

# High-Speed Rail (HSR) in the United States — Why Isn't There More?

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## Introduction

American tourists and business travelers often return from trips to Japan and Europe with favorable memories of their travel on the shinkansen, TGV or ICE trains.<sup>1)</sup> Japanese and European visitors to the USA often return wondering at the absence of high-speed service in the USA. Suppliers of HSR equipment often dream of the time when the American market for their equipment and expertise will develop—and they all wonder when...

This is not surprising. The shinkansen has long been a point of Japanese pride, and the pictures of the shinkansen passing in front of Mt. Fuji are almost as well known to western tourists as any other Japanese attraction. The familiar pictures of the bright orange TGV trains speeding through the French countryside are a similar French attraction. Germany will no doubt soon develop travel posters of the ICE and the TR07 MAGLEV.<sup>2)</sup>

The USA certainly does not lack the capability nor the resources to put theory into practice—as the NASA space program shows. In fact, work on HSR and MAGLEV actually began in the USA at the same time as in other countries. Steam trains exceeded 160 km/h in the USA at the turn of the century (picture of New York Central steam train) and the New York Central Railroad was experimenting with 300 km/h trains in 1966 (picture of New York Central "jet train"). Nor is the USA an "anti-rail" country. Rail service grew early and fast in the USA, and few countries have more links in song and myth. At least through the early 1950s, most observers would have guessed that the USA would remain a world leader in HSR applications.

But there are no shinkansens, TGVs nor ICEs in the USA, and there are no im-

mediate prospects for any to be built. The case appears strong, and the opportunity looks favorable, so why has nothing happened, and what are the prospects that such systems will eventually emerge?

## Current Status and Some Interesting History

A partial answer is that HSR and MAGLEV have never been totally ig-

nored. If HSR is 200 km/h or faster,<sup>3)</sup> there already is HSR between New York City and Washington, DC—but it is limited at best. There are historical reasons why.

As Figure 1 shows, rail was losing market share to cars well before World War II, but its share was artificially propped up by wartime restrictions on private-car usage. Immediately after the war, rail's passenger role continued to plummet. Even

Figure 1 Modal Shares in US Passenger Market

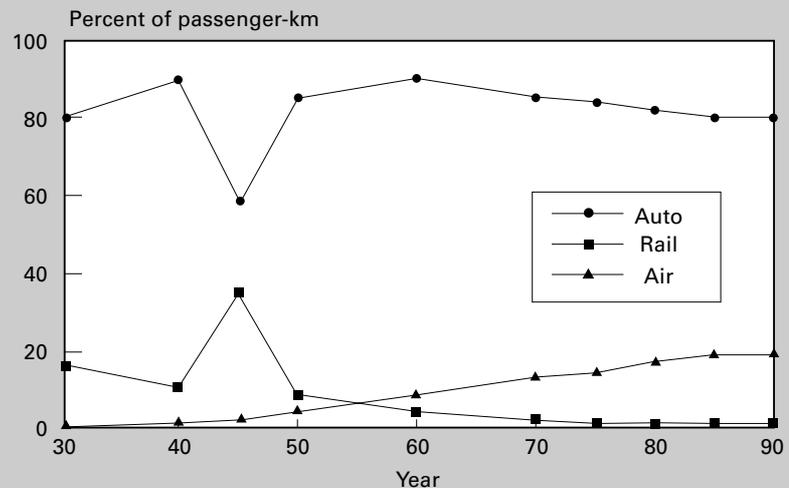
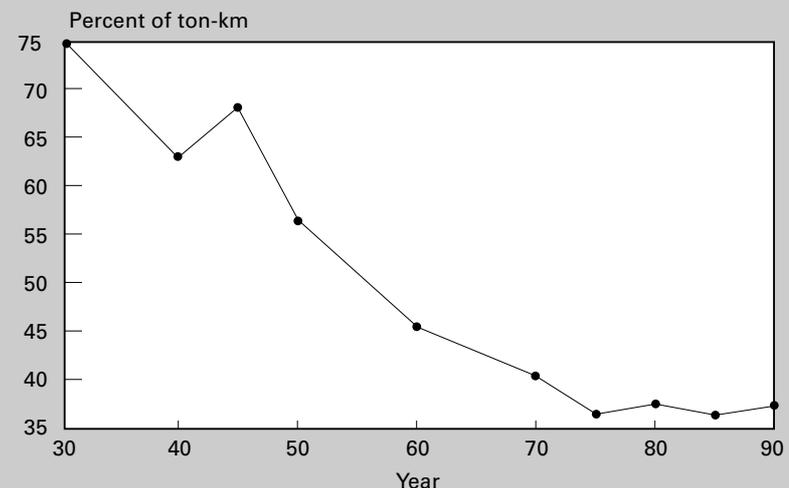
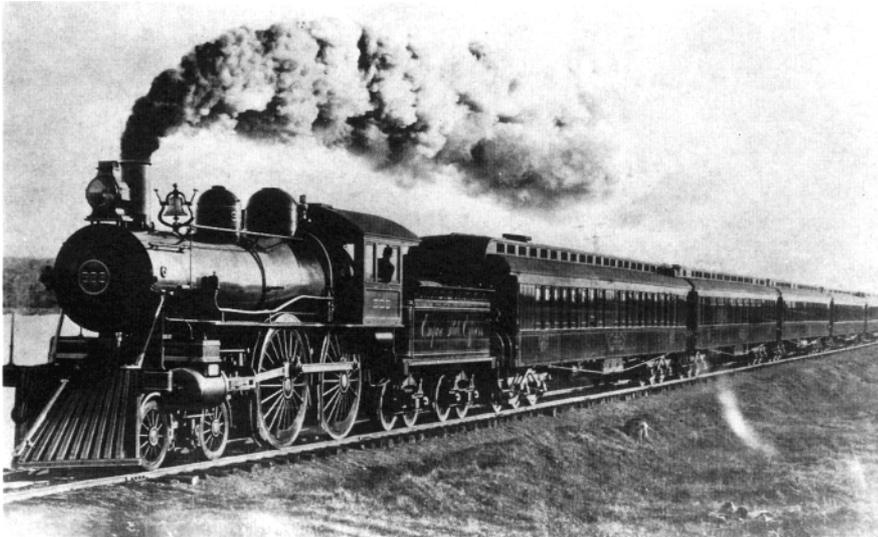


Figure 2 Rail Share of US Freight Ton-km



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■ The Empire State Express at 160 km/h

(Trains Magazine)

more important in the overall story, because of its impact on the financial health of the privately-owned rail industry, was the parallel loss of rail share in the freight market (Figure 2). Rail simultaneously lost both its passenger traffic and the ability to finance the investment that might have defended that share.

Governments responded slowly to the growing crisis. In fact, misguided government regulation of the railways—politically distorted rates and inability to adjust services—was one of the primary reasons for the rail dilemma. The other reason was the assistance by government in the growth of the highway and airline system. By the early 1970s, much of the nation's private rail network was effectively bankrupt. Worse, the Federal government had no good ideas about how to resolve the crisis.

Fortunately, the crisis eventually generated its own solutions. First, Amtrak was created in 1970 as a way to get the rail passenger service (planning, management and deficits) onto the agenda of the Federal and state governments. As a result, passenger services no longer cause the freight carriers to lose money. Amtrak is operated (for the most part) as if it were a private company, and neither its rates nor its service quality are regulated by government. Although Amtrak is required to operate a designated network, the government pays its deficits and meets some of its capital needs. Next, many of the bankrupt freight carriers were taken over by the Federal Govern-

ment, restructured, and subsequently privatized,<sup>4</sup> and they succeeded rather well. Finally, the rail freight and trucking industries were substantially deregulated in 1981/82. As a result, the overall USA freight rail industry is probably in the best shape in its history.

Although the primary focus was on freight and conventional passenger service, HSR was not completely ignored during the mid-1960s and later; several initiatives were undertaken which subsequently bore fruit. The first was the creation of the Office of High Speed Ground Transportation (OHSGT) with the mission of studying the possibility of HSR in a number of areas in the USA. The attention of OHSGT focused on the needs of the

market between Washington, New York City, and Boston, Massachusetts—generally known as the "Northeast Corridor" (NEC). OHSGT eventually produced what became the seminal report on HSR in the NEC.<sup>5</sup>

At roughly the same time, the Pennsylvania Railroad (PRR) spent over \$70 million upgrading track and buying new rolling stock (picture of original Metroliner) in order to "test" the demand for higher-speed passenger service between Washington and New York ("Metroliners") and New York and Boston ("Turbotrains").<sup>6</sup> The experiments were an immediate success, and created significant public support for sustained improvements in rail passenger service. As a result of the OHSGT planning and the PRR tests, Congress authorized the Northeast Corridor Improvement Project (NECIP), a \$2.5-billion project aimed at improving rail passenger service between Washington, New York City and Boston. The NECIP began in 1976 with the bulk of the work finished by 1988.

NECIP's accomplishments were considerable.<sup>7</sup> Much of the track between New York and Washington was brought up to "high-speed" standards (205 km/h) and certain of the present Metroliners<sup>8</sup> (picture of "new" Metroliner) actually travel a significant distance at that speed. In addition, signal systems were improved, stations rehabilitated or built, bridges rehabilitated, and new maintenance facilities built. Trip times (2 hours and 50 minutes from DC to NYC, 3 hours and 40 minutes from NYC to Boston) and trip reliability



■ Jet-Powered Budd M-497 Test Run in 1966

(Trains Magazine)

were improved, as was initial ride quality and rolling stock. Unfortunately, for funding and other reasons, Amtrak has not maintained the track at appropriate quality levels, and continues to operate with sadly outdated rolling stock.

Two problems remained unresolved: 1. Major segments of the track between NYC and New Haven are not owned and controlled by Amtrak but are, instead owned by a commuter passenger operator (Metro North), and 2. There is no electric traction between New Haven and Boston, forcing a change of locomotives and use of slower diesels over the section. Because of these problems, there is no HSR north of NYC.

After completion of the first phase of NECIP, work slowly continued in upgrading the NEC. Minor improvements have been made in disentangling commuter from higher-speed intercity trains in the Metro North section, and money has been authorized to complete the electrification between New Haven and Boston, saving about 30 minutes on existing trip times. The DOT has outlined a series of additional improvements for Congressional consideration which would lead to a further marginal improvement in trip times and improve operational reliability at a cost of several billion dollars. Follow-on studies are now underway on new and better ways to operate the NEC services.<sup>9)</sup>

The NEC did not receive all the attention for potential HSR service. Beginning in the early 1980s, the DOT and Amtrak began to study other potential corridors (called "Emerging Corridors").<sup>10)</sup> This highlighted several corridors, notably Los Angeles-San Diego, that deserved attention. At the same time, the studies showed that some of the corridors had little economic potential.

There have been three HSR corridor initiatives that were not conducted by the Federal government. The first was Los Angeles-San Diego. In this case, Amtrak worked with Japanese investors to propose a shinkansen-type service, essentially to be funded privately. Although the proposal received considerable attention, it did not succeed because: 1. There was too much local opposition; 2. There were persistent questions about the demand forecasts which were never adequately resolved; and, 3. When the ability of the private sector to carry out the project came into question, neither the Federal govern-

ment nor state governments came forward with the rescue support.

The second project was Tampa-Orlando-Miami in Florida. The initiative came from the State government which created a commission that put the concession for the service up for competitive bids. The terms of the concession were essentially that private investors would be responsible for building and operating the corridor, with the commission's role restricted to facilitating the acquisition and enhanced development of the necessary real estate for operation and development of ancillary properties. The winner of the competition was a group headed by a real-estate development firm proposing Swedish X-2000 technology. Despite several years of effort, the group was unable to bring the project to the construction stage, again largely because the State and Federal government refused to participate and the net income to be earned from operations and related real-estate development was clearly insufficient to support the enormous capital investment.

The third significant project was the "Texas Triangle" service between Dallas/Fort Worth-Houston-San Antonio. This project was also based on the principle that a private sector concession could succeed without public money or active involvement. Despite the support of a major

private sponsor and access to TGV technology, this project has also essentially been halted. Despite assurances to the contrary at the outset, the private sector alone simply was not capable of bringing the project to fruition.

## Why Aren't The Results Better?

There was no lack of either resources or technology in these cases, yet nothing has happened, and there are only plans on the horizon. Why? What are the differences between Japan, Europe and the USA preventing "progress" in the USA?

### Challenging Physical Constraints and Demographics

One answer is that some of the USA corridors are actually not particularly good markets for HSR. To understand why this is so, we need to discuss the fundamental characteristics of HSR— what it can and cannot do.

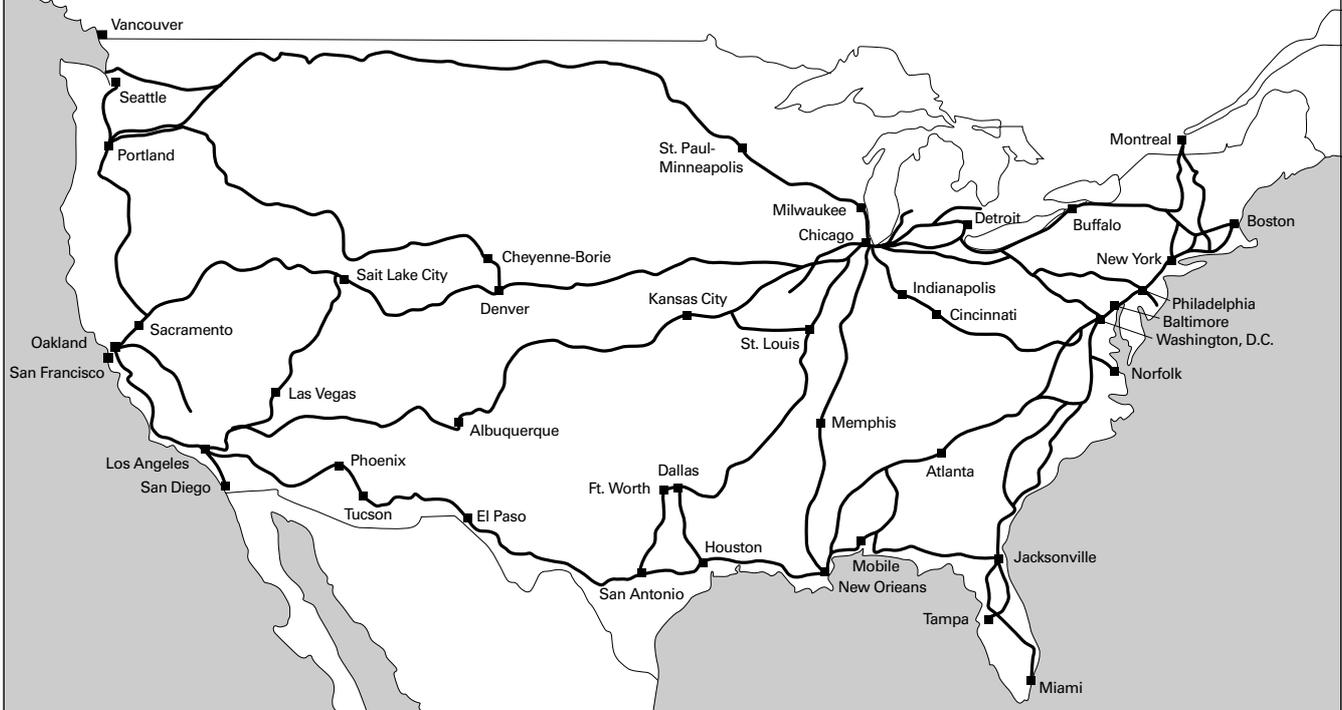
HSR has certain advantages: 1. Above a minimum trip length, it is faster than the car, and sometimes faster than air if the trip is short enough and the access time to the airports is long enough; 2. It can carry large volumes of people while using relatively limited land space; 3. At comparable speeds, HSR consumes less

**Figure 3 Annual Added Public Expenditure (in \$) For Rail Service in Various Corridors**

Corridor	\$ per Pass-km	\$ Per Liter of Fuel Saved*
Atlanta – Nashville	0.99	-23.98
Atlanta – Savannah	3.05	-15.21
Boston – New Haven	0.23	-24.57
Cleveland – Cincinnati	0.66	-60.49
Chicago – Cincinnati	0.15	-36.34
Chicago – Cleveland	0.23	5.12
Chicago – Detroit	0.20	15.81
Chicago – St Louis	0.29	38.49
Chicago – Minneapolis	0.21	15.30
Los Angeles – Las Vegas	0.12	6.49
Los Angeles – San Diego	0.03	1.07
San Jose – Reno	0.27	-20.56
Miami – Jacksonville	0.17	-58.08
New York – Buffalo	0.08	2.97
Philadelphia – Atlantic City	0.12	3.20
Philadelphia – Harrisburg	0.53	-44.02
Seattle – Portland	0.92	37.89
Texas Triangle	0.50	22.09
Washington – Richmond	0.16	-9.49

\*A negative number indicates that fuel would actually be wasted if the corridor were constructed.

Map 1 Amtrak's National Rail Passenger System



energy and causes less pollution than airlines or cars; 4. HSR can operate in and out of the center of major cities; and, 5. Once built, the marginal operating cost of each passenger is quite small so that, if volumes are high enough, HSR can be the lowest cost and best service mode. Balanced against these advantages are several disadvantages: 1. HSR systems are expensive to build (between \$8 million and \$30 million per km<sup>11</sup>)—about twice the cost of comparably-located highways); 2. HSR systems are limited in coverage—they do not serve as well where the high-speed tracks do not go; 3. Unlike Europe and Japan, shinkansen or TGV-type HSR in the USA is unproven, making planning, design and finance difficult, especially in the private sector; and 4. Many of the potential benefits—lower noise and cleaner air—are social not consumer benefits, so the ticket price cannot pay for them.

So, HSR best serves large flows between limited numbers of points, preferably city-center to city-center, and in relatively flat territory. HSR does not perform well where population density is low or construction cost exceptionally high (unless offset by unusually high demand).

It is thus important to emphasize that the USA is different from the well-known markets in Europe and Japan. First, the

population density of many of the potential American HSR markets is well below that prevailing near the successful services in France and Japan.<sup>12</sup> The New Tokaido line alone carries more passengers in 1 month than the entire NEC does annually. The South-East TGV (Paris to Lyons) carries four times the passengers of Amtrak's NEC, and the NEC is by far the most promising of the USA corridors. With the possible exception of Los Angeles-San Diego, few other areas come close in potential passenger density, although some corridors have shown population growth rates high enough to make them reasonable candidates for the future.

In fact, because of the relatively low population density of the "Emerging Corridors", another of the putative advantages of HSR, energy saving and lower pollution, is questionable. The DOT has studied HSR in most of the potential corridors and concluded, as shown in Figure 3, that HSR in most of the corridors could actually waste energy (that is, the trains would not be full enough to take advantage of potential energy efficiency) or would only save energy and reduce pollution at a cost far above any reasonable estimate of the true benefits. This conclusion could change with better technology and demographics, but the underlying

caution should be kept in mind.

The USA is also different in another way; HSR faces much stiffer competition from both cars and air. The full dimensions of the car advantage derive from the very high rate of car ownership in the USA (car ownership in the USA is 0.57 per person, whereas in France it is 0.42 per person, in Germany 0.43 per person, and in Japan 0.28 per person)<sup>13</sup> combined with very low fuel prices (gasoline costs about \$0.30 per liter in the USA versus \$0.80 to over \$1.00 per liter in Europe and Japan). Again, unlike France and Japan, the highway user in the USA generally does not pay tolls,<sup>14</sup> and certainly not high ones, for using the Interstate Highways linking major urban areas. Given also that the USA taxes car sales lightly (most states have sales taxes of about 6% versus 14% or much higher levels in Europe and Japan), car usage really is cheap in the USA. A less obvious but probably more important car advantage is the fact most modern American cities were actually organized around the capabilities and needs of the car and not mass transit as in Europe and Japan. Cities based on mass transit have dense central business districts (CBDs), and are inherently good sources of rail traffic; cities based on the car essentially have no CBDs, and do not

readily generate rail traffic. Because much of the USA grew around the car, it is probably condemned to stay bound to the car, at least for the near future and until society is prepared to spend the enormous amounts of capital required to change the structure of the major cities.<sup>15)</sup>

As with the car, which is HSRs competitor for shorter trips (less than about 300 km), so it is with air, the prime competitor for longer trips (longer than about 500 km) in the USA. As Figure 1 shows, air has decimated the rail position in longer-haul travel. While some of this shift has to do with the relatively greater distances in the USA (the average air haul is 1,300 km), the air share is also large even for quite short distances such as the 360-km trip from NYC to Washington, DC. The reason for air's large share is simple—the low fares resulting from stiff competition in the larger air markets, especially after the deregulation of airline entry and tariffs in 1978. As a result, air fares in the major short haul markets in the USA (except NYC to DC, where fares approach European and Japanese levels) are 20% to 50% below those in the typical French, German and Japanese markets.

Interestingly, while it can be argued that USA fuel taxes and car sales taxes are too low, and that car travel is thereby unfairly supported (and that, if world prices eventually do prevail in the American market and if environmental externalities are more accurately reflected in the prices of cars and gasoline, user costs for car travel will rise), it seems equally

clear that air fares in Europe and Japan are too high. If, as appears likely, the recent changes in EC competition rules eventually make their way into air tariffs, European HSR will face much more effective air competition, as in the USA.

To summarize the economic reasoning, the demographics of the USA are often not as favorable to HSR as in Europe and Japan. And, even those markets in the USA appearing to have potential face much more severe competition from cars and air than in other countries. But this is not the whole problem.

### Institutions Not Suited to Central Solutions

Amtrak is not a single-purpose actor

In addition to challenging demographics, HSR in the USA will have to surmount a governmental and managerial structure that is not well suited to funding and operating a highly-centralized transport mode like HSR. This issue has several dimensions.

First, Amtrak does not play the same role as the national railways in most European countries and Japan. Although Amtrak appears to be an integrated, national carrier, it actually performs three quite different, and not well connected functions: 1. It operates high-density services in the NEC (some higher speed, some low speed) which clearly have a transport efficiency rationale; 2. It also operates a disconnected series of low-density, short-haul corridors, of which only

some (notably Los Angeles-San Diego) have more than one train per day in each direction, and only a few currently have a real transport efficiency justification; and, 3. It operates a series of very long haul (2,000 to 3,000 km), sleeper/diner oriented trains, mostly on a one train per day schedule, except for a few routes that have three trains per week. The Amtrak system map clarifies these distinct route groupings.

Amtrak's divided function has a cost; Amtrak's support comes from a political coalition requiring the agreement of supporters of all three types of service. Anything leading Amtrak too much in one direction comes at the potential cost of one of the others, and Amtrak's annual struggle for funding is usually too serious to permit offending any of its supporters. As a result, Amtrak has found it hard to posture itself as a dedicated HSR supporter, and Amtrak's divided focus has caused many potential HSR promoters (as in Florida or Texas) to plan on operating their corridors without Amtrak. Amtrak would have difficulty being a financial supporter of a major HSR program without stretching its resources beyond breaking point. This is not to be critical of Amtrak, but is instead just an observation of the pressures at play in the American HSR scene.

It also stresses how different the USA is from Japan, Germany and France where there is an effective national carrier that can afford to be a champion of HSR.

The role of the public and private sectors is different in the USA

It is also important to realize that the private sector plays a different role in the USA than elsewhere, especially in rail activities. In general, if an activity is truly profitable, USA government looks to the private sector to take the risk and reap the rewards. Only those activities that are unprofitable commercially, but that offer large and agreed public benefits (reducing congestion or pollution, for example) are conceded to be in the realm of the public sector, at whatever level. HSR does not fit well into this context and, in fact, HSR supporters have created a conundrum; if HSR is profitable, why can't the private sector handle the whole problem? And, if HSR is not profitable, how can a case be made for public support? This is the dilemma that hindered the Florida and Texas proposals.



■ Original Metroliner

(Amtrak)



■ New Metroliner

(Amtrak)

But the private sector approaches passenger rail from quite a different perspective to that of governments. The private sector asks whether revenues (passenger tickets, other passenger service revenues and ancillary revenues such as real-estate development) from the project are large and certain enough, to cover operating costs and permit the project to be financed at a reasonable cost. The private sector also wants to know whether the project will be so socially, environmentally or politically controversial as to threaten the capital budget or project schedule. When private investments are at risk, hard questions are asked, and real answers demanded.

#### Governmental roles are different

Because of the greater distances and large sizes of states in the USA, most potential HSR markets lie within one state or, at most, two or three states. Even the NEC only covered 8 states and DC although, because of the high population density, it represented about 30% of the American population. HSR is therefore not an effective competitor for Federal funding where it has to compete with truly national transport priorities such as the Interstate Highway System or Airports and Airways spending. This is particularly true in an era of Federal budget deficits where the pressure is heavily against taking on new and large spending commitments with geographically-restricted benefits. In addition, there has been no readily available tax which looks enough like a "user charge" to make it saleable at the Federal level.<sup>16</sup> As a result, there has been no reliable national

funding or planning program to fund or coordinate HSR projects.

Potential two-or-three state HSR projects (for example, Chicago-Milwaukee, Chicago-Detroit, or Seattle-Portland) face yet another hurdle because the USA has no well established system of regional (but sub-national) governments. Ad hoc authorities can be created, but in practice it is time-consuming to do so. Most regional authorities need Federal authorization and, when established, must then convince two or more independent state governments to agree on a common program of planning, design, construction and taxation. Finally, the authority so created must then serve two or more masters for a period of years—also not easy. Such authorities have been created (the Washington Metro serving DC, Maryland and Virginia) and they can work reasonably well, but they are rarely decisive or innovative in management or concept design.

In practice, most "Emerging Corridor" projects are actually focused on serving only one state (Miami-Tampa or Los Angeles-San Diego), even if, as sometimes happens, they have a short section in another state (like Chicago-Detroit). However, HSR projects purely at the state level are difficult because: 1. The required investment and subsidies are huge compared with typical state budgets (the cost of the Florida project would be 3 to 4 times larger than the entire annual budget of the Florida DOT); 2. Many state governments are not used to dealing with the kind of financial, commercial and integrated planning issues that HSR raises (New York, Massachusetts, New Jersey,

Illinois and California may be partial exceptions); 3. Although many of the environmental and developmental benefits accrue at the state or local community level, much of the expertise and authority to deal with such issues lies at the Federal level (For example, the proposed Florida, California and Texas projects needed a myriad of Federal permits and approvals, although there was supposed to be no Federal money involved.); and, 4. The ability of the states and the private sector to work together can actually be hindered (or fostered) by Federal policies, especially tax and labor policies.

An example of problems at the state level is the experience in Ohio where a state authority (the Ohio High-Speed Rail Authority) was established to plan and construct an HSR between Cleveland, Columbus and Cincinnati. Although the authority struggled valiantly for years to get the project started, it was never able to do so. Part of the problem was unclear economics; however, even with arguably-favorable financial prospects, the project was not politically feasible because the Ohio electorate was unwilling to pass the bond issue, supported by a proposed sales tax, needed to implement the project.

## Prospects

Here, a variant of Murphy's famous law, "Pessimists are usually right," is relevant. Much of the publicity about American HSR projects has been sound without substance, the result of promotion by specific interests. The seasoned observer quickly learns to check the source, and the source's banker, before believing glowing promises. And yet, after all the hot-air has been factored out, there are corridors where the current mix of car and air probably will not suffice in the future, and something better is needed.

However, in dealing with the issue, we should probably distinguish between higher speed, meaning incremental improvements in existing services leading to shorter trip times, and high speed, meaning new lines built and operated to shinkansen, ICE or TGV equivalent (300 km/h) standards.

#### Improved, Higher-Speed Services

When everything is compared, the original NEC from Washington to Boston is far and away the most promising opportunity

for further investment in higher-speed rail (as well as HSR). It was clear from the inception of NECIP that not all the problems were going to be solved by the original program, especially north of NYC. In fact, before the original NECIP budget was established by Congress at \$1.75 billion (later raised to over \$2.6 billion), internal studies at the DOT had considered programs costing as much as \$4.5 billion in 1976 dollars (equivalent to as much as \$10 billion in 1994 dollars) and, as later became clear, it would have actually cost more than \$10 billion to complete the scope included within the comprehensive estimate. Also, the northern part of the NECIP bore the brunt of the Reagan-era budget cuts which, among other things, eliminated the planned completion of the electric traction from New Haven to Boston. The result was that the trip times from Boston to New York remained much slower than Washington to New York although the distance is about the same.

The DOT has announced that it is preparing a new Master Plan for a program of further improvements in the NEC. Although no definitive projects have been announced, and no total budget set, it seems safe to conclude that there will be a continuing and significant program to improve the NEC, with a special focus on service at the north end. There will also be improvements in cruising speed over parts of the distance at both ends to as much as 240 km/hour, but this will not cover the entire distance at either end. The eventual result is likely to be slightly improved trip times at the south end (15 minutes better), and north-end trip times equivalent to those at the south end today (2 hours and 50 minutes, an improvement of 1 hour or more). In addition, schedule reliability and ride quality will be much improved from today's levels.

The prospects for higher speeds in other corridors are less clear. Of the 19 Emerging Corridors studied in 1981 by the DOT,<sup>17</sup> only two were found to be even marginally break-even on an operating cost basis, and only one was found to save energy at a net cost less than the world price. The report did not attempt to study incremental improvements in existing corridors, however, and it is quite likely that there is a set of incremental improvements in several of the corridors that would have a reasonable payoff. Both the DOT and Congress have been considering

the possibility of a program whereby the DOT and the states would identify a set of corridors and incremental improvement programs that would qualify for partial Federal funding. States wishing to provide their share would be free to start the upgrading programs. Under various legislative mandates, the DOT is already evaluating the financial feasibility of various levels of improvements in some of the more-promising corridors.

### New High-Speed Services

While the prospects for partial upgrading programs for higher-speed rail appear favorable in certain corridors, the odds in favor of a new high-speed corridor being built are lower. First, as discussed, there are not many corridors where the fundamental economics are strong enough. Of these, New York-Washington, New York-Boston, Los Angeles-San Diego, and Miami-Tampa seem to be the strongest candidates. Other possible candidates might be Houston-Dallas and several Chicago-based corridors. Each possibility offers a different mix of transport demand, competition from other modes, and congestion and environmental benefits.

What does appear certain is that the current mix of institutions and authorities will not work. The Federal government is not going to do the job by itself, both because of a shortage of funds and because many of the benefits are rightly-seen to be at the state or local level. The private sector is not going to do the job by itself, either; projects of the size of an HSR system are too large and risky for private investors acting alone. Also, many of the potential benefits of HSR are economic externalities and can never be included in the ticket price. Nor can state and local governments do the job alone, although they are significant beneficiaries, again because there is a mismatch between their resources and authority and the needs of HSR projects. A new approach is needed.

### A New Synthesis

If no one agency can do the job alone, then they are all going to have to work together. In doing so, the respective roles need to be based on the benefits each realizes, and on the expertise and authority each possesses.

There is an existing model for the potential Federal role—the Federal Transit Administration (FTA) within the DOT,

which funds part of the capital cost of local transit projects. The rationale is that there is at least a partial Federal interest in resolving local problems, as long as the local agencies carry their fair share (30% to 50% of capital costs), and as long as the Federal role is confined to capital costs with a very limited or no Federal share in operating subsidy. Exactly the same argument could be made for HSR or incremental rail improvement projects. In addition, the Federal government would have to exercise its responsibilities and authorities for: 1. Safety specification and regulation; 2. Ensuring fair and workable tax, labor, economic regulatory and modal promotional regimes; 3. Ensuring that environmental issues are handled in a way consistent with national policies; and, 4. Ensuring that the Amtrak role in the project, if any, is consistent with other national transport priorities.

There must likewise be a financial role to be played by state and local governments. For example, the State of Florida rightly viewed HSR as a way of funneling economic development into areas where the ecological impact could be minimized, and as a way of reducing the investment they would otherwise have to make in highways or airports. Similar arguments were made in Texas and, indeed, along the NEC. To the extent these arguments are valid, neither the Federal government nor the private sector should be expected to pay. In addition, states and local governments are uniquely situated to designate rights-of-way and acquire the necessary properties; paying at least part of these costs could easily form their share of the total cost of the project.

Finally, the private sector must bear the primary responsibility for getting the demand forecasts, service levels, fares and investment and operating costs right. This, combined with control over the development of the properties adjacent to the stations, ought to determine whether the project really has merit. State and Federal shares, as appropriate, should ensure that the project truly receives the credit for its real environmental and social benefits.

This suggests a mixture of formula and individuality for each project. Federal and state roles would be fixed as general procedures and shares of costs; the private sector role would focus on seeing if the project could be made to work within these general sup-

port levels. Only by this sort of teamwork, not now in evidence, will new HSR projects in the USA become reality. ■

#### Notes:

- 1) "Shinkansen" means the high-speed, standard-gauge trains in Japan operating between Tokyo and Hakata, Niigata and Sendai (and being extended elsewhere). "TGV" refers to the French high speed trains operating between Paris and Lyons, Le Mans, and Lille (and also in the process of extension). ICE refers to the German Inter City Express trains operating, for example, between Hamburg, Frankfurt and Munich.
- 2) "MAGLEV" includes both the Japanese versions, one attracting and one repelling, as well as the German version (which is attracting). It also includes whatever MAGLEV might emerge from US experimentation or development. These systems, while technically distinct, are more alike than different in their costs and performance, and none has a particular advantage in solving most of the issues discussed below. See source 9 for further discussion.
- 3) A better definition might be the capability to provide downtown to downtown trips in a time equivalent to air.
- 4) See source 1.
- 5) See source 7.
- 6) The Turbo trains actually began under the New Haven Railroad before the Penn Central merger.
- 7) See source 5.
- 8) Today's electric-locomotive-hauled Metroliners with 6 to 8 cars are entirely different to the originals, which were EMUs.
- 9) See source 8.
- 10) See source 6.
- 11) See sources 3, 4 and 9.
- 12) It deserves emphasis here that not all of the Japanese and French services are equally successful in economic terms. While the Tokaido (Tokyo to Osaka) services are profitable from any point of view, and the Sanyo (Osaka to Hakata) services not far behind, neither the Joetsu (Tokyo to Niigata) nor the Tohoku (Tokyo to Sendai) services have done nearly as well in economic terms. The same is true in France; the original TGV from Paris to Lyons has been successful by almost any measure, but the newer lines are less clearly so. This is not to say that any of these lines should not have been built: it is clear, though,

that some are far less successful than others for the same reasons that many US markets probably fall in the less favorable category: lack of population, and thus ridership, density. Some US markets, though, do have densities which match those in Europe.

- 13) Ownership is important because, once a person is an auto owner, whatever the original reason for purchase, he or she sees individual trip decisions as an incremental cost. US DOT studies have suggested that the average auto owner often perceives (incorrectly, but significantly) the incremental cost as being essentially the fuel cost alone. This bit of consumer psychology makes the auto look very cheap to use!
- 14) The highway tolls from New York to Washington are about \$7.00 (no tolls from New York to Boston), compared with about \$25.00 from Paris to Lyons and about \$100.00 from Tokyo to Osaka.
- 15) Only the much older cities, like Chicago, Boston, New York City, Philadelphia and Washington, are mass transit dependent and highly urbanized like most European and Japanese cities.
- 16) The US does have highway fuel taxes at the national and state levels, the proceeds of which are generally allocated directly to highway construction or maintenance. There is also an air passenger ticket tax at the national level, and an airport passenger tax at the airport level (usually owned by local or state authorities) which are also plowed back into the airports and airways systems. These taxes were fiercely resisted by highway and air interests: needless to say the same interests do not want to see any of "their" trust funds diverted to rail passenger use. While there has been some success in making transport funding more flexible for mass transit use, and possibly for rail use (in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991), there is not yet enough flexibility to accommodate the needs of an HSR project. Amtrak has long tried, without success, to tap the Highway Trust Fund through its "Penny for Amtrak" proposal, a pro-

posal to let Amtrak have a one-cent tax on each gallon of gasoline which would raise about \$1 billion annually.

- 17) See sources 6 and 9.

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