OVERVIEW

High-speed passenger rail systems (125 mph and above) now operate in Japan, France, and Great Britain. There is growing interest in introducing such passenger rail service in this country, and several State and local governments and private sector groups recently have undertaken feasibility studies for this purpose. Prompted by these initiatives, the Subcommittee on Transportation of the House Committee on Appropriations; the Senate Committee on Commerce, Science, and Transportation; and the House Committee on Energy and Commerce asked the Office of Technology Assessment (OTA) to examine the experience of foreign countries and to assess the outlook for high-speed passenger rail technology in the United States. As part of this study, OTA also was asked to examine the prospects of magnetic levitation (maglev) technologies—ultra-high-speed ground transportation that relies on magnetic suspension instead of conventional steel wheels on rail—and the status of railcar manufacturing industries.

High-speed rail.—The technologies for high-speed rail are well understood. High-speed rail systems are costly to construct, and all foreign high-speed lines have been built with government assistance. They generally report favorable financial results, with regard to operating costs, though independent audits to confirm this are not available.

The lowest cost option, typically used for lower volume operations, is conventional diesel-powered equipment on existing track, the system the British have in operation. The most expensive option is to build new track, which the Japanese have done. The cost of building new track, although higher than upgrading existing track, varies widely depending on terrain, land use, and population density. For example, although the new French high-speed line cost $4 million per mile to construct, the most recently completed two links of the Japanese system cost an estimated $35 million to $40 million per mile. The original route cost about $20 million per mile. *

High-speed systems require high ridership to generate enough revenue to cover operating costs. The high-speed rail systems of Europe and Japan are situated in corridors that have higher population densities than any of those being considered in the United States, with the exception of the Washington, New York, Boston Corridor (the Northeast Corridor or NEC). Also, both Japan and France had reached capacity on sections of their conventional lines before implementing high-speed service.

OTA's analysis of the factors that influence a passenger's choice of travel mode suggests that a potential high-speed passenger rail corridor should have some or all of the following characteristics: 1. cities grouped along a route giving major passenger travel flows in the 100- to 300-mile-trip range; 2. cities with high population and high population densities; 3. cities with developed local transit systems to feed the high-speed line; and 4. a strong travel affinity (reason to travel) between cities, generally because one city is a dominant center of commercial, cultural, or governmental activity.

OTA did not evaluate specific proposals for high-speed corridors in the United States. Based on foreign experience and current U.S. market factors, however, it seems that *any U.S. corridor with totally newhigh-speed rail service would have difficulty generating sufficient revenues to pay entirely for operating and capital costs.* This same comment does not necessarily apply to upgraded rail lines or other improvements.

Maglev technologies. -Different types of maglev systems for high-speed intercity passenger service are being developed independentl$_y$ b$_y$ the Federal Republic of German$_y$ and by Japan. Although neither system appears to have insurmountable technical obstacles, both require further development and testing to substantiate technical feasibility and to determine the capital and operating costs under conditions that fairly reflect those of actual revenue service. Not

*Per-mile costs for the Japanese lines are shown in 1979 dollars.

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until 1985 will sufficient information be available from the West German tests to determine if the system can meet performance standards under operating conditions at costs suitable for revenue service. Japan is seeking to build a new test track and continue testing the advanced technology developments, including the superconducting magnets used in their system.

Railcar manufacturing.—As a result of adverse market conditions, all U.S.-owned passenger railcar manufacturers have abandoned the field. * U.S. sales are being filled by foreign owners. U.S. manufacturers (other than the Budd Co.) are not likely to reenter the field unless the United States follows the example of Europe and Japan, which sustain their passenger railcar manufacturing industries by ensuring a stable, predictable, and planned market for rail equipment. At present, the U.S. market for railcars is small and uncertain. Most railcar orders for the rest of the 1980's already have been placed, and the market for the 1990's and beyond is not likely to be large enough to support more than a few small U.S. manufacturers.

● The Budd Co., though located in the United States and employing U.S. labor, was purchased by Thyssen, a West German corporation, in 1978.