a consequence of the Orange County debacle California Voters imposed Proposition 13, which caps general property tax revenue collection. RVBs, however, are also susceptible to financial problems because revenues may not always be sufficient to pay debt, or because cities get into financial difficulties and dip into the revenues generated by these RVB backed enterprises. For example, the Chicago Calumet Skyway in 1963 came close to default when the city halted debt service payments on $100 million of outstanding RVBs to fund general city operating costs (Lee et. al, 2004).

As a consequence of these activities the Securities and Exchange Commission now heavily regulates all bond issuances from government jurisdictions.

Revenue Bonds

As noted above RVB's rely on specific revenues for their security. RVBs are issued for capital improvements but usually run for terms longer than twenty years. This is because the construction timelines and ramp-up often take many years, and these longer time periods allow for a different repayment structure.

Local government authorization for RVBs is, in most instances, a simpler less "political" process than what is required for GO bonds. Because they are not secured by FF&C of the issuer they usually do not require voter approval. They are also not subject to state caps placed on GO debt. RVB's are typically issued for self-supporting local enterprises, such as water, waste, energy, parking, airports, marine facilities, and toll roads. Governing board approval is usually required for the legal authorization of RVBs. Authorization is usually given after a feasibility study is undertaken. The study will demonstrate project viability, and the rationale for using RVBs (see text box for the required elements of feasibility studies).

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[2] *See, South Carolina v. Baker, Treasury Secretary of the United States, 485 U.S. 505 (1998) questioning a law that denied tax-exempt status to bearer bonds. Supreme Court ruled that the Tenth Amendment did not prohibit federal regulation of state and local governments and that there is no constitutional right to state and local immunity from federal tax provisions.*

Required Elements of Feasibility Studies

- Project overview: purposes, scope, cost estimates, contingencies, and future financing requirements and sources
- Description of existing facilities or system
- Project constructions schedule
- Laws, policies, conditions, and assumptions that affect operations and financing
- Projected enterprise demand, including identification of competing providers
- Historical and anticipated operating trends
- Analysis of historical and anticipated revenues and spending
- Customer base and user trends
- Debt service requirements
- Future rates and charges required to produce sufficient revenues
- Economic, social, and demographic factors that are likely to affect needed increases in future rates
- Revenue and expenditure performance under indentures that differ from generally accepted accounting principles (GAAP)
- Reconciliation of revenues and expenditures between GAAP and indenture accounting
- How rates and charges are derived under bond contract or ordinance?
- Costs at competing facilities or systems
- Methodology and assumptions used in feasibility study
- Conclusions and recommendations (Moody's 1994)

Net revenues form the backbone of the security pledge. Net revenues are the total or gross revenue less operating and maintenance expenses. The revenues also provide the source of debt service for the bonds. Some entities also chose to have reserves, which are set aside for debt service and are part of the pledged security. If operating revenues are insufficient for debt service payments the reserve will provide resources to make these payments for a specified period of time. RVBs will also have multiple covenants within the bond instrument and these include:

- *Covenant on rates,* which requires the issuer to set user rates and charges sufficient to meet or exceed coverage ratios specified in the contract.
- *Covenant on debt service reserve,* which requires the issuer to maintain a reserve fund equal to debt service for one year (sometimes six months). The trustee representing bondholders holds or controls the debt service reserve fund.
- *Covenant on additional bonds,* which prohibits the issuer from selling additional bonds or debt in the future on the project unless the issuer meets specific coverage requirements.
- *Covenants on construction and operation,* which govern the spending of bond proceeds.
- *Covenants on flow of funds,* which establish funds usually for specific timelines in the bond, for example construction fund, revenue, operations and maintenance, debt service, debt service reserve, repair and replacement, surplus or reserve funds. Sometimes there is an arbitrage rebate fund. The covenants governing these funds prohibit transfers between these funds and to other enterprises or projects set up by the jurisdiction.

Because RVBs have a limited liability pledge, and offer less security than FF&C GO bonds, they often have a higher interest rate than GO bonds. However, as the market has become

more sophisticated and as jurisdictions have gained experience within the market, RVB ratings have inched upwards. In some instances AAA ratings are acquired and the interest rates have begun to mirror GO interest rates.

What is a bond rating?

A bond rating is an opinion regarding the creditworthiness of a debt issuer and also the creditworthiness of the debt being issued whether it is a specific project, or a financing program. The rating also is inversely linked to the interest rate that the issuer will have to pay for the bond. For government jurisdictions who obtain a nationally recognized debt rating access to capital is greatly enhanced. This offers opportunities to increase the pool of investors willing to invest in bonds and, also, creates competition among these investors which can lead to lowering the interest rate that will be paid to investors (Vogt, 2004).

The rating agencies generally follow a process that is fairy similar in determining the bond rating (Temel, 2001). Standard & Poors, for example, bases its rating for long term debt on the following three factors:

1. Likelihood of user meeting its financial commitment under the contract.
2. Nature and provisions of debt contract (security pledged, and other protections afforded).
3. Protections available to investors under laws that authorize or limit debt, for example state constitutional laws on debt.

Ratings of GO's secured by FF&C usually apply to all the GO debt of the issuer. So, as a rating is acquired, this applies to all outstanding debt issued by the government jurisdiction. According to Vogt (2004) because *"the issuer's general credit underlies its ability to repay all GO bonds, a GO bond rating is similar to an issuer rating: applying to the issuer and not to specific debt of the issuer."*

Ratings of RVBs are different. Each issue of RVBs has unique security provisions and payment provisions that distinguish it from other issues. So while the rating agencies will look to the underlying strength of the issuer, they will also scrutinize the issue and its underlying support - i.e., net revenues to cover expenses. It has become the norm net revenues to equal 125 percent or more of annual debt service in any year bonds is outstanding (compared to 150 to 200 percent that was required in the 1970s and 1980s). The rating of RVBs also depends on competition for this facility, and, the ability of the enterprises to raise rates to meet needs. Other considerations include: contractual provisions in the bond contract and the extent that these protect investors, debt levels, the financial position of the enterprise, policies regarding transfers of resources to other funds, and management's experience.

Why is the rating so important?

Vogt (2004) lists four reasons why bond ratings are important:

1. Broadens the market for agencies to access credit and creates competition to lower the interest rates the issuer pays. Investment grade ratings can mean the difference of percentage points on interest paid. Over the lifetime of the debt a lower interest rate will lead to tremendous savings for the local jurisdiction on the amount of interest they will pay out.

2. Marketability of bonds for debt trading, holding down yields and raise and supporting prices that the bonds trade at.
3. Independent review and comprehensive assessment identifies good planning, financial management practices, and provides an incentive for officials to continue these practices.
4. Bond insurance to guarantee future principal and interest payments is available only for rated debt.

Who are the stakeholders?

There are various stakeholders involved in a bond deal. These are:

- *Issuers* – state or local government issuing debt.
- *Bond Counsel*[3] – certifies that the issuer has legal authority to issue debt and that this debt is a valid obligation of the issuer. Without these certifications, investors will not buy debt. The opinion should be based on a conclusion that would be *unreasonable* for a court to render a contrary judgment. The opinion will appear in the official statement and will go on each bond certificate. Attorney's that act as bond counsel must be independent of the issuer and have standing in the market. Bond counsel will be hired at the beginning of the project. Nationally recognized counsels are listed in the Bond Buyer's Municipal Marketplace which is known as the "red-book".
- *Underwriters* – buy the debt from the issuer and resell to investors. They are financial intermediaries who bring together issuer and investors and lenders. They do this as principals not as intermediaries (brokers).
- *Underwriters Counsel* – is involved in sales of RVBs and will make sure the underwriters and the issuer comply with disclosure requirements under SEC rules. They also are involved in preparing the official statement. The issuer pays for the underwriters counsel. In some instances, for complex transactions, a special tax counsel will also be hired.
- *Financial Advisor* – will serve several purposes and will help issuer obtain financing at competitive and affordable rates. They are often selected through an RFP process. The advisor will determine whether or not to incur the debt and provide advice on the amount of debt the jurisdiction can afford to carry. They will also develop the RFPs for professional services and assist in the selection process. They will prepare for the rating process, will check accuracy of bid and decide whether to accept bids. Advisors were often paid on a fee per $1000 of debt issued. This was criticized because it provided an incentive to encourage the amount of debt borrowed and also did not reward the financial planning and acumen. Most are now paid on an hourly basis.

[3] Railroad development in the 19th century was for the most-part financed through the use of bonds. However, the legality of using municipal bonds for the railroads was challenged. This eventually gave rise to the demand for an opinion of bond counsel to accompany each issue.

- *Brokers* – do not work directly with institutional or private investors but facilitate trades in bonds. For example, they are often approached by dealers wanting to sell bonds or by investors looking for bonds. The broker will arrange these transactions.
- *Rating Agencies* – these agencies evaluates the capacity and willingness of the issuer to repay the debt when due. They also evaluate the protection afforded to investors. There are three rating agencies in the US: Standard & Poor's Corporation (a division of McGraw Hill Companies), Moody's Investors Service, and Fitch IBCA.
- *Bond Insurers* – will guarantee debt issuers periodic debt service payments of principal and interest. Bond Insurance also guarantees Triple A rating from the rating agencies. If the issuer fails to make these payments the insurer is obligated to make this payment. Bond Insurance became commonplace in the late 1980s as state and local issuers sold more RVBs and as the tax exempt provisions for banks and other financial institutions were limited under the Tax Reform Act of 1986. As banks reduced their debt holdings, individual investors came into the market and they, according to Temel (2001) sought reduction in risks through bond insurance.
- *Trustees* – play a key role and are appointed by the bank or trust company. They represent the interests of the bond holders and usually approve the amount of bonds to be issued. They also receive and disburse proceeds, monitor construction, oversee receipt of pledged revenues, and make debt service payments. They also approve additional bond issuance and the use of outside consultants or engineers hired by the issuer. They monitor operations and approve changes in operating and finance policies to accord with the bond contract. Finally they are also the enforcer of bond holder's remedies in the event of default.
- *Paying Agents* – as more public debt was sold it began to be registered as a book entry rather than in certificated form. The Depository Trust Company (DTC) – owned by securities firms, banks and other financial companies – was established to serve as the national depository for publicly sold or traded securities. The investor now does not receive the securities themselves but will get a confirmation notice/receipt from the underwriter or broker who sold the debt. This receipt indicates the investor owns a certain amount, at face value, of the debt of a specific maturity and interest rate with a specific CUSIP (Committee on Uniform Security Identification Procedures) number. The DTC also now serves as the paying agent. The issuer will wire interest and principal payments to the DTC who will then credit the brokers or banks of the investors who will pass to their clients.
- *Investors* – public and private entities that purchase bonds
- *Regulators* – various governmental entities that regulate the market. These include:
  - The Securities and Exchange Commission which enforces the following laws:
    - Securities Act(s) 1933 & 1934
    - Public Utility Holding Company Act 1935
    - Trust Indenture Act 1939
    - Investment Company Act 1940
    - Investment Advisors Act 1940

- Municipal Securities Rulemaking Board (established by Congress in 1975) governed by the SEC
- National Association of Securities Dealers (established under authority granted in the 1938 Malony Act Amendments to the Securities Regulations).

How is a bond sold?

Bonds can be sold publicly or privately placed. In a public sale the issuer sells the debt to an underwriter or an underwriting group who will then resell it to investors. Public sales are used for large projects with capital costs of $10 million or more. The debt is marketed using a notice of sale and a preliminary *"official statement"* - often placed in financial media. A public sale can be competitive or negotiated. In a competitive sale different underwriters compete and the issuer will sell to the underwriter offering the lowest rate. In a negotiated sale, the issuer will select a specific underwriter using an RFP process. The underwriter and issuer will then negotiate the interest rates, prices, and terms. The underwriter then buys the debt and resells to investors. The various actors described above are involved within public sales and these often involve significant issuance costs.

Investment bankers prefer negotiated over competitive public sales because in a negotiated sale the underwriter plans and manages the transaction and can design the debt, according to Ehlers (1998) and Joseph (1994), to meet market demands. This enables the underwriter to pre-sell all (or most) of the debt and secure low interest rates for the issuer (which the bankers do not want). Underwriters comment that negotiated sales avoid the need for the issuer to have a financial advisor and that underwriters in negotiated sales often provide a secondary market after initial issue.

Ehlers (1998) and Joseph (1994) have criticized negotiated public sales on three factors:

1. Underwriters face a conflict of interest in negotiated sales, because they are attempting to meet the needs of both issuer and investor. Issuer wants low rate: investor's high yields.
2. Underwriters contribute to political campaigns of elected officials who then select underwriters to sell debt. Both parties are open to "pay-to-play" accusations. In the 1990's the Municipal Securities Rule Making Board adopted rules prohibiting municipal bond dealers from engaging in negotiated debt transactions with state and local government issuers within two years of making any contribution to any official of the issuer.
3. Some argue that the spread and costs of negotiated transactions exceed those of competitive sales.

For a private sale, the issuer will place the debt directly with an investor. These are often used for small capital projects that range in the tens of thousands of dollars to the millions of dollars. In these transactions a financial advisor will often arrange the private placement. For these projects issuance costs are significantly reduced. Many of the stakeholders above are not required for private placement.

Issuance costs

As noted earlier the cost of selling government debt is considerable. Most RVB's include fees for bond counsel, underwriting, ratings, registration and paying agent services, printing, advertising, and other expenses. Costs also include payments to attorneys, other issuer's bond counsel, fees for financial advisory services, and insurance or other premiums. Vogt (2004) undertook a review of North Carolina bonds issued in 2000 and 2001 and found that issuance costs for RVB's were $14.75 on average for each $1,000 of debt compared to $8.93 for GO bonds. He also found that issuance costs were determined by economies of scale and by the rating. In general attorney fees accounted for less than one-fourth of costs for RVB issuance, while bond rating fees contributed approximately 10% on average. Finally, Vogt (2004) found that underwriting fees comprised the largest portion of issuance costs, averaging 50 to 60% for both GO and RVBs.

Calculating debt service

The principal on long-term debt is usually paid annually and interest paid semiannually with the debt declining overtime. This also helps to lower interest payments overall. This is often called the level debt service model. However, for RVBs because of the longer ramp-up time period using this model is often inappropriate. In most instances RVBs will be structured so that a graduated increasing annual debt service is used. Annual revenue takes time to build, so it requires the issuers to keep principal retirement and debt service low in the early years of the bond. Some series structures are also created so that principal retirement is deferred for approximately two to five years after issuance. While annual interest will be paid during these years principal is not. This is a structure often used for RVBs and for transportation infrastructure.

Capitalization of interest on debt is also often added to project costs and in some instances may be paid from bond proceeds. If interest on debt during the construction period is not paid from project revenues it will form part of the annual debt service and will be paid from annual revenues. Some states, as well as generally accepted accounting principles, allow interest and other financing costs during project construction to be charged to the project. These will then be paid from bond proceeds as opposed to operating revenue. Capitalization of interest usually occurs in RVB projects. When it occurs, it does not reduce debt service during construction but rather shifts source of payment for interest portions of the debt service.

What are the risks associated with investing in bonds?

According to Finnerty (2001) at least seven types of risk are associated with bonds:

1. *Interest rate risk* – the value of a bond changes in the opposite direction from a change in interest rates. As interest rates rise (fall), the price of the bond falls (rises). This price fluctuation is referred to as interest rate risk (or market risk). This risk is caused by several factors, but primarily by changes in inflation, riskiness of the jurisdiction, and changes in supply/demand for funds.
2. *Reinvestment Risk* – When a coupon payment is made, there is the risk that the payment must be reinvested at a lower interest rate. This is greater for longer holding periods and bonds with large coupon payments.

3. *Call risk* – if interest rates drop the issuer may chose to exercise its call option, and investors will need to reinvest money at a lower rate
4. *Default risk* – the bond issuer might default. There are two types of default – payment default (issuer does not make required interest and principal payment) and technical default (other provision is violated).
5. *Inflation risk* – or purchasing power risk occurs because the value of a set cash flow amount falls as inflation rises. For all but floating-rate bonds there is inflation risk because the coupon rate is fixed.
6. *Liquidity risk* – depends on ease with which investors can sell bonds at or near their intrinsic value, i.e., the spread between the bid price and the ask price.
7. *Foreign exchange risk* – if the bond is denominated in a foreign currency.

Other bond nomenclature

- *Average life* – is the number of bond years divided by the total number of bonds in an issue.
- *Bond years* – are calculated by taking the number of bonds outstanding times the number of years outstanding.
- *Bond year dollars* – are the number of bond years times $1000 for each bond.
- *Call Provisions* – standard feature of most tax-exempt issuers. It gives the issuer the option to retire part of the bond. Some bond instruments will provide for penalties if calls come in early.
- *Coupon Rate* – the interest rate stated on the bond (fixed or variable) payable to the investor. It is usually stated in denominations of $5000.
- *Dated Date* – the day, month and year from which the investor is entitled to receive interest, even if bonds are sold on a different date.
- *Debt Service Schedule* – is the repayment schedule with amortization of principal and interest.
    - Level Debt Service – the total of principal and interest repaid each year is the same throughout the life of the bond issue
    - Level Principal or Declining Debt Service – the dollar amount of annual serial maturities is the same each year throughout the life of the bond issue; therefore the interest portion declines each year.
    - Ascending Debt Service – the largest principal payments are made in the future, with little amortization of principal in the early years.
- *Maturity Date* – the day, month and year upon which the investor will receive final payment of principal and interest.
- *Net Interest Cost* – Total interest payments plus discount divided by Bond dollar years is an older method which is hardly used any more.
- *Par Value* – is the amount to be repaid by the maturity date.

- *Put Provision* – is a bondholder option to sell the bond back to the issuer for a par value on designated dates. This feature benefits investors and therefore increases the bond's value.
- *Serial Bonds* – typical municipal bond offers are made up of as many as 20 different maturities. This allows issuer to spread out the debt service costs. Serial bonds are often matched to the useful life of the different capital items being financed. The longer the maturity, the higher the interest rate.
- *Term Bonds* – are due only at one maturity. They usually require a sinking fund which will have retirement funds placed into it.
- *True Interest Cost* – is the most commonly used method to compute cost in a competitive bid. This is the rate which will discount all future cash payments so the sum of the present value of cash flows will equal the bond proceeds.
- *Underwriters Discount* – this is the underwriter's fee from a bond sale - also called the gross spread. The gross spread minus their expenditures is their net profit or net loss. This is the difference between the price that the underwriter pays for the bonds and the price at which the underwriter resells to investors. Gross spread is usually quoted in terms of $ per 1000 bonds. According to Finnerty (2001) the spread has three components:
  - The management fee – usually 15 to 20% of the spread, which compensates the managing underwriters for their assistance in designing the issue, preparing the documentation, forming the syndicate, and directing the offering process.
  - The underwriting fee – usually 15 to 20%, which compensates for underwriting risk.
  - The Selling concession – generally the remaining 60 to 70%, which compensates for the selling effort.
- *Years Average maturity* – is a measure of how long, on average a bond or debt issue that is retired in annual or period installments over many years is outstanding.
- *Zero coupon bonds* – are sole and purchased at a discount. Interest is not paid to the investor on a semiannual basis. At the date of the maturity the investor receives the principal amount plus interest which is compounded semiannually.

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