High-Speed Rail for Chicago and the Midwest

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The views and findings in this paper are those of the authors and do not necessarily represent the statements or policies of The Civic Federation.

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INTRODUCTION

Intercity commerce and travel to and from Chicago is important to the region's economic health. With increasing demand for regional travel causing airline delays and highway backups, the cost of travel in terms of both time and money has begun to raise concerns within the public and private sectors. To ease this congestion, several plans have been considered including new airports and highways.[2] An idea that continues to attract attention is a proposed Midwestern high-speed rail network connecting Milwaukee, St. Louis, Detroit, and Chicago, with Chicago serving as the hub. Proponents of high-speed rail believe it has the potential to significantly ease congestion and encourage development in Chicago.

The purpose of this study is to provide an analysis of the economic and developmental impacts of a high-speed rail network and its associated costs on this region's transportation needs. This paper has three objectives. First, it provides a review of the existing research on Midwestern high-speed rail.[3] Second, it provides an analysis of high-speed rail projects in other areas of the world. Last, it examines future developments in the area of rail transportation, identifying important issues and areas that require additional research.

Several key issues were identified in the initial research. These points form the structure of this paper. They are:

- Demand and Ridership;
- Economic benefits;
- Costs; and
- Feasibility.

BACKGROUND

The Federal government describes High-Speed Ground Transportation as "trains and magnetic levitation (maglev) systems capable of traveling at 125 mph or faster."[4] The papers, research, and documents concerning High-Speed Rail (HSR) policy in the Midwest have looked at options ranging from making slight speed improvements to the existing trains and infrastructure to acquiring all new rights-of-way for trains traveling at 200 mph. While the Federal government defines HSR as exceeding 125 mph, this paper also includes rail alternatives which may not be as fast, but do shorten total travel time. Diesel powered trains with maximum speeds of 110-125 mph using existing rights-of-way are one example.

[2] *Transportation Improvement Program for Northeastern Illinois.* CATS, January 1994.
[3] In addition to written reports, research was conducted by interviewing officials from both City and State government, transportation consultants, and transportation planners.
[4] *High-Speed Ground Transportation*, US GAO, Nov. 1996. p.2

1.0 DEMAND & RIDERSHIP

Travel demand in the Midwest has been growing at an exponential rate. Average daily vehicle miles for automobiles in Chicago has increased 33% between 1980 and 1990.[5] In just four years, between 1987 and 1991, average vehicle miles traveled increased 6%, making Chicago the fourth most congested city in the US.[6] Many of the expressways in Chicago are at capacity for 12-15 hours a day. Automobile traffic is not the only expanding mode of transport. The growing need for transportation infrastructure is beginning to stress both the existing roads and the regional airports. In the case of aviation, O'Hare and Midway are also experiencing increased demand for regional travel. O'Hare and Midway have limited capacity remaining.

The Midwest provides a substantial travel market. The Chicago Hub region has 18 million inhabitants and the total intercity passenger-miles within the Midwest adds up to over 10 billion miles annually.[7] This market has created the busiest airport in the world and some of America's most congested highways.

In order to ensure that Chicago's metro region remains the transportation hub of the Midwest, alternatives to increased road and air congestion must be studied. One option that is beginning to attract publicity and gain popularity is rail transportation. Since rail accounts for less than 2% of Midwestern intercity travel, it is considered an underutilized method of transport.[8] For example, only in the past couple of years has there been an increasing demand for Amtrak's existing rail service.

Amtrak Intercity Ridership[9]

Intercity Route	Riders Dec. 1995	Riders Dec. 1996	Percent Change
Chicago-Detroit-Pontiac	34,701	41,247	+18.9%
Chicago-St. Louis	23,068	24,615	+6.7 %
Chicago-Milwaukee	28,049	32,486	+15.8%

Amtrak attributes this ridership increase to improved frequency, better on time performance, and maximizing the use of existing rail cars and locomotives (rolling stock). These small service improvements and their subsequent ridership increases shows the sensitivity of rail as a method of travel, but also shows the increasing demand for rail travel. If small changes to service and train frequency can have significant changes in ridership, a high-speed, frequent, and reliable train service has the potential to create a substantial ridership base.

The idea of HSR in the Midwest is not new, but it is beginning to attract attention as a viable mode of transportation. Because of its potential to carry large numbers of travelers at

[5] Figure for six county area. *Strategic plan for land management*, NIPC, June 18, 1992. p.27
[6] *The impacts of the RTA system on the regional and state economies*. Cambridge Systematics and Vlecdes-Schroeder Associates for RTA, January 1995. 2-34
[7] *High-speed ground transportation for America*. USDOT, FRA, August 1996. 0-23
[8] *Ibid.*, USDOT, FRA, August 1996. 0-23
[9] *Amtrak intercity ridership rises for the first quarter of fiscal year 1997*. Amtrak Intercity, Feb. 3, 1997.

high-speed between cities, HSR is being studied as a complementary form of transport to road and air.

The exact passenger demand for HSR is under much debate. Without an operating HSR system in the Midwest, it is difficult to determine the potential demand. However, by looking at existing systems elsewhere one can point out differences between the Midwest and existing systems and posit ways that demand can be increased.

Examples of high demand for HSR travel can be seen in Europe and in the Northeast Corridor (NEC). The demand in Europe is driven by several factors that are not present in the US:

- European countries subsidize the cost of train tickets;
- European countries have significantly lower subsidies for automobile travel;
- European cities are fairly compact making their stations accessible to a sizable percent of the population; and
- The quality of European Rail service has never declined.

The Northeast Corridor is the only example of HSR in the US. Trains run between New York, Philadelphia, and Washington DC at 125 mph. There are significant demand factors at work in the NEC that are not present in the Midwest:

- High density and close proximity of cities in the northeast;
- Cities are geographically located in a row along the coast making them easy to link together;
- The cities in the NEC have always had regular usage of trains and public transportation systems; and
- Costs for road travel in the NEC are much higher than in the rest of the US. Tollway and bridge fares, as well as a higher cost of gasoline, lead to much higher travel costs.

However, the "Chicago Hub" proposal has some similarities with and advantages over European networks and the Northeast Corridor:

- Chicago has a much denser downtown business district than European cities. This concentration allows a downtown terminal to be accessible to vast numbers of business travelers;
- The level of congestion in Chicago is similar to congestion in the NEC and in Europe;
- Chicago is the hub of the Midwest's existing rail network with several thousand miles of track and 22 rail yards;[10]
- The Midwest has some of the most severe winters in America. Winter storms often cause closure of airports, diversion of flights, and highway accidents. Trains are not

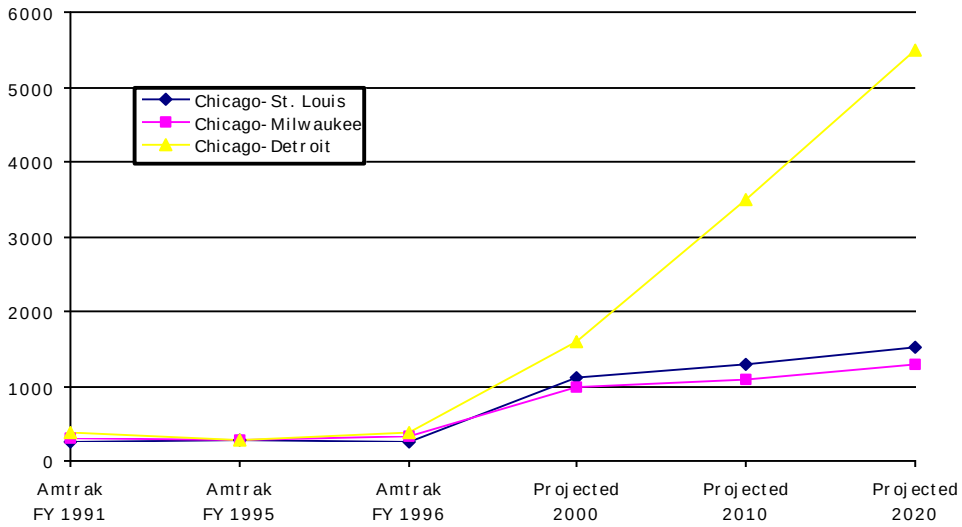
[10] Chicago still main axle of nation's railroads. David Young, *Chicago Tribune*, Nov. 13, 1996.

as affected by weather and could continue to operate when other modes of travel are stopped by the weather;

- As in the Northeast, congestion has led to large usage of public transportation networks. Chicago has the second largest public transportation network in the US, which can benefit and benefit from increased rail travel; and
- Seven cities with populations over one million are located within 350 miles of Chicago. These cities are within a short enough distance that rail can be competitive with other modes.

Using these advantages to increase rail service and incentives built into HSR in other places, one could develop a way to increase rail ridership in the Midwest. Extensive HSR ridership studies have been conducted by the Departments of Transportation (DOT) in Illinois, Wisconsin, and Michigan. These studies tend to look at many factors such as fares, train frequency, different ridership baselines, and the costs of road and air travel. For example, if a projection assumes that the price of fuel will increase significantly in the next 10 years, then the cost of road and air travel go up at a higher rate than train travel. This leads to higher ridership numbers, as people switch from cars to more energy efficient trains. If a projection assumes low train frequency with high fare prices, projected ridership will be very small. The DOT reports examined for this study determined that there is sufficient ridership to cover operating costs and have excess annual revenue. The values in the following graph are the only figures available from the DOTs of Michigan, Illinois, and Wisconsin and are not accurate enough to project revenue for Midwestern HSR. Further study would be necessary to show that HSR could create the revenue needed for private investment.

Amtrak and Projected HSR Ridership[11]
(in 1,000 of riders)



Rail usage in America is highly sensitive to changes in other transportation modes. Rail ridership increases during inclement weather when planes are grounded and road travel is too

[11] Current and projected figures compiled from Michigan, Illinois, and Wisconsin DOTs and Amtrak Intercity.

hazardous. Ridership often increases during holidays when other modes are over congested. Rail ridership is also very sensitive to fare prices. In 1995, a short lived fare increase of 50% on the Chicago-Milwaukee line cut ridership 27%.[12] Since then ridership along this route has increased 15.8% and the route continues to be one of Amtrak's fastest growing. In fact, all of the routes that make up the Chicago Hub network have shown significant ridership increases in recent years. This sensitivity to conditions is a significant advantage for HSR. If ridership increases due to small service and speed improvements, an HSR network could draw a large ridership base.

Another way to increase ridership is to connect HSR to another transportation mode. For example, an O'Hare airport stop has been suggested.[13] This stop has the possibility of increasing ridership as a form of airport access, but also puts a terminal into a heavily traveled area that would provide convenient access to the businesses and population of the northwestern suburbs.

According to the ridership reports, the market demand to make HSR viable in the Midwest exists. Future aspects that could affect ridership would include changes in the price of gasoline, airline ticket prices, and congestion. These ridership issues will need further study to project the revenue of an HSR system.

2.0 ECONOMIC BENEFITS

The economic benefits of high-speed rail come in many different forms. The US Department of Transportation published a report analyzing areas of the US and their suitability to HSR development. This report states that the "Chicago Hub" network is the most feasible network outside of the NEC. The "Chicago Hub" has a total costs versus total benefits ratio of 1:2.5. That means that for every $1 invested, the benefits would be $2.50.[14] The benefits that were quantified in this study were the gains to HSR users over and above the fares that they pay, congestion relief in the air and highway modes, and reductions in emissions. The factors that were left out of this report were the economic impacts of HSR operation and construction, capital savings on airports and highways, and energy savings. These factors would need further study and could lead to a more favorable costs vs. benefits ratio.

As with any economic assessment, HSR's economic benefits depend on the variables being measured. Below is an outline of the possible benefits of high-speed rail.

2.1 Transport advantage

[12] Coming months critical to area rail. Larry Sandler, *Milwaukee Journal Sentinel*, Monday, September 23, 1996.
[13] *Chicago-Milwaukee High-Speed Rail: Consideration of an O'Hare Airport station stop.* Grove Management, January 1997.
[14] *Ibid.,* USDOT, FRA, August 1996. 0-24

This category includes many of the points that make HSR attractive to travelers. Factors like lower fare prices, reduced congestion, and improved travel times will be large components in attracting ridership to an HSR system.

Reduced Congestion

Congestion can be difficult to measure and numbers can be manipulated to make congestion savings look very large or rather insignificant. Most reports agree that HSR will reduce congestion at airports and on highways, but they disagree to what extent.

A Coalition of Northeastern Governors (CONEG) study of the NEC placed annual congestion savings through HSR on the Boston-New York route at 4.3 million hours.[15] The New York-Washington route has already captured 70% of air traffic within that corridor. Amtrak states that an HSR corridor between Chicago and Detroit could divert up to 33% of existing air travel.[16] In Chicago, road congestion costs the average driver $470 per year.[17] The growth of this congestion in the next 10-15 years is a concern that needs to be examined. At improved speeds of 110 mph to 125 mph, the main competition for HSR will be the automobile. Travel time remains longer than air travel, but in terms of total travel time from downtown-to-downtown, HSR can also be competitive with short-to-medium distance air travel.

Improved Travel Time

The current Amtrak travel times between Chicago-St. Louis and Chicago-Detroit are 5 hours and 30 minutes. This could be reduced to 3 hours and 20 minutes on both corridors using 110-125 mph rail service.[18] These travel times are still longer than air travel, but the door-to-door travel time is often less by rail. A typical air travel scenario would be: 30 minutes to get to the airport, 30 minutes for check in and boarding, 1 hour and 45 minutes of flight time, 20 minutes for arrival and baggage claim, and then 30 minutes to get from the airport to your destination. When all the times are added together, the total time is 3 hours and 35 minutes. While this is not considerably longer, there are more shifts in modes and less time to work, read, or relax. Train stations are located in central areas which are more accessible than airports on the fringe. When the total travel time is taken into account, HSR is competitive with driving and air travel. HSR travel could also help reduce travel times on existing travel modes by diverting traffic off roads and runways.

Lower Accident Rates

Train travel is much safer than road travel. Auto accidents in the US represent 110 deaths per million passenger miles while rail travel has 0.3 deaths per million passenger miles.[19] The French TGV in its first 11 years of service carried 250 million riders without a single injury or fatality.[20] High-speed trains can often be safer then

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[15] *CONEG High-Speed Rail Regional Benefits Study*. CONEG, Oct. 1990. 2-4
[16] *Rail Passenger Service*, Amtrak, 1995. p.1
[17] Commuter's time is lots of money. Carol Castaneda, *USA Today*, Dec., 11, 1996.
[18] *Midwest High Speed Rail Network Financial Alternatives Analysis*, ELPC, June 1995. p.2
[19] *Ibid.*, Amtrak, 1995. p.10
[20] TGV: 11 years, 250 million riders, no accidents. (sidebar) *Railway Age*, May 1993. p.40

conventional trains due to improved rails and signaling used on high-speed corridors.

Savings in Travel Costs

HSR travel offers competitive pricing with current rail travel, short distance air travel, buses, and automobile travel. HSR in the NEC costs 25% less to travelers as compared to short-haul flights.[21] Although short-haul flights are more expensive in the NEC, savings over current air fare in the Midwest would also be possible with HSR. The CONEG study showed that on the Boston-New York corridor, the cost of auto travel (calculated at $ .25 a mile) was $60.50. The ticket price of HSR was $65, but with 2 hours less travel time. Savings to the consumer will increase if congestion and travel costs on other modes increase in the region.

Increase Use of Public Transportation Networks

Linking transportation hubs with existing ground transportation has beneficial effects for both methods of travel. The CTA and METRA links to Midway and O'Hare are examples of intermodal nodes that have generated increased travel. By linking the HSR terminal facility with the existing public transportation, increases in ridership can be achieved. This has been true on the NEC. The improvement of tracks and signaling on HSR corridors has led to much faster commuter rail. New York's rail commuters save 5 billion hours annually due to rail corridor improvements.[22] METRA riders on the north and south corridors into Chicago would experience less delays and faster service to the downtown due to rail and signal improvements.

2.2 Development

The development potential of HSR is difficult to measure, but looking at studies of European and Northeast development and applying them to the studies made in the Midwest yields some examples of possible economic development in the Midwest and Chicago in particular.

Investment and Development Around Terminal

In the Chicago Hub system, Chicago stands to benefit the most as the center of the three corridors. If Union Station were chosen as a terminal location for HSR, development around the station area would revitalize the area between the river and the expressway. According to one of Chicago's leading architects, there are plans underway to build a conference center and hotel above Union Station and there are also several redevelopment plans for the old post office structure. Some of these plans include conference centers, a rail station, and a retail mall. If HSR ridership numbers are correct, the Chicago terminal could service an additional 6.8 million passengers a year. Midway airport currently handles 10 million passengers a year. This amount of passenger flow in the downtown would generate economic growth.

Revitalization of Chicago's Industrial Base

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[21] *Ibid.* CONEG, Oct. 1990.
[22] *Ibid.* CONEG, Oct. 1990. 2-4

As the hub of the Midwest network, the Chicago area's rolling stock industry could bid to construct the rolling stock for this new system. The new high-speed train for the NEC is being constructed in up-state New York. As the popularity of high-speed rail in Europe and Asia continues to grow, developing an American HSR industry would be valuable to regional employment and export sales potential.[23] Rail industries in Chicago could capture rolling stock markets world-wide and provide long-lasting regional employment benefits.

Increased Tourism

In 1992, 25 million visitors came to Chicago and contributed $10.3 billion to the region's economy. These figures do not include the 1993 expansion of McCormick Place or the redevelopment of Navy Pier. The added contribution of Navy Pier and the McCormick Place expansion to the economy is approximately another $300 million.[24]

The linking of the Loop area with the outlying areas and the big cities of Detroit, St. Louis, and Milwaukee will provide direct access from the Midwest to the conventions and attractions of Chicago. The Eurostar train in Europe has encouraged more vacationers and even shoppers to use rail service between Brussels, London, and Paris.[25]

Reduction in Urban Sprawl

The studies on HSR's effects on urban sprawl conducted by the Northeastern Illinois Planning Commission (NIPC) concluded that no major effect would be seen in terms of settlement patterns.[26] With only 6 million riders a year, HSR could not impact urban sprawl, but it would have a centralizing effect. Companies that do business in Springfield or Detroit would find it advantageous to remain in the downtown near cheap, fast transportation. While other factors are involved in the movement of corporations, the added benefit of rail transport could help downtown Chicago.

Savings from Less Highway and Airport Construction

The introduction of the TGV line from Paris to Lyon in 1981 led to decreased highway demand on this route. By 1986, the highway traffic on this route had only reached 120% of the 1972 levels.[27] O'Hare is the world's busiest airport, handling 60 million passengers a year, but rail stations can handle more passengers using less land. Paris' Saint-Lazare train station handles 150 million per year and Penn Station in New York has 182 million passengers annually.[28] Some reports have claimed that

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[23] *Ibid.*, Amtrak, 1995. p.7
[24] *Ibid.*, RTA, January 1995. 2-21
[25] *The economic impact of high-speed rail*. Rodger Vikerman, Mass Transit, Sept./Oct. 1996. p.69
[26] Information based on personal communication with NIPC staff.
[27] *The economics and financing of high speed rail and maglev systems in Europe*. National Urban Transit Institute, March 15, 1995. p.45
[28] *Ibid.*, Amtrak, 1995. p.15

HSR could have the economic benefits equal to 65% of a new airport development.[29] $450 million was spent to rebuild 7.5 miles of the Kennedy expressway.[30] With rural highway construction priced at $10-$15 million per lane mile and a new airport estimated at $3-$4 billion, HSR could be a more economically viable transportation network.

2.3 Employment

The jobs created due to HSR can include direct, indirect, and induced employment. Direct employment includes people hired to operate the system. Indirect employment is derived from increased business caused by the expenditure of wages earned by those in direct employment and the expenditures of the transportation system itself. Induced employment comes from jobs created due to the fact that the transportation network exists. An example of induced employment would be the creation of businesses near rail accessible areas. This would provide more employment, but the induced employment aspects of any project are difficult to predict.

Jobs Created by Construction

The Regional Economics Applications Laboratory (REAL) model projects that 15,260 jobs would be created during the construction phase of the project, approximately three years in length. About 3000 of these jobs will be construction related. The remainder are indirect jobs (no induced jobs were calculated by the REAL model).[31]

Jobs Needed for Operation

During the operation of the HSR system, 2090 jobs would be created. Unlike the employment during the construction phase, these operational jobs are long-lasting employment. Most of these jobs are in retail and service jobs created by increased spending by riders and employees of HSR. Amtrak's Chicago operations employed 2000 people in 1994. Almost 700 additional railroad jobs would be created due to increased train traffic and service brought about by HSR.[32]

2.4 Environmental

In recent years, the environmental impact of transportation systems has received greater attention. The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) mandated stricter control of emissions in urban areas, creation of an intermodal transportation network, and increased public involvement in transportation planning. Due to these factors, projects involving highway expansion and airport construction have reevaluated their plans. High-speed rail provides a mode of transportation that can fit within the environmental and organizational structure of ISTEA. There is currently a movement in Congress, led by 60 legislators, for the inclusion of programs to aid HSR in the reauthorization of ISTEA.[33]

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[29] *High Speed Rail in Chicago: The Challenge of the 1990's for the Downtown*. Transportation Management Systems for City of Chicago, November 14, 1990.
[30] Pin Hopes on High-Speed Rail, Not Peotone. Mark Miller, *Sun-Times*, January 29, 1995.
[31] Economic Impacts of a Proposed High-Speed Rail Network on the Midwest. REAL, Nov. 26, 1996. p.7
[32] *Ibid*., REAL, Nov. 26, 1996. p.9
[33] Letter to Chairman Shuster and Congressman Oberstar, Feb. 25, 1997.

Reduced Air Pollution

Air pollution is one of the most critical environmental issues in the US. Transportation contributes 70% of the nation's carbon monoxide emissions. Approximately 80% of these transportation emissions are created by highway traffic.[34] Rail travel is one of the most environmentally friendly ways to travel. The HSR link between Boston and New York is expected to reduce total pollution by 2,683 tons annually.[35]

Energy Savings

An HSR link between Chicago and Detroit could save 438,000 to 718,000 barrels of oil per year.[36] Amtrak trains consume only 56% of the British thermal units (BTUs) consumed by autos per passenger mile and 43% of the BTUs consumed by commercial aircraft.[37] Overall, rail travel is the most energy efficient mode of intercity transport. If the cost of energy increases, rail could become more competitive than air transport and cars due to the lower energy requirements.

Low Noise Levels

The Environmental Protection Agency estimates that aircraft noise affects 50 million Americans and highway noise affects 81 million.[38] Noise pollution is a problem that is growing with the expansion of airports and roads. Rail has very little noise impact and newer trains-sets have greatly reduced sound and vibration. Ambient noise on board high-speed trains is also lower than on board aircraft.

Little to No Land Use Interference

Using the existing rights-of-way in the Midwest will have minimal impact on land use. Highway and airport construction consume vast tracts of land. Airports usually use 15,000 acres, which is the amount of land needed to provide 300 miles of rail line.[39]

The possible benefits outlined above show the advantages of HSR as a form of transport. The combined effect of all of these factors will provide substantial benefits, but the extent to which they will be present in an operating Midwestern HSR system is difficult to measure. In order to interest the private sector, more tangible benefits will need to be demonstrated. Without extensive due diligence, a private investor will not be able to justify the financial risk of HSR.

3.0 COSTS

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[34] *Ibid.*, Amtrak, 1995. p.14
[35] *Ibid.* CONEG, Oct. 1990. 4-3
[36] *On the Right Track to the Future* . Swedish Environmental and Transportation Consulting Group, Feb. 1992. p.53
[37] *Ibid.*, Amtrak, 1995. p.12
[38] *Ibid.*, Amtrak, 1995. p.14
[39] *Ibid.*, Amtrak, 1995. p.15

Costs for a high-speed rail network can be broken down into three categories: construction, operation, and financing. These costs are different for each corridor and vary by type of train technology used. The GAO estimated costs of various systems in an August 1996 report. For 125 mph service, the average cost per mile is $10 million; for 150 mph service the cost per mile rises to $13 million, and for new, dedicated right-of-way service operating at 150-200 mph it is $27-$45 million per mile. The majority of the state, federal, and private reports on Midwestern high-speed rail have pointed to using existing rights-of-way and diesel powered, tilt-body trains to achieve 110-125 mph service. This is referred to as incremental high-speed rail. The GAO report states, "the incremental approach provides a lower-cost, near-term option for developing high-speed passenger service in the United States."[40]

3.1 Construction Costs

Using the incremental approach to construct the HSR network will spread construction costs out over a 3-5 year period. Chicago-Detroit and Chicago-St. Louis construction costs reflect a 125 mph train using existing right-of-way. The Chicago-Milwaukee proposal is for a 110 mph train using existing right-of way.

Capital Costs
(in millions of $)

	Chicago-St. Louis[41]	Chicago-Milwaukee[42]	Chicago-Detroit[43]
Capital Costs:	387.9-434.2	471	794.1

Construction Cost Break Down on Chicago-St. Louis Corridor
(in millions of $)

Cost Category	Chicago-St. Louis[44]
Rolling stock:	93.5
Maintenance facility:	13
Trackwork and	
Land acquisition:	139.6-169.2
Grade separation:	77.4-79.1
Fencing:	10.6-11.5
Signaling:	53.8-67.9
Total:	**387.9-434.2**

The two cost estimates reflect two different alignments studied by IDOT. The first is a Chicago-Joliet-St. Louis alignment and the second is a Chicago-Peotone-St. Louis. The latter is more expensive due to its greater length. It is important to note that these costs projections do not include a proposed link to the Peotone airport. The additional costs of the airport extension would add $130 million to the costs outlined above. The cost of station

[40] *Ibid.*, US GAO, Nov. 1996. p.24
[41] *Ibid.*, IDOT, May 20, 1994. p.9
[42] *Ibid.*, IDOT, WI DOT, April 1996.
[43] *Ibid.*, MDOT, August 31, 1992. p.10
[44] *Ibid.*, IDOT, May 20, 1994. p.9

construction and renovation are also not included in these figures. This is due to the fact that most of the stations along this route have new or recently renovated stations with the exception of St. Louis which has a $35 million station project underway. The maintenance facility included in this plan would be able to service all the proposed trains on other routes as well, eliminating the need for separate maintenance facilities for other corridors.

Construction Cost Break Down on Chicago-Milwaukee Corridor
(in millions of $)

Cost Category	Chicago-Milwaukee[45]
Rolling stock:	48.7
Trackwork and Grade crossings:	306
Acquisition of right-of-way:	41.6
Construction management:	56.1
Other capital costs:	18.6
Total:	**471**

The Chicago-Milwaukee corridor is the shortest of the three routes, but at $471 million, it is the most expensive route per mile. The added cost is due to the density in the area around the rights-of-way and the heavy use of this route by freight trains which would require more trackwork and grade crossing improvements. This route is proposed to offer 110 mph service. The cost of 125 mph service is estimated at $702 million and the time savings are 5-10 minutes over 110 mph service. Both speed options include a stop at Mitchell field, but not at O'Hare airport. An O'Hare stop is estimated at an additional cost of $72 million.[46] Construction management is listed separately, but the other plans include it in construction costs. The $306 million includes additional sidings, crossovers, fencing, signaling, warning devices, grade separation, and pedestrian crossings.

Construction Cost Break Down on Chicago-Detroit Corridor
(in millions of $)

[45] *Ibid.*, IDOT, WI DOT, April 1996.
[46] *Chicago-Milwaukee High-Speed Rail: Consideration of an O'Hare Airport station stop.* Grove Management, January 1997. p.1

Cost Category	Chicago-Detroit[47]
Trackwork:	185.5
Curve realignment:	6.9
Right-of-way:	21.4
Grade crossing:	187.3
Signaling:	36.2
Terminals:	21.6
Contingencies:	66.6
Design/Const. Mgt:	76.6
Rolling Stock:	192
Total:	**794.1**

The Chicago-Detroit costs are estimated at $794 million. Due to the 280 mile length, the numbers for grade crossings, rolling stock, and trackwork are much higher than on other routes. Michigan has already spent $150 million in state and federal money to update rails and install high-speed signaling along sections of this corridor. Trains are now capable of 110 mph speeds on these segments of the Chicago-Detroit corridor. The incremental improvements made in the past few years might have reduced certain costs in the above figures.

3.2 Operating Costs

Annual Operation Costs
(in millions of $)

	Chicago-St. Louis[48]	Chicago-Milwaukee[49]	Chicago-Detroit[50]
Operating Costs:	31.4-32.6	19	69.9

Chicago-St. Louis
The operating costs along the Chicago-St. Louis route are the most comprehensive, ranging between $31.4 and $32.6 million depending on the alignment (the Peotone is the more expensive option). This allows for 8 daily round trips between Chicago and St. Louis. These costs include:

- Track and signal maintenance
- Staffing
- Equipment maintenance
- Energy
- Administration
- Sales and marketing

[47] *Ibid.*, MI DOT, August 31, 1992. II-14
[48] *Ibid.*, IDOT, May 20, 1994. p.12
[49] *Ibid.*, IDOT, WI DOT, April 1996.
[50] *Ibid.*, MDOT, August 31, 1992. II-13

- Purchased services
- Leases
- Insurance
- Materials/Spare parts
- Track usage fees

Chicago-Milwaukee

Costs along this route are estimated at $19 million. This allows 12 daily round trips trains operating at 110 mph. The cost includes:

- Equipment maintenance
- Administration
- Energy
- Track usage fees

These four factors include many of the more detailed points in the Chicago-St. Louis route (above). Increasing the speed to 125 mph would increase operating costs to $21.7 million with 16 daily round trips.

Chicago-Detroit

Operating costs on this corridor are estimated at $69.9 million. The higher cost of operation along this corridor is due to the 280 mile length. Personal and track usage fees contribute heavily to this number. A unit cost of $38 per train mile was assigned. Included in this figure are:

- Maintenance of equipment
- Maintenance of right-of-way
- Energy
- Operation of service
- Operation of stations
- Signaling
- Communications
- Administration
- Sales
- Insurance

Overall, the operational costs of the entire network would add up to about $120 million, but some savings could be achieved by linking the corridors together and sharing administration, marketing, and maintenance costs. The FRA report suggests that, “depending upon the technology case, passenger miles are 37 to 49 percent higher, annual revenues 25 to 38 percent higher, annual operating surpluses 53 to 178 higher, and O&M (operating and

maintenance) expenses per passenger-miles from 14 to 27 percent lower," if the system were built together rather than in separate parts.[51]

3.3 Financing Costs

Financing costs are heavily dependent on the type of organization that builds and operates the HSR network. The three basic options include completely public, completely private, or a public-private. A public initiative in Ohio and a private initiative in Texas both failed to structure financial plans that were feasible, but new public-private ventures underway in the NEC and Florida look to provide the future of HSR financing. Other factors that affect financing options include:

- Federal, State, and local outlays
- Rider revenue
- Liability
- Construction time table
- Level of service

Florida's initiative is a public-private partnership that is very far along in the planning and development stages. This progress has been made by the State's backing and a coalition of international companies that have come together to build and operate the system. The planned opening of the Florida Overland eXpress (FOX) is estimated around the turn of the century.

IDOT's financial implementation plan outlines several types of financing plans. The IDOT plan only looks at the financing of the Chicago-St. Louis line. IDOT outlines two different plans to implement high-speed rail service.

Private Franchise
"Under a private franchise agreement, a private developer obtains a franchise from the State to design, finance, construct, and operate the high speed system. The private developer would lease right-of-way from the State and use public funds for certain projects such as grade crossing improvements. This structure offers the advantages of private-sector financial participation, rapid and cost-effective development, and the marketing and operational efficiencies normally associated with private, profit-driven enterprises. However, under this approach, the private franchisee would not be eligible for lower cost tax-exempt bonds."[52]

Turnkey Development
"Under turnkey development, a new independent public authority would be established to arrange funding (including public grants and tax-exempt bonds), to acquire or lease the right-of-way, to contract with a private developer for the design and construction of the system,

[51] *Ibid.*, US DOT, FRA, August 1996. 0-22
[52] *Ibid.*, IDOT, May 20, 1994. p.ii

and to contract with an operator on a three to five-year basis. This option has the advantage of using tax-exempt debt, but adds restrictions that limit private capital contributions and private development and operational efficiencies."[53]

IDOT envisions these options as feasible ways to finance the Chicago-St. Louis route. Both of these options call for the use of revenue-backed financing through bonds and leases for the rolling stock; maintenance facility; and a portion of the track improvement, signaling, and fencing costs. Costs of grade crossing improvements and right-of-way acquisition would be paid for with Federal dollars set aside for these programs. The plan assumes that all but $60 million dollars can be covered. IDOT does not anticipate any use of direct State tax dollars. The State envisions its role as a coordinator and planner with little financial support, and expects Federal support for HSR to be the main source of funding. IDOT also looked at the option of a government guarantee for the bonds, which would reduce initial contributions, but would expose the government to additional financial risk.[54]

The Environmental Law and Policy Center has published a report with similar plans. The report outlines a 100% private plan, a private-State plan, and a private-State-Federal plan. All of these plans look at revenue-backed funding as the largest contributor to the financing of the construction debt. There are many sources for funding that could be effectively combined to allow savings in financing and debt management.

Public Funding Sources

- Federal

- Amtrak funding could be used for capital and operating appropriations;
- The most recent development for HSR funding is ISTEA. Section 1010 of this document outlines the Chicago Hub as a HSR corridor. This designation allows the Chicago Hub to qualify for ISTEA funding. Michigan has been very active in using these funds to upgrade rail lines and signaling. Other government funding is expected to come in the form of highway moneys for the improvements of grade crossings; and
- High-speed rail programs could finance corridor development grants and investment matching.

- State and Local

- General transportation funds could be used for capital improvements;
- Tax-exempt bonds, which have interest rates between 1.5-3.0% lower than taxable bonds could be used in infrastructure projects. However, tax-exempt bonds are available to government affiliated projects. As a result, these bonds can only be used if the HSR project is not 100% private; and

[53] *Ibid.*, IDOT, May 20, 1994. p.iii
[54] *Ibid.*, IDOT, May 20, 1994. p.iv

- Programs like Tax Increment Financing (TIF) this would allow income from real estate and business taxes along the corridor to help pay for the infrastructure costs. This is imagined to be a limited program, but could help in urban areas to pay for stations and surrounding infrastructure.

- Private Sector

- Construction franchises could use the turnkey method explained above or a Build-Operate-Transfer option that would transfer right-of-way ownership and liability to the State after construction;[55]
- Service contracts for operation and maintenance could lower the cost of operation; and
- Equipment leasing would lower the initial costs of acquiring rolling stock and could save considerable money when rolling stock upgrades are necessary.

Several of these options, like dedicated taxes and the diversion of funds from current transportation systems, are not as feasible due to existing funding needs, such as the CTA; however, many of the financing options listed above could be used to gather the capital to build a high-speed train in the Midwest without affecting local transportation funding.

4.0 FEASIBILITY

The feasibility of high-speed rail is largely dependent on government support. However, this dependency is due not so much to government's financial support, but due to policies that would foster HSR projects. While government capital has been used for HSR projects, policies that allow states and corporations to develop HSR will contribute more to HSR in the long run. Some of these polices have already been put into place. The largest impact on high-speed rail development has been the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA). In another big step forward, Amtrak has been given the green light on a $611 million project to upgrade the line between Boston and New York to 150 mph which should become operational early next century. Florida has earmarked $70 million a year in state capital to foster HSR development along its busiest corridors. The 110-125 mph revenue service of the Metroliner on the NEC has proven that high-speed rail will work in the US. It takes a different form than in Europe or Japan, but with organization and support from government, high-speed rail can be made feasible. In the Midwest, public and political support has been building for some time. The "Chicago Hub" network is considered the most profitable HSR corridor after the NEC. Service on these Midwestern routes is already in place under Amtrak and several incremental service improvements have already been undertaken. Along the Chicago-St. Louis corridor, several IDOT lead projects are already making progress towards better rail service. A Federal and State funded track alignment project is being done in East St. Louis. This project will provide direct access to the station in downtown St. Louis from the Illinois side and reduce passenger train delays on a very congested freight corridor. IDOT has also received grants to test and install new signaling equipment on segments of the route. Another demonstration project underway is to increase

[55] Incremental High-Speed Rail Issues. Daniel Roth, *Transportation Quarterly*, Spring 1995. p.63

grade crossing safety using a VAS (Vehicle Arresting System). This system uses a stainless steel net to stop traffic from crossing onto the tracks as well as standard lights and barriers. It is currently being demonstrated in three locations. This system is expected to cost $500,000 per crossing. While the VAS is more expensive than standard grade crossings, which cost $150,000, it is considerably less than using bridges, viaducts, and tunnels at a cost of $2-$3 million per crossing.

On the Chicago-Detroit route, significant upgrades have already taken place. Michigan has invested more than $100 million during the last decade in the "Mainline 90" program. This program has installed a high-speed signaling system on 71 miles of the route, increased passing sidings, replaced switches, upgraded stations, and funded research for further improvements to the line. Amtrak trains will begin 110 mph service in Michigan in early 1998.[56] The "Mainline Express" program is the next phase of the Michigan plan and involves $68 million to be used on the following components:

- $20 million for improved signaling along the entire route;
- $8 million for new passing sidings;
- $10 million for upgraded junctions, connection tracks, and switches;
- $15 million for new and improved station facilities; and
- $15 million for track improvements and upgrading the urban approaches into southeast Michigan.

Along the Chicago-Milwaukee route only preliminary work has been done, but the corridor is already a heavily used and modernized corridor.

ISTEA has supplied the funding for some of these projects. This money is not being taken away from public transport, but is mainly highway money. Obstacles to high-speed rail development include:

- Building governmental and private support for HSR development;
- Defining an institutional structure that will design, construct, and operate the network efficiently;
- Coordination of mixed freight and passenger trains on same corridors;
- Controlling liability issues; and
- Minimizing the long-term financing costs of the capital debts.

Governmental Support

At the Federal level there is support for high-speed rail. The Intermodal Surface Transportation Efficiency Act of 1991 authorized $2.5 billion to be used for HSR demonstration projects, grade crossing elimination, master plan development, and corridor improvements. By 1994, only $12 million of the $2.5 billion had been appropriated to HSR

[56] Hopes high for high-speed train. Thomas DeVier, *The Detroit News*, Dec. 15, 1996.

projects. The majority of these projects have been grade crossing elimination. President Clinton's "Next generation high-speed rail program," appropriated another $32 million to the HSR demonstration program. In the past three years, more and more money has gone into rail improvements. A letter signed by 60 congressmen was sent to Congressman Shuster, the Chairman of the House Transportation and Infrastructure Committee and Congressman Oberstar, the ranking Democratic member of the same committee. The letter urged them to include more HSR support in the reauthorization of ISTEA. An Illinois Congressional delegation has circulated a letter that was sent to Congressman Shuster and Congressman Chafee of the Committee on the Environment and Public Works, voicing support for Midwestern HSR. Similar legislative support has also grown in Michigan. President Clinton has voiced his support for high-speed rail many times and has allowed vast sums of money to be spent upgrading the NEC. Federal programs support high-speed rail, but very few of these programs have the capital to finance an HSR project without help.

State DOTs have most of the planning and funds allocation power over transportation. Midwestern DOTs have been studying HSR for decades and many advances have been made. State governments are in favor of high-speed rail as long as the Federal government or a private firms put up the majority of the money.

At the local level, there is currently a plan underway at CDOT (Chicago Department of Transportation) to determine the location of a Chicago HSR terminal. CATS (Chicago Area Transportation Study) which is the MPO (Metropolitan Planning Organization) for the region does not have HSR on the plans for 2010 or 2020. The reasons for this include the fact that rail is intercity transportation and CATS looks more at regional travel. Another reason is the cost of HSR. With the regional projects like CTA, PACE, and METRA expansions, CATS sees very little capital for HSR in the near future. The inclusion of HSR into the MPO's 2020 plan would be necessary for the allocation of regional transportation funds.

Private Support

Private support for HSR has been building in Chicago and around the region. The 1996 FRA report which ranked Midwestern HSR as having the highest payoff in the country outside of the Northeast has stirred up private interest in the Midwest. The Civic Committee of the Commercial Club of Chicago has been gathering information and meeting with business leaders from the Greater Milwaukee Committee and the Wisconsin Department of Transportation. The business community is becoming more aware of investment opportunities surrounding high-speed rail. Another issue is the airlines. HSR advocates suggest that airlines will look favorably at HSR as a way to cut down on the number of regional flights, but in Texas, Southwest Airlines took the Texas TGV commission to court. Herbert Kelleher, CEO of Texas-based Southwest, opposed governmental support of HSR industries over airline industries in Texas. His main concern was that government money would go towards operational subsidies. Kelleher has been more receptive to incremental rail improvements. This is due to the fact that incremental HSR is less competitive with air travel, and less reliant on public funds. As long as funds are not diverted from airline funds, the airline industry will probably remain neutral.

Institutional Structure

The institutional structure could take the form of a branch of a DOT, but would have to be connected with other DOTs in other states the rails passed through. This type of governmental organization is unlikely due to the amount of state funding necessary. Other organizational options include turnkey and private franchise which are outlined in section 3.3. A variation of the franchise would involve the Build-Operate-Transfer method. A franchise would be awarded to a private group to finance, design, build, and operate the system. The franchise structure permits the infusion of state and federal capital into the financing. Before operation began, ownership of the right-of-way, debt, and liability issues would be turned over to the public sector. This would allow the private company to operate the system, but would free the private group of liability concerns.[57] The organization could also be entirely private. This HSR organization would do all necessary construction projects, acquire rolling stock, and operate service in a three to five year time frame to minimize financing costs and risks. This structure is riskier than the others due to liability and debt concerns.

Coordination of Mixed Traffic Use

Using rights-of-way for both freight and passenger traffic is already a concern. Freight rail is a growing industry and the volume of intermodal freight traffic has revived rail carriers. Amtrak currently runs on rights-of-way owned by freight railroads and the laws that allow Amtrak to run on these rails has caused conflict in the past. Amtrak pays usage fees to railroads that help cover track and signal maintenance. Freight railroads are keeping a close eye on HSR developments and are opposed to spending freight rail money to upgrade lines. They are receptive to the idea of track and signal improvements because it would benefit their traffic as well. The concern is that if high-speed rail becomes a popular mode of transportation and freight traffic continues to grow, capacity along rail lines will be filled. With the recent mergers of large freight carriers, rights of way that are no longer needed might become available for passenger use. A concern would be that these unused rights-of-way would be sold or abandoned. Preservation of these rights-of-way will be crucial to HSR development. Working with the freight railroads will provide information on future plans and projected traffic on specific corridors. If the HSR organization were to purchase the right-of-way, provisions for freight traffic would have to negotiated. Negotiations with freight operators in the Midwest would be necessary before any HSR project could proceed. HSR can not be allowed to cripple America's resurgent freight rail operations.

Controlling Liability Issues

The issue of liability represents one of the major stumbling blocks in the efforts to develop HSR. Amtrak currently is governed by the 403(b) agreement which frees the freight railroads of financial liability for accidents.[58] If Amtrak becomes the operator for a HSR system in the Midwest, the liability issue could be dealt with within the current framework, as it is in the NEC. If Amtrak is not the operator, serious liability issues would have to be resolved with the right-of-way owners and the system operators. While high-speed rail service involves better tracks and signaling, the severity of accidents at higher speeds is a

[57] Financing: It can be done. William Allen, *Railway Age*, May 1993. p.40
[58] *Ibid.*, Roth, *Transportation Quarterly*, Spring 1995.

cause for concern.[59] In order to reduce risk and costs, work must be done with railroads to minimize risks, target problem areas along the corridor and have constant communication and control of trains. Whether liability stays at the Federal level or is brought to a State or private level will change any financing of HSR.

Minimizing long-term costs and debts

Capping the debt of a HSR project could prove to be the undoing of any project. The Texas project failed to look carefully at its debt management. While most reports claim that HSR revenue will cover all operating expenses, there is debate over what percentage of capital costs will be covered through revenue. Without a return on the investment, HSR will never receive private sector support. State or Federal money would be necessary to fill in the gaps. If Federal and State bonds were used and the capital costs were taken on by a private group, the financing costs would be lower and public funds would be less involved. IDOT's plan focuses on keeping state tax dollars out of HSR, but does not rule out the possibility of State bonds and tax incentives to help foster HSR development.

CONCLUSION

High-speed rail is a topic that has been in the planning and research phase since the 1960s. Developments over the last 10-20 years in the Midwest, such as increased congestion, population growth, and travel demand have begun to increase its potential for development. Before HSR in the Midwest can be implemented successfully, several issues will have to be addressed:

- **A plan for institutional structure-** This type of project involving several states will be very difficult to coordinate. Leadership will be a key in developing HSR. Plans for the organizational structure should be examined in order to minimize administrative redundancy within each state and organization as well as maximize the use of public and private organizations.
- **A region-wide ridership study-** Although extensive studies have been made by state DOTs, an update of this information, coupled with a ridership study of all the parts of the system, will provide better information on HSR revenues.
- **A detailed benefits analysis-** An analysis of economic and other quantifiable benefits that would result from HSR development in the Chicago region could be used to foster development and support for HSR.
- **The role of the freight railroads-** The current congestion of tracks and the possibility of increases in passenger and freight traffic will have to be addressed. Negotiations for right-of-way ownership and usage will have to be settled before HSR trains could begin service. A precise coordination and control of trains will have to set up to ensure the safety of large numbers of trains traveling at higher speeds on the same corridors.
- **A detailed financial plan-** A more exact examination of the costs, benefits, and ridership should form the basis for a detailed financial plan. This plan should be

[59] Operations and Safety Considerations in High-Speed Passenger/Freight Train Corridors. Kenneth Ullman and Alan Bing, *Transportation Research Record*, no. 1489.

presented to the public and private sectors and structured to provide the investment potential to attract the necessary capital from both sectors.

Addressing these topics will result in a clearer understanding of HSR's potential in the Midwest. HSR has the potential to be a viable method of transportation in the Midwest, but existing rights-of-way and other infrastructure must be available. The sale and abandonment of rails, the destruction of viaducts, and the closure of stations will cripple any future attempt to improve rail service. Chicago has a large amount of rail infrastructure that will be necessary for rail development. This infrastructure should be preserved because it will be too costly to replace.

The broad reports on HSR that have been advanced thus far have set up the framework of Midwestern HSR. The next step to build around that framework to provide the information necessary to determine the feasibility of high-speed rail and bring the interested parties to the table. The Civic Federation hopes that this analysis will clarify this issue and encourage further study of high-speed rail transportation in Chicago and throughout the region.

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