Preliminary Report to Congress and the Public

A Reexamination of the Amtrak Route Structure

United States Department of Transportation

May, 1978

THE SECRETARY OF TRANSPORTATION

WASHINGTON, D.C. 20590

MAY 1 1978

Dear Mr. Chairman:

I am pleased to transmit to you a report containing the Department's preliminary recommendations for a restructured intercity rail passenger system to be operated by Amtrak. The Department's recommendations were requested by the Appropriations Committee Conferees in the report accompanying the FY 1978 Supplemental Appropriations Act (P.L. 95-240).

I have supported Amtrak since its inception and I continue to believe in the need for an intercity rail passenger system. While this report was being prepared, I considered whether Federal support of intercity rail passenger service should simply be terminated in light of the large amounts of money we are spending to serve a relatively small segment of the traveling public. I have rejected that option, however. There is a significant constituency for maintaining Amtrak as a transportation alternative, even among people who today do not frequently use it. The system will be more efficient and will serve people better if we restructure it and improve its operations in the manner suggested in this report. Further, abandonment of the system would involve large labor protection costs and other expenses, with no subsequent benefits.

Additionally, there is the need to consider Amtrak in the context of the nation's energy shortage. The passenger train, if it is operated well and if it carries a reasonable number of passengers, is energy efficient. The 1973-74 fuel crisis demonstrated that the American people will ride trains when automobile fuel is in short supply. We probably will reach a time when supplies will be permanently limited. In the meantime, we must work at improving the Amtrak system and its operations, so that the American people will, when the time comes, have available an energy-efficient alternative.

The system which I recommend is described in detail in Chapter 5 of the report. I believe it to be a good system which will serve the American traveling public well. In recommending it to you, I want to emphasize that:

-- The system is national and serves all regions of the country. Because all taxpayers support Amtrak, its services should not be limited to only a few corridors.

-- The system will provide service to and from those locations where a significant percentage of our people live. Approximately 160 Standard Metropolitan Statistical Areas are served by the system, including our 36 largest cities.

-- The system will provide a service that will be used. It is expected to have an overall level of usage of over 150 passenger miles per train mile, equivalent to the current level of usage in the Northeast Corridor.

-- There are no "poor" performers in the recommended system. Amtrak management will be able to concentrate attention and equipment on those routes which show promise, rather than having to devote resources to routes which today have been shown to be hopeless.

-- All of the routes in the system, at the ridership levels projected, will have the potential to be energy efficient, in the sense that they would consume less energy than if their riders were traveling by automobile.

-- The system is of a size that Amtrak's present and on-order equipment fleet will be well utilized. It will also require significantly smaller additional expenditures for new equipment than the existing system.

My choice of the recommended system was not made because it meets any preconceived budget goals. My decision was made because of the attributes outlined above. The choice was made from among a variety of potential route systems which were designed by the Federal Railroad Administration to offer alternative types and levels of service.

I would be remiss if I did not state that I have serious concerns about the level of funding required for Amtrak. The present Amtrak system is far too costly for the service which it offers. Projections show that if we continue the present system as it is, by 1984 we will be providing subsidies to Amtrak of around $1 billion a year for operations alone. Such a constantly rising level of Federal subsidy cannot be permitted.

Unfortunately, these budget concerns will not end even if the recommended system is adopted and implemented. Clearly, the recommended system will be less expensive to run than the existing system. Had it been in place in FY 1977, the operating appropriation for Amtrak would have been $402 million, instead of $482.6 million. Were we able to operate the recommended system for the full year in FY 1979, the operating appropriation needed would be $496.6 million. As it is, because the authorizing legislation which is being considered by the Congress would not permit implementation of the new system to begin until three-quarters of the way through the year, $575 million will be required to subsidize Amtrak's

operations in FY 1979. In FY 1980, the first full year in which the recommended system would be operated, it would require an operating appropriation of $547 million, whereas the existing system would require $665 million. Nevertheless, by 1984, so long as present trends continue unabated, the recommended system would require an operating appropriation of $799 million. While significantly less than the $976 million which would be required to operate the present system, this level also is too high.

There are two problems. First, Amtrak's costs have increased at far higher rates than those experienced by other elements of the railroad industry. Second, Amtrak's fare structure has not yet been comprehensively designed on a market-by-market basis to recover as much of those cost increases from the passenger as is possible. The disparity between costs and revenues grows each day. As a result, whereas in 1971 revenues covered 50 percent of the costs of operating the system, in 1977 they covered only 37 percent of those costs. The general taxpayer has had to make up the rest.

As pointed out in the body of the report, we, unfortunately, have had to assume continuation of the present cost structure and revenue trends. I have, however, directed Jack Sullivan, the Federal Railroad Administrator, to work closely with the Amtrak Board between now and the time we present our final recommendations to Congress to diagnose the problems inherent in Amtrak's cost and fare structures and to develop remedies which will result in lower future Federal subsidies than those we are now projecting. I am informed that Amtrak has begun a market-by-market review of the Corporation's fare structure to find those markets where adjustments, either up or down, can be made to reduce the total net deficit. I am encouraged by such a move on the part of Amtrak and I have directed my staff to cooperate and assist in any way possible. Similar efforts must be made to review Amtrak's costs.

I believe that once we have established a new and more sensible Amtrak route structure, we should not consider it to be forever permanent. The review process which is being initiated by this report is healthy and valuable. We should require such a review periodically, whether by the Department or by Amtrak's Board. One of the desirable products of the last six months' analytical efforts has been the creation by FRA staff and Amtrak management of methods for evaluating Amtrak's route structure and operations which have not previously existed. These tools are available for future use and should be applied in periodic overall reviews of the system and its operations.

In connection with my final route structure recommendations I will present the Congress with a set of financial and operational goals for Amtrak against which we should measure its future performance. If future

review tells us that Amtrak is meeting or beating the goals which we will set, then we may decide that we have a sufficient margin to allow for expansion. Until that time no totally Federally supported services beyond those included in the new system should be initiated. If future review tells us that Amtrak has not achieved substantially greater control over costs and revenues than it has today, and is falling short of those goals, then we must consider further reducing the system.

I will support future growth of the Amtrak system only if we can gain control over the cost/revenue relationship and if the level of service we are providing is being provided in an efficient manner. At present, however, I must oppose any move to increase the size of the system above that which I have recommended. We must remember that the primary surface intercity common carrier mode is the intercity bus. Any decision to expand the scope or intensity of Amtrak's operations must carefully consider the subsequent impact on private sector competitors. I believe firmly that wherever possible there should be more coordination between Amtrak and the bus industry in providing intercity passenger travel. Several ways in which such coordination may be achieved are discussed in the body of the report. I will continue to encourage both parties to find ways to work together to attract intercity passengers from the least efficient energy alternative, the automobile.

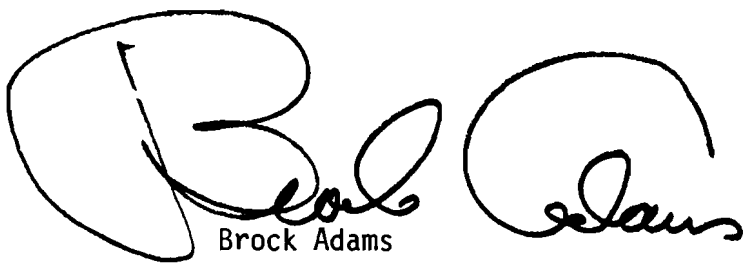
I also believe that the Administration and the Congress should reexamine Amtrak's corporate structure and relationships with the Federal Government, particularly with regard to budgetary control. Given the original expectations for Amtrak's eventual profitability, the existing structure and set of relationships were probably appropriate. However, as there is no reasonable prospect that Amtrak will be able to sustain its operations from revenues, and since the need for Federal subsidy assistance has grown so large, Amtrak's institutional framework must be reconsidered. This issue is discussed in the body of the report. When I submit my final route structure recommendation to the Congress, I will also offer recommendations on Amtrak's institutional and organizational relationships. The necessary legislative modifications will be submitted shortly thereafter.

I am looking forward to the receipt of public comments on the recommended route system. I do not consider the individual routes and routings which I have recommended to be final. They are indeed "preliminary," and I expect to make changes in the recommendations as public comment is received and as we further refine our basic information and our methods of analysis. In fact, in several instances where our information was clearly insufficient, we have refrained from recommending specific routings and we have instead indicated alternatives for public consideration. It is inevitable that individuals at the local level and in

state governments will know of, and will bring to our attention, information which could not be collected in the time available for preparation of this report. We welcome receipt of such information and the comments of all concerned individuals.

This study and the recommended route system will give the Congress and the public the information needed to make decisions about the future of Amtrak. I believe that a well managed and efficient rail passenger service will play an important role in our transportation system for many years to come.

Sincerely,



Brock Adams

Enclosure

Identical letter sent to the Chairmen of the following Committees and Subcommittees:

United States Senate:

Committee on Appropriations
Subcommittee on Transportation

Committee on Commerce, Science and Transportation
Subcommittee on Surface Transportation

House of Representatives:

Committee on Appropriations
Subcommittee on Transportation

Committee on Interstate and Foreign Commerce
Subcommittee on Transportation and Commerce

TABLE OF CONTENTS

EXECUTIVE SUMMARY

In 1970, the Rail Passenger Service Act was enacted into law, and on May 1, 1971, Federally-sponsored intercity rail passenger service began. The Act, which envisioned limited interim Federal funding, had as its objectives the improvement of deteriorating rail passenger service and the establishment of such service as a profitable operation. The results of seven years of operation are mixed. Amtrak has improved and increased rail passenger service but, instead of becoming profitable, its losses are increasing rapidly. The limited Federal funding which was envisioned has become continuous and large.

Disturbed by Amtrak's ever-increasing deficit, the Congress has requested the Department to undertake a reexamination of the Amtrak route structure. This report is the Department's response to the Congressional request. It contains the Department's preliminary recommendations for a new Amtrak route structure and presents sufficient background information and data to permit a careful evaluation of those recommendations by the Congress and the public. It also introduces and discusses a series of policy related issues regarding the operation of the Amtrak system in the hope that there will be sufficient public comment on those issues to provide the Department with valuable guidance in formulating the final Amtrak route structure recommendations. The recommended system presented in this report is considered to be "preliminary," in anticipation of passage of legislation authorizing the route system implementation process and because the Department desires to have the benefit of public comment before providing the Congress with "final" recommendations.

AMTRAK'S PERFORMANCE

On the positive side, during Amtrak's seven years of operation, intercity rail passenger-trips and passenger-miles have increased at a faster rate than train-miles. In the Northeast Corridor, Amtrak has attracted a significant number of passengers from air and has demonstrated that, under proper conditions, the time conscious business traveler will use the train. During the 1973 energy crisis, a significant increase in ridership demonstrated that Amtrak is indeed a transportation alternative to which people will turn in times of severely constrained automobile fuel supplies.

The quality of service provided by Amtrak over the past seven years has varied as freight train delays, scheduling problems, and roadbed conditions have occasionally hampered operations. Although system on-time performance and scheduled speeds have generally decreased, certain aspects of service have improved. For example, the addition of new equipment has increased passenger comfort on several routes and can reasonably be expected to have a positive impact on market response.

As a result of the increases in passenger-trips and passenger-miles, coupled with fare increases, revenue has shown a steady increase since 1972. Unfortunately, costs have risen at a significantly higher rate than revenues, and the gap between costs and revenues has widened. While revenue in 1971 covered almost 50 percent of total costs, it covered only 37.4 percent of total costs in 1977. As a result, the deficit per revenue passenger-mile has more than doubled, from a 5.3 cent level in 1972 to a 12.7 cent level in 1977.

During Fiscal Year 1977, the last complete period for which data are available for analysis, Amtrak's patronage increased to 19.2 million passenger-trips, generating 4.3 billion passenger-miles. To achieve those levels, 31.6 million train-miles were operated over a 27 thousand mile route system. The Corporation's revenues during this period totaled $311.3 million, including $259.5 million derived from passenger tickets. Its total operating costs of $936.3 million included $95.2 million which was reimbursed by other agencies for work performed, leaving the net cost of operating the system at $841.1 million. The difference between those costs and total revenues resulted in a $529.8 million deficit, which is equivalent to an average loss of 12.3 cents per passenger-mile. Federal operating subsidy funds required to meet that deficit, after deducting non-cash charges (primarily depreciation), totaled $482.6 million.

With costs rising more rapidly than revenues, the levels of future Federal financial support of intercity rail passenger service which are implied by a continuation of today's trends are clearly troublesome. Controlling the rate of increase of the deficit requires a close look not only at the route system structure but also at the types of services offered and the current operating and pricing practices. The Department believes that a thorough detailed review and analysis of Amtrak's cost structure is one of the most urgent tasks to be addressed and proposes to work with the Amtrak Board to undertake such a review as an immediate priority.

DEVELOPING THE RECOMMENDED ROUTE STRUCTURE

In developing the recommended route structure, the Department evaluated numerous alternative Amtrak routes and services, exclusive of the Northeast Corridor (NEC). The NEC, including the Amtrak-owned feeder lines from Harrisburg, Pennsylvania and Springfield, Massachusetts, was assumed to remain in place under all alternatives.

A series of five conceptually different alternative systems was developed and analyzed. The alternatives ranged from a system providing isolated short distance, daytime services only, to a system directly linking the various regions of the country, as well as providing additional services of interest primarily to individual states or groups of states. In refining the systems, certain population and market criteria were applied to select specific routes and services. Selections based on those criteria were modified by cost considerations and by the desire to allocate available resources equitably and to insure a measure of geographic balance and an appropriate mix of long and short distance services.

Operating cost and revenue estimates for each alternative system were developed by using models, based on FY 1977 actual data. Capital costs were estimated using data from Amtrak's most recent five-year plan. The systems were compared for a base year (FY 1977), and projections were made of the operating deficit for each system for the period 1979 through 1984. Existing Amtrak operating and pricing practices were assumed for the evaluations and projections.

THE RECOMMENDED ROUTE STRUCTURE

The Department's recommended route structure is illustrated in Figure ES-1 which shows the largest cities and key intermediate points to be served. Other points between those shown would also receive service. In several locations where service is recommended but a specific preferred routing has not been determined, Figure ES-1 indicates the existence of optional routings by a dotted line. Where specific routings are presented, they are considered preliminary, but preferable, based upon analysis of available data. The Department is anxious to receive additional information during the public hearing process, which will aid in the final route selection process.

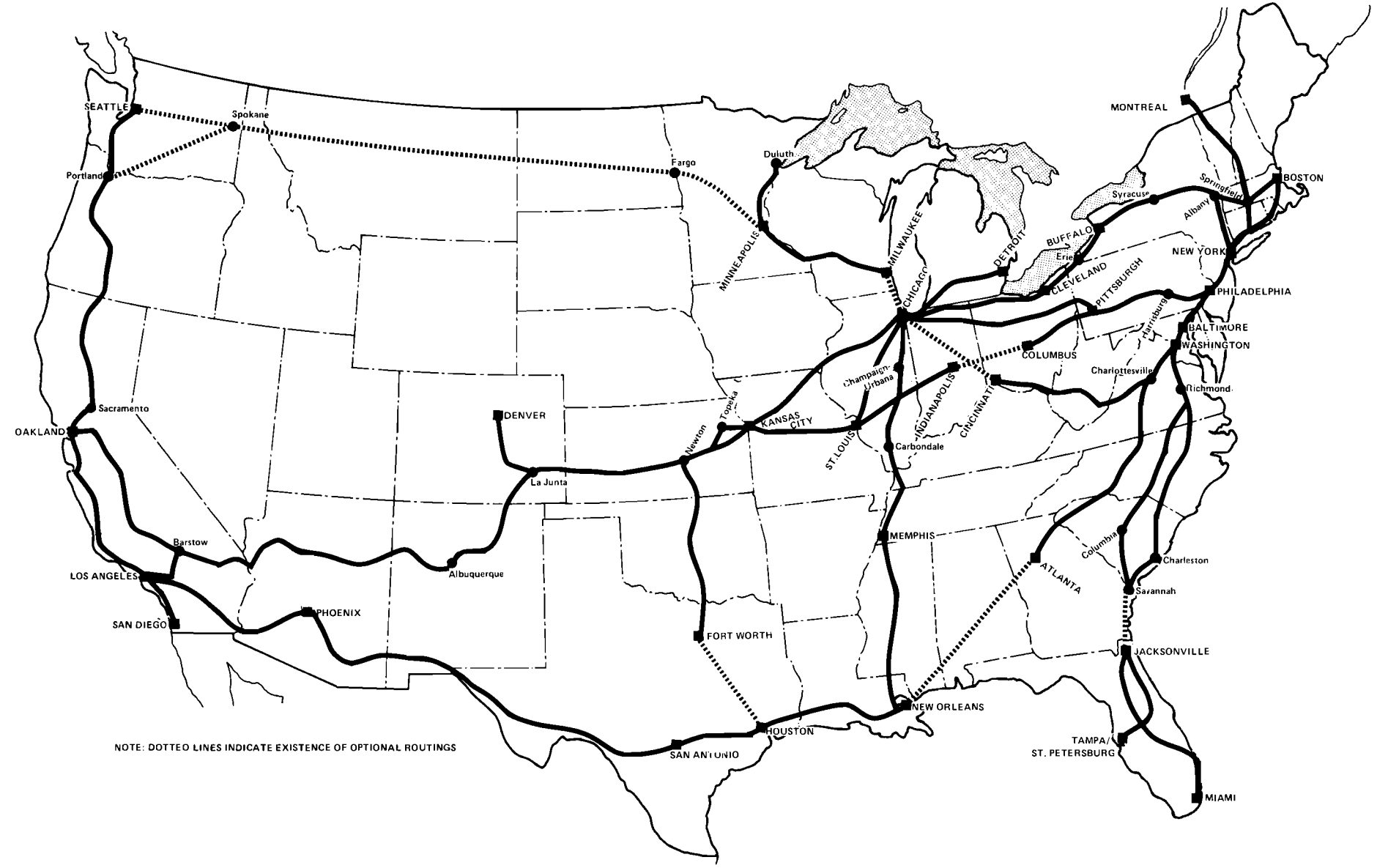
While the recommended system would terminate existing intercity rail service to some areas, it would also add service in new markets displaying high potential. It would provide for a basic level of national service, as well as for significant interregional service and service on high-potential feeder lines.

The 18,900-mile system would provide at least daily services on all routes. The basic national long distance east-west links would provide coast-to-coast service on northerly routes via Chicago and on southerly routes via New Orleans and Houston. The basic north-south links would provide daily service along the east and west coasts and from the Midwest to the South, completing a national system. The system would provide service to about 160 Standard Metropolitan Statistical Areas (SMSA's), including the 36 largest cities. It is estimated that all of the services recommended could make a positive contribution to energy conservation.

Were the system to be in operation in FY 1979, it would require an estimated operating subsidy of $497 million. As it is, because present versions of authorizing legislation do not provide for implementation of the new system to begin until March of 1979, an operating subsidy of $575 million will actually be needed in FY 1979 to keep the existing system running for three quarters of the year. The projected operating subsidy need of the recommended system, in FY 1980, the first full year of its operation, is estimated to be $547 million. That amount is expected to grow to $799 million by FY 1984. Operation of the current system would require a FY 1980 operating subsidy of $665 million, and a $976 million operating subsidy by 1984. The recommended system would thus save the taxpayers $118 million a year in operating subsidies in FY 1980 and $177 million a year by 1984. In order to implement the recommended system, an estimated $70 to $300 million in labor protection payments to displaced Amtrak and railroad employees will be required, as well as approximately $12 million in incremental initial capital costs. In total, when those additional costs and annual capital costs are taken into account, the recommended system would save the taxpayer

Figure ES-1

THE DEPARTMENT'S RECOMMENDED ROUTE STRUCTURE



between $570 and $800 million over the six-year period from 1979 through 1984, when compared to continued operation of the current system.

The recommended system does not include services which may be of interest to specific States and are appropriate candidates for State funding or combined Federal/State funding. The Department does not intend to preclude the provision of such services but has focused in its recommended system only on routes which should be 100 percent Federally funded. The funding of such State interest services is discussed in Chapter 6.

ISSUES FOR PUBLIC COMMENT

There are various public policy-related issues which, when resolved, will affect Amtrak's future costs, revenues, and services just as much as will the design of a new route system. These issues are discussed at length in Chapter 7 of this report in the belief that the Congress, the Department, and Amtrak will benefit from receiving the public's views. They include:

- Fare policy. Because of the ever-widening gap between revenues and costs, the objectives of the Amtrak fare structure must be explicitly determined and techniques of tariff construction must be used which will properly meet those objectives.

- Market. The current and potential markets for Amtrak service must be determined and better methods of attracting the automobile passenger to the train must be developed.

- Corridors. The attributes of a true intercity rail passenger corridor must be defined and the question of investing public funds in converting existing or proposed short distance routes into corridors analogous to the Northeast Corridor must be addressed through public sector cost-benefit analysis.

- Commuters. Amtrak transports a significant number of passengers who travel on sharply discounted commutation tickets. It must be determined whether those commuter type operations should continue. The question of who should assume the burden of the incremental capital and operating costs attributable to Amtrak commuter operations must be answered.

- Sleeping cars and related services. The extent to which sleeping and dining car services contribute to or detract from Amtrak's financial results must be determined. Ways of increasing the net contribution of such services must be defined.

- Institutional. There are problems inherent in Amtrak's present organizational relationships with the Federal Government. Alternative institutional and organizational arrangements must be considered.

Chapter 1

INTRODUCTION

After seven years of National Railroad Passenger Corporation (Amtrak) operations, the Congress has requested a reexamination of the Amtrak route structure. In response to this Congressional request, the Department of Transportation has conducted an evaluation of alternative national intercity rail passenger systems, and presents its preliminary recommendations in this report for public comment. Beyond the route structure, the Department has identified several policy issues which merit public scrutiny.

In 1970, the Rail Passenger Service Act was enacted into law and a Federally-sponsored intercity rail passenger service began. The Act had two purposes: (1) to relieve the nation's privately-owned railroads of the burden of passenger trains which were then costing them over $400 million a year to operate; and (2) to determine whether a well-run intercity rail passenger service would bring travelers back to the railroads, particularly those traveling by automobile. The argument was advanced that the railroads, faced with a losing service which by Government regulation they were compelled to operate, had deliberately allowed intercity trains to deteriorate to the point that few people would use them; that railroads offered a fuel efficient and environmentally sound alternative to the automobile; and that a well-run, interconnected rail system, operated with modern equipment, would revive rail service as a popular and economic means of travel. It was hoped that the system would require only interim Federal funding.

The system now has run for seven years and sufficient evidence is available from which to draw certain conclusions. On the positive side, Amtrak has been successful in stemming the decline in rail ridership, despite having inherited an equipment fleet which was aged, as well as having had to operate in many cases over roadbeds which are not maintained to passenger train standards. Passenger-trips on Amtrak have grown from 13.7 million in Fiscal Year 1972 to 19.2 million in Fiscal Year 1977, an overall 40 percent growth. Passenger miles have increased to a similar degree, and daily train-miles have increased about 20 percent. In the Northeast Corridor (NEC), Amtrak has attracted a significant number of passengers from the airlines and has demonstrated that under proper conditions the time-conscious business traveler will use the train. During the 1973 energy crisis, a significant increase in ridership demonstrated that Amtrak is indeed a transportation alternative to which people will turn in times of limited availability of automobile fuel. Finally, even in the face of serious service and financial problems, Amtrak continues to generate public support for its existence; for example, in a recent Hart Research Associates poll conducted for the Department, 53 percent of the respondents endorsed continued subsidies for Amtrak.

Unfortunately, the hope that Amtrak would be successful with only interim funding has proven to be unfounded and the progress that Amtrak has made has been achieved only at considerable public expense. To date, the Federal Government has directly provided $2.5 billion to Amtrak in capital and operating subsidies and has also funded $900 million of capital acquisitions through guaranteed loans, most of which are held by the Federal Financing Bank.

Disturbed by the ever-increasing Amtrak deficit, the Congress has begun to reexamine the Amtrak system. In acting on a request by the Amtrak Board of Directors for a supplemental appropriation to increase the Federal operating grant for Fiscal Year 1978, the Appropriations Committee conferees adopted (and transmitted by letter to this Department on November 8, 1977) the following request for a reexamination of Amtrak's route structure.

> The conferees are of the opinion that a comprehensive reexamination of Amtrak's route structure from a zero base should be undertaken and hereby direct the Department of Transportation, in cooperation with Amtrak, to prepare and submit its recommendations for a route structure that will provide an optimal national railroad passenger system based upon current and future market and population requirements. Included as an integral part of such recommendations should be projections of operating and capital appropriations that will be required to support the system . . . .

Identical language was contained in the Conference report accompanying the Fiscal Year 1978 Supplemental Appropriations Act (P.L. 95-240) which was signed into law by the President on March 7, 1978. Additionally, as this report was being prepared, authorizing legislation was being considered by the Congress which would direct the Department to conduct such a reexamination and which would establish a process for implementing a new Amtrak system based upon preliminary recommendations by the Department, a public comment and hearings process, and then the submission to the Congress of final Departmental recommendations for an Amtrak route structure.

This report presents the Department's preliminary recommendations in the following framework: Within the historical context of a long-term decline in the common carrier share of intercity passenger travel, and an even more precipitous downward trend in rail patronage, Chapter 2 reports on Amtrak's progress to date in reversing the long-term trends. Chapter 3 describes and discusses the present intercity rail passenger service system and the operation of that system.

Chapter 4 discusses the methodology which produced the five route structure alternatives that were analyzed in this report, and graphically portrays them. Chapter 5 presents the Department's recommended route structure, offers projections for its operating performance and financial results, and describes the rationale for its selection. In Chapter 6, the future funding consequences of the preliminary recommendation are discussed, along with possible means of meeting those funding requirements. Finally, beyond the route structure itself, Chapter 7 broaches significant issues that deserve public scrutiny, reflection, and comment. Such issues include Amtrak's fare policy, the market for intercity rail passenger service, the scope and feasibility of corridor development outside the Northeast Corridor, the existence and future of Amtrak commuter operations, the economics of sleeping and dining car services, and the institutional framework of Amtrak.

Chapter 2

A BRIEF HISTORY OF INTERCITY RAIL PASSENGER OPERATIONS

During its first 7 years of operations, Amtrak has begun to reverse the steady decline in intercity rail passenger travel which began after World War II. The system over which it operates has grown from 23,000 route-miles in 1971 to 27,000 route-miles in 1977. Unfortunately, the rail share of the total intercity travel market is small and Amtrak has a long way to go in creating any significant change in national passenger transportation patterns. Amtrak operating costs have risen faster than revenues and the deficit has grown from 5.3 cents per revenue passenger-mile in FY 1972 to 12.7 cents in FY 1977. One of the primary benefits of Amtrak, the retention of a passenger transportation alternative to the automobile in the face of a growing energy resource problem, received a real-life test during the oil shortage of 1973 - 1974, during which people turned from the automobile to the train in significant numbers and Amtrak was able to accommodate an unexpected significant additional demand.

LONG-TERM TRENDS IN PASSENGER TRAFFIC

Since early in this century, common carriers have transported a generally decreasing share of a growing intercity passenger traffic market (see Figure 2-1). Although the years during World War II saw a temporary reversal of the long-term trends, by 1950 the common carrier market share had decreased to a level that has since remained constant at around 13 percent. Against this backdrop of a decreasing common carrier market share during a period of total market growth, the share of the common carrier market total carried by all class I railroads declined from 66.7 percent in 1939 to 5.8 percent in 1976,[1] while the bus share declined from 26 percent to 13.2 percent, and the aviation share increased dramatically, from 2 percent to 78.9 percent (in passenger-miles).

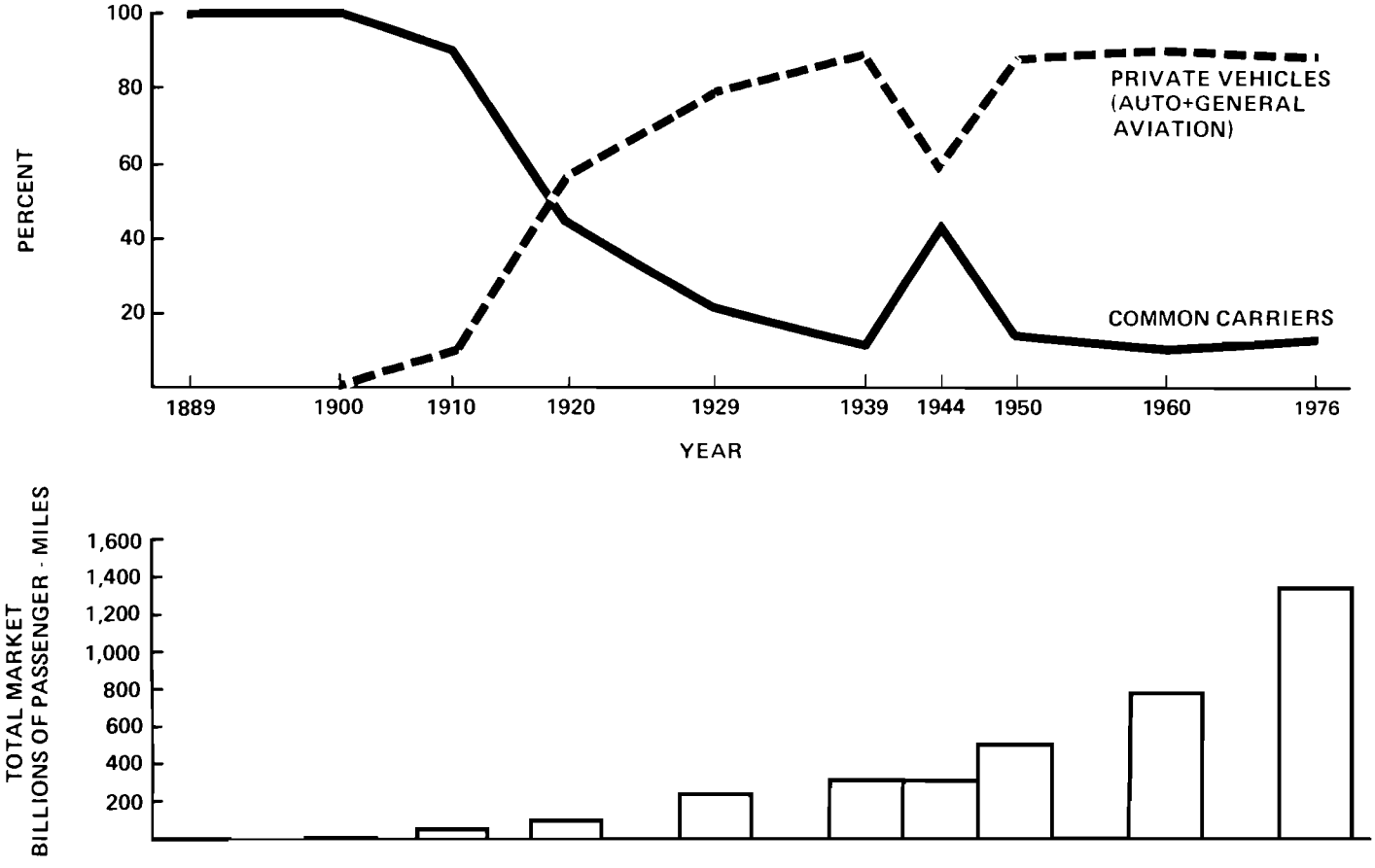
As shown in Figure 2-2, total rail passenger traffic (including intercity and commuter traffic) has declined from 23.7 billion passenger-miles in 1939 to 11 billion passenger-miles in 1976. Of this declining total, the intercity portion declined from 82 percent in 1939 to 56 percent in 1976. Thus, over the past 38 years, intercity rail passenger service has ceased to be a primary factor in common carrier intercity passenger transportation.

---

[1]This 5.8 percent is subdivided as follows: Amtrak intercity, 39%; Amtrak commuter, 1%; other intercity, 17%; other commuter, 43%. Source for statistics in this and the next paragraph: Association of American Railroads, Yearbook of Railroad Facts, 1977.

Figure 2 - 1

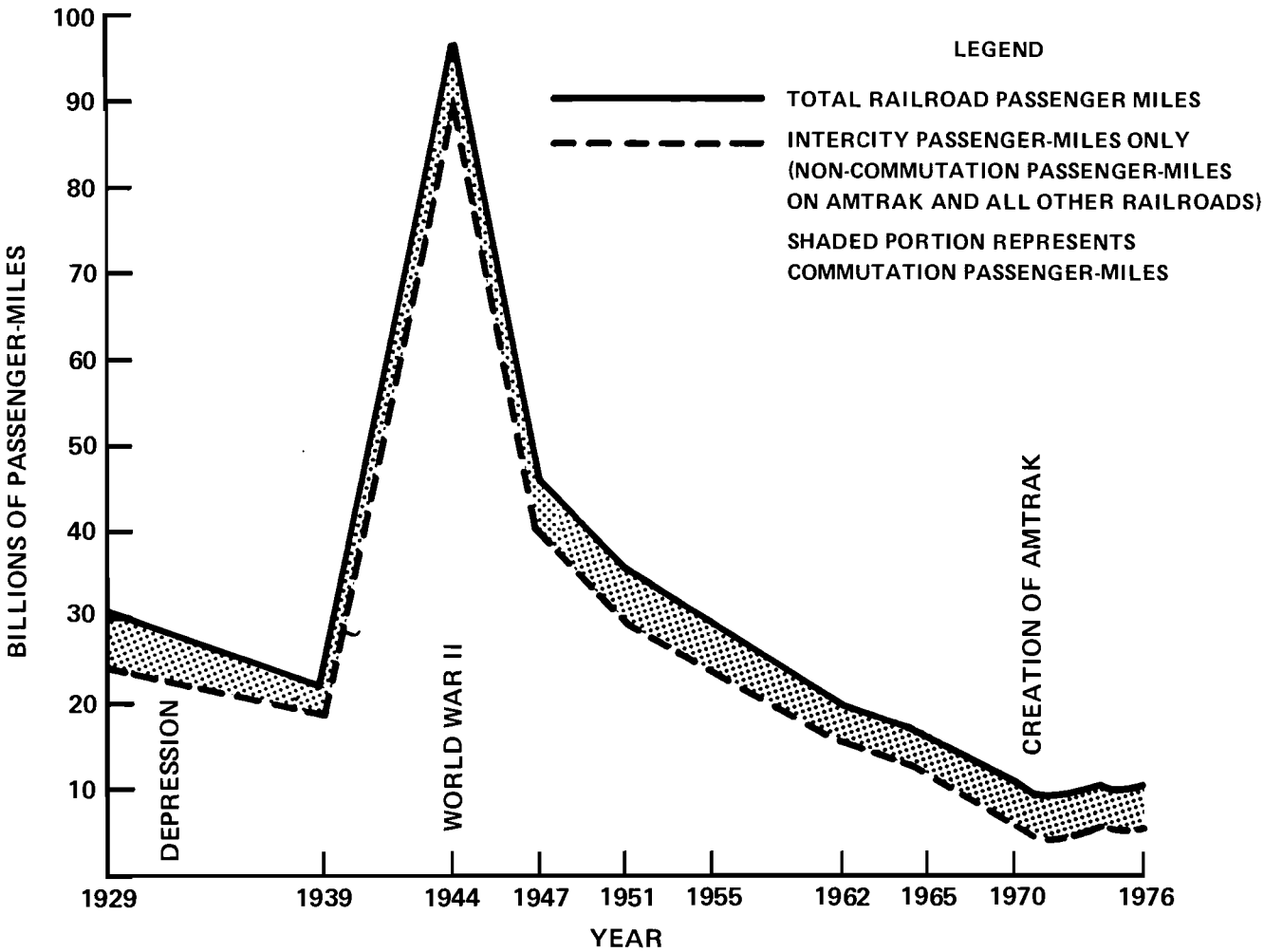
INTERCITY PASSENGER MARKET:
COMMON CARRIERS VS. PRIVATE VEHICLES



SOURCES: Association of American Railroads, Yearbook of Railroad Facts
Harold Barger, The Transportation Industries, 1889 - 1946
Motor Vehicle Manufacturers Association, Automobile Facts and Figures

Figure 2 - 2

HISTORICAL TRENDS IN RAIL PASSENGER-MILE VOLUME



SOURCE: AAR, Yearbook of Railroad Facts, 1977, "Passenger-Miles by Classes."

THE CREATION OF AMTRAK IN 1971

The National Railroad Passenger Corporation (Amtrak) was established by the Rail Passenger Service Act of 1970 and began its operations in 1971. The Act relieved the railroads of the financial burden of providing an intercity rail passenger service that lost hundreds of millions of dollars each year by affording them the opportunity to join Amtrak for a fee equal to 50 percent of their fully allocated passenger service deficit in 1969 and to transfer to Amtrak the responsibility for rail passenger service. The fee was made deductible for income tax purposes. Some marginally profitable railroads were offered and accepted Amtrak stock in lieu of taking tax deductions. Eventually, all but 8 intercity rail carriers joined Amtrak. The exceptions were the Southern, the Reading, the Rock Island, the Canadian Pacific, the Denver and Rio Grande Western, the Long Island, the Chicago South Shore and South Bend, and the Georgia Railroad.

The Act also established the provision of some level of intercity rail passenger service as a Federal responsibility, at least on an experimental basis. Amtrak was created as a mixed ownership (private and public) corporation operating over a basic system defined by the Secretary of Transportation with its operations to be initially supported by Federal funds. The Federal subsidy was, presumably, to be an interim measure, since the stated goal of Amtrak was to become a self-sustaining, intercity rail passenger carrier. Amtrak was an experiment, designed to determine whether a company solely concerned with transporting intercity passengers by rail could operate at a profit.

ROUTE STRUCTURE DEVELOPMENT

On May 1, 1971, Amtrak began operation over its basic system, which included 23,000 route-miles between 21 city-pairs. Through the addition of experimental routes, legislatively mandated international routes to Canada and Mexico, routes partially subsidized by the States (under the provisions of section 403(b) of the Amtrak legislation), and routes voluntarily added by the Board, the route structure had grown to 24,000 miles by 1974, 26,000 miles by 1975, and 27,000 miles by 1977. Amtrak has also added frequencies on existing routes. Table 2-1 shows total additional service existing by the end of each year from FY 1972 through FY 1976, expressed in daily train miles (excluding the NEC). The present Amtrak route structure is portrayed and discussed in detail in Chapter 3.

SYSTEMWIDE OPERATING AND FINANCIAL TRENDS

Over its entire network, Amtrak has reversed the long-term downward trend in intercity rail passenger traffic and has managed to increase passenger-trips, train-miles, and passenger-miles.

Table 2-1

TRENDS IN AMTRAK DAILY TRAIN-MILES

	Short-Distance		Long-Distance	
Period	Route	Daily Train Miles		Daily Train Miles
Existing at End of FY 1971	Chicago-Detroit	1,128	New York/Albany-Chicago	1,922
	Portland-Seattle	744	New York/Washington, D.C.-Chicago	2,280
	Los Angeles-San Diego	512	New York/Washington, D. C.-Kansas City	2,782
	Chicago-Milwaukee	510	Newport News/Washington, D. C.-Chicago	2,106
	Chicago-St. Louis	1,128	New York-Florida	7,826
	Chicago-Carbondale	620	Chicago-Florida	3,776
	New York-Buffalo	3,474	Chicago-New Orleans	1,846
	New York-Pittsburgh	870	Chicago-Houston	2,738
	Cumulative Total	8,986	Chicago-Los Angeles	4,446
			Los Angeles-Seattle	1,812
			Chicago-Seattle(Havre)	4,574
			Chicago-Seattle(Billings)	2,065
			Chicago-Oakland	3,250
			New Orleans-Los Angeles	1,733
			Cumulative Total	43,156
Added By End of FY 1972	Los Angeles-San Diego	256	New York/Albany-Chicago	(1,922)
	Chicago-Milwaukee	340	Los Angeles-Chicago	4,446
	Chicago-Quincy	526	Los Angeles-Seattle	(256)
	New York-Buffalo	(876)	Cumulative Total	45,424
		572		
		(282)		
	Washington, D. C./ Cumberland	702		
	New York-Pittsburgh	(870)		
	Cumulative Total	9,354		
Added By End of FY 1973	Seattle-Vancouver	312	Chicago-Los Angeles	(4,446)
	Washington, D. C.- Cumberland	(410)	Los Angeles-Seattle	1,566
	Cumulative Total	9,256	Chicago-Seattle(Billings)	(140)
			St. Louis-Laredo	372
			Washington, D. C.-Montreal	1,340
			Cumulative Total	44,116
Added By End of FY 1974	Chicago-St. Louis	483	Chicago-Seattle(Billings)	2,065
	Chicago-Dubuque	364	Chicago-Oakland	1,565
	Chicago-Carbondale	258	St. Louis-Laredo	628
	Washington, D. C.- Cumberland	58	Cumulative Total	48,374
	Oakland-Bakersfield	624		
	Cumulative Total	11,045		
Added By End of FY 1975	Chicago-Detroit	483	New York-Detroit	1,352
	Chicago-Detroit	106	Norfolk-Chicago	1,065
	Chicago-Milwaukee	(170)	Cumulative Total	50,791
	Chicago-Port Huron	636		
	New York-Montreal	764		
	Minneapolis-Superior	288		
	New York-Buffalo	(876)		
	Cumulative Total	12,275		
Added By End of FY 1976	Chicago-Milwaukee	(974)	New York-Florida	1,656
	Los-Angeles-Las Vegas	93	New York-Florida	(1,954)
	New York-Newport News	826	New York/Washington, D. C.-Chicago	170
	Cumulative Total	13,097	New York/Boston-Chicago	2,358
			Newport News/Washington, D. C.-Chicago	(342)
			Chicago-Houston	62
			St. Louis-Laredo	(33)
			Cumulative Total	52,708

SOURCE: Amtrak Schedules.

NOTE: Mileage shown in parentheses denotes service discontinued.

As a result of increases in passenger-trips and passenger-miles, coupled with a succession of fare increases, revenue has shown a steady increase, totaling 104 percent since 1972. Unfortunately, costs have risen continuously at a significantly higher rate than revenues and in all years other than 1973 the gap between costs and revenues has widened. While revenue in 1971 covered almost 50 percent of total costs, in 1977 it covered only 37.4 percent of total costs. The net result has been a steadily growing deficit. The deficit per revenue passenger-mile has more than doubled from a 5.3-cent level in FY 1972 to a 12.7-cent level in FY 1977. From FY 1972 to FY 1977, Amtrak's total expenses increased 172 percent. Amtrak's operating results from FY 1972 through FY 1977 are summarized in Figure 2-3.

Table 2-2 compares Amtrak's financial and operating trends with those of the railroad freight industry as a whole for calendar years 1972-1976. While there are obvious differences between Amtrak and the freight railroads in the relative size of their principal cost elements (Amtrak for example employing more skilled labor for car maintenance than a freight railroad), this should be reflected in the size of the cost base. The rates of change arguably should be similar, especially considering that the labor component of both is roughly equivalent. Nevertheless, in every category, Amtrak's yearly cost increase has been greater than the railroad industry average. Over the period, the industry experienced increased operating expenses of 42 percent, compared to Amtrak's 121 percent. Of particular note is that cost per car mile (a basic production measure for both freight and passenger operations) increased 49 percent for the freight carriers and 89 percent for Amtrak during the 1972-1976 period. The rate of increase does not appear to be solely attributable to inflation. For this reason, a detailed study of Amtrak's cost structure is required, particularly if similar increases over the railroad norm are to be avoided in the future. The Department proposes to work with Amtrak to undertake such a detailed cost review as an immediate priority.

Service quality, measured by several key variables, has varied since Amtrak's inception. System on-time performance has, with some exceptions, generally decreased, continuing a trend already well-established before Amtrak. (See Figure 2-4.) Of 41 route segments outside the NEC, 34 showed declines in average scheduled speed (including stops) between 1965 and 1976.[1] The specific reasons for these lengthened schedules vary from route to route, and may include such items as deteriorating track conditions, operating practices that are unfavorable to expeditious passenger service, and revised routings. Certain non-quantifiable attributes have improved, however. For example, the purchase of 492 Amfleet coaches in 1975-1977 undoubtedly enhanced passenger comfort on many routes, including the Northeast Corridor.

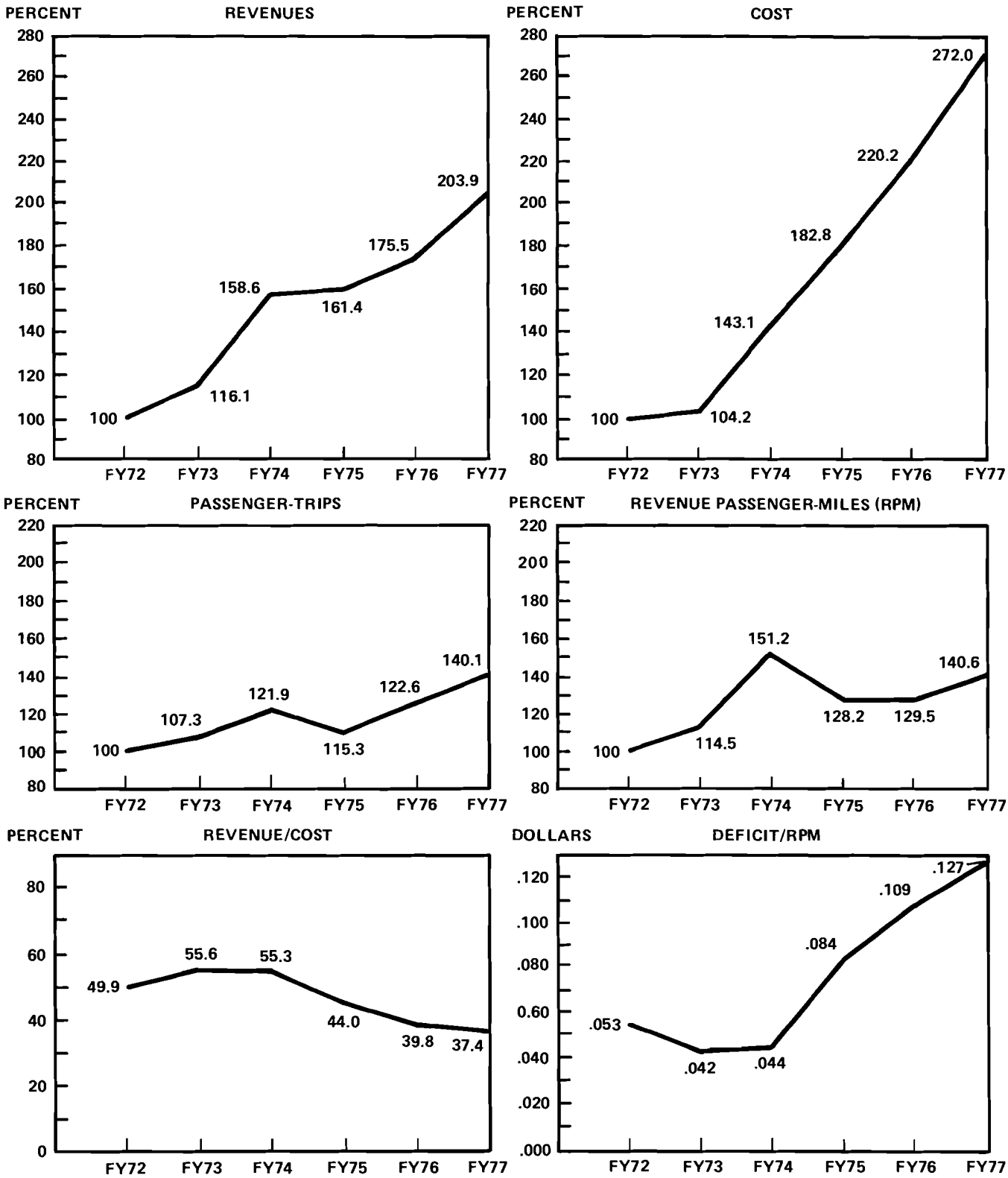
AMTRAK PERFORMANCE DURING THE 1973-1974 ENERGY CRISIS

One of the primary benefits to the public of maintaining Amtrak is its availability as an alternative to the automobile in an era of increasing energy problems. Therefore, of special note in any review of Amtrak history is its performance during the 1973-1974 energy crisis. As can be seen in Table 2-3, during the period from November 1973 to April 1974, as compared with the equivalent six-month period in 1972-73, Amtrak registered gains in passenger-miles

[1] Source: Amtrak internal document, "Non-Corridor Schedule Review."

Figure 2-3

TOTAL AMTRAK SYSTEM PERFORMANCE BY FUNCTION THROUGH FY77



SOURCE: Calculated from Amtrak financial and operating reports to the Department and the Interstate Commerce Commission.

Table 2-2

PERFORMANCE MEASURE COMPARISONS, FREIGHT RAILROADS VS. AMTRAK

(CALENDAR YEARS)

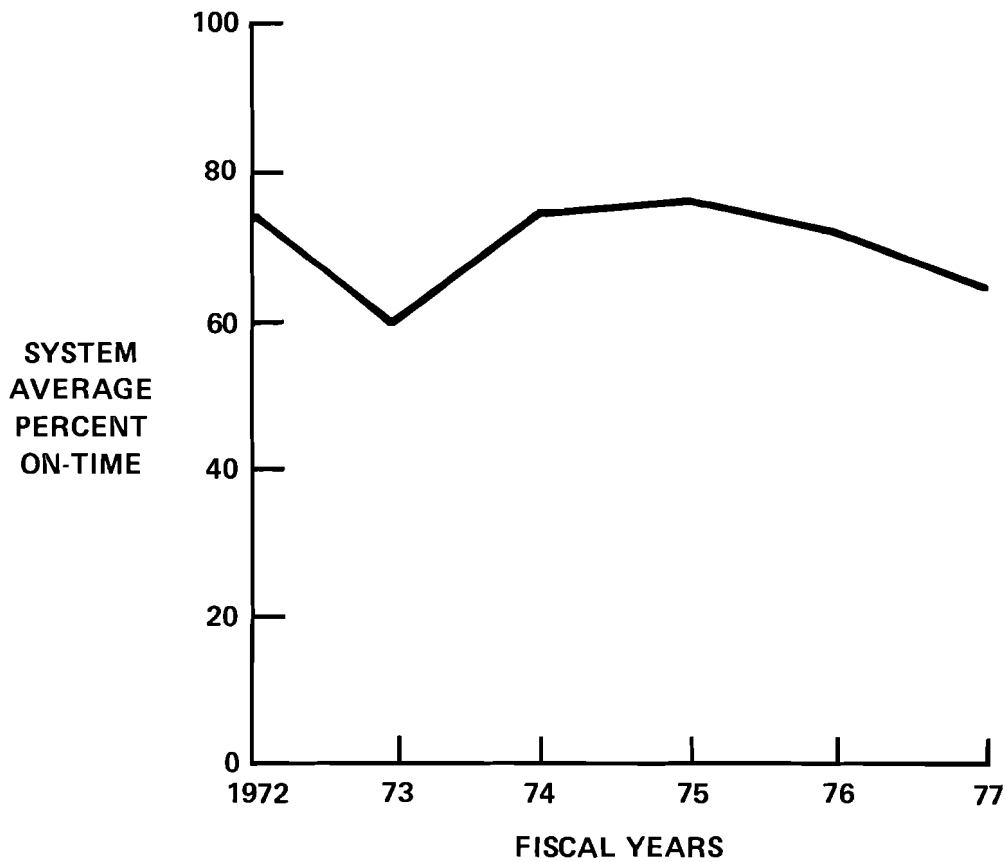
	1972		1976	
	Freight Railroads	Amtrak	Freight Railroads	Amtrak
Operating Expenses ($ millions)	10,550	309	14,948	681
Index	100	100	142	221
Car-Miles[a] (millions)	30,309	212	28,514	247
Index	100	100	94	117
Operating Expense per car-mile ($)	0.35	1.46	0.52	2.76
Index	100	100	149	189

[a] Freight car-miles for freight railroads, passenger car-miles for Amtrak.

SOURCE: Amtrak statistics calculated from Amtrak financial and operating reports to the Department and the Interstate Commerce Commission. Railroad industry statistics calculated from Association of American Railroads Year Book of Railroad Facts 1977 Edition.

Figure 2-4

SYSTEMWIDE ON-TIME PERCENTAGES



SOURCES: Amtrak Public Affairs Department, "Background on Amtrak"; 1977 data is from Amtrak Performance Measurement Report, December 1977

Table 2-3

ENERGY CRISIS RESULTS - SUMMARY

Oil Shortage Period is Highlighted

NEC Routes	Passenger-Trips (millions)	Passenger-Miles (millions)	Revenues ($ millions)	Fully-Allocated Costs ($ millions)	Surplus/ Deficit Per PM ($)
Nov.'72 - Apr.'73	4.53	477.65	32.17	39.70	(.016)
Nov.'73 - Apr.'74	5.41	647.27	42.80	57.55	(.023)
Nov.'74 - Apr.'75	4.79	552.83	46.28	76.28	(.054)
Long-Haul Routes					
Nov.'72 - Apr.'73	2.32	909.04	45.79	106.72	(.067)
Nov.'73 - Apr.'74	2.06	1,363.95	69.96	136.72	(.049)
Nov.'74 - Apr.'75	1.79	1,021.56	61.36	168.18	(.105)
Short-Haul Routes					
Nov..72 - Apr.'73	.62	130.31	5.99	17.21	(.086)
Nov.'73 - Apr.'74	1.39	201.22	9.23	23.95	(.073)
Nov.'74 - Apr.'75	1.15	106.82	11.40	36.42	(.234)
Total System					
Nov.'72 - Apr.'73	7.47	1,517.39	83.96	163.63	(.053)
Nov.'73 - Apr.'74	8.87	2,212.44	121.99	218.22	(.043)
Nov.'74 - Apr.'75	7.73	1,761.21	119.05	280.88	(.092)

SOURCE: Calculated from Amtrak financial and operating reports to the Department and the Interstate Commerce Commission.

across all major categories of routes (+36 percent in the NEC, +50 percent on long-distance routes, and +54 percent on short-distance routes). Further, the Corporation managed in so doing to reduce the systemwide deficit per passenger-mile by 19 percent (for long-haul routes by 27 percent, and for short-haul routes by 15 percent). Only the NEC registered a gain in deficit per passenger-mile (+44 percent).

While the positive ridership increases of the energy crisis period did not continue in later periods, and while the deficit per passenger-mile soon began to increase again, it is clear that during the 1973-1974 period of reduced availability of gasoline, people turned to the train. It is also clear that an unexpected surge in traffic was accommodated by Amtrak and a portion of that increase (19 percent) was retained in the following year.

Chapter 3

THE EXISTING SYSTEM AND ITS OPERATION

During the fiscal year ending September 30, 1977 (FY 1977), the most recent complete period for which data are available for analysis, the Amtrak system generated 19.2 million passenger-trips and 4.3 billion passenger-miles. Although Amtrak captured only a small proportion of total intercity passenger travel nationwide, it accounted for a larger percentage of travel in the markets in which it competes. To support operations over its system, Amtrak owned and maintained an equipment fleet of 1,954 passenger cars and 353 locomotives, as well as 32 maintenance facilities. Although one-half of Amtrak's FY 1977 passenger-miles were generated by trips of over 500 miles, most trips taken by Amtrak passengers were for short distances; the average trip was 226 miles in length. In operating its system in FY 1977, Amtrak incurred a deficit of $529.8 million,[1] for an average loss of 12.3 cents per passenger-mile,[2] on a fully-allocated basis. Within these systemwide figures, there are significant variations among route groupings and individual routes. Amtrak's fuel consumption record for FY 1977 reveals that energy efficiency differs widely from one type of service to another. Intercity rail passenger service remains a very safe mode of transportation to which a net benefit from reduced fatalities may be attributed.

SYSTEM DESCRIPTION: ROUTES

The Amtrak system comprised 27,000 miles of routes at the end of FY 1977, as shown in Figure 3-1. Table 3-1 lists the routes, the operating railroads, and, for routes added after 1971, the basis of addition to the system including:

- Section 403(b) of the Rail Passenger Service Act, which permits States to request and pay half of the solely related operating and capital costs, net of revenues, of additional Amtrak service.
- International routes to Canada and Mexico
- Experimental routes added pursuant to section 403(c) of the Act.
- Other additions made by decision of the Amtrak Board.

---

[1]All results for FY 1977 in this chapter reflect adjustments completed in March 1978.

[2]All passenger-mile figures and derivatives thereof in this and subsequent chapters reflect total passenger-miles, as opposed to revenue passenger-miles which exclude pass riders.

Figure 3-1

1977 AMTRAK SYSTEM

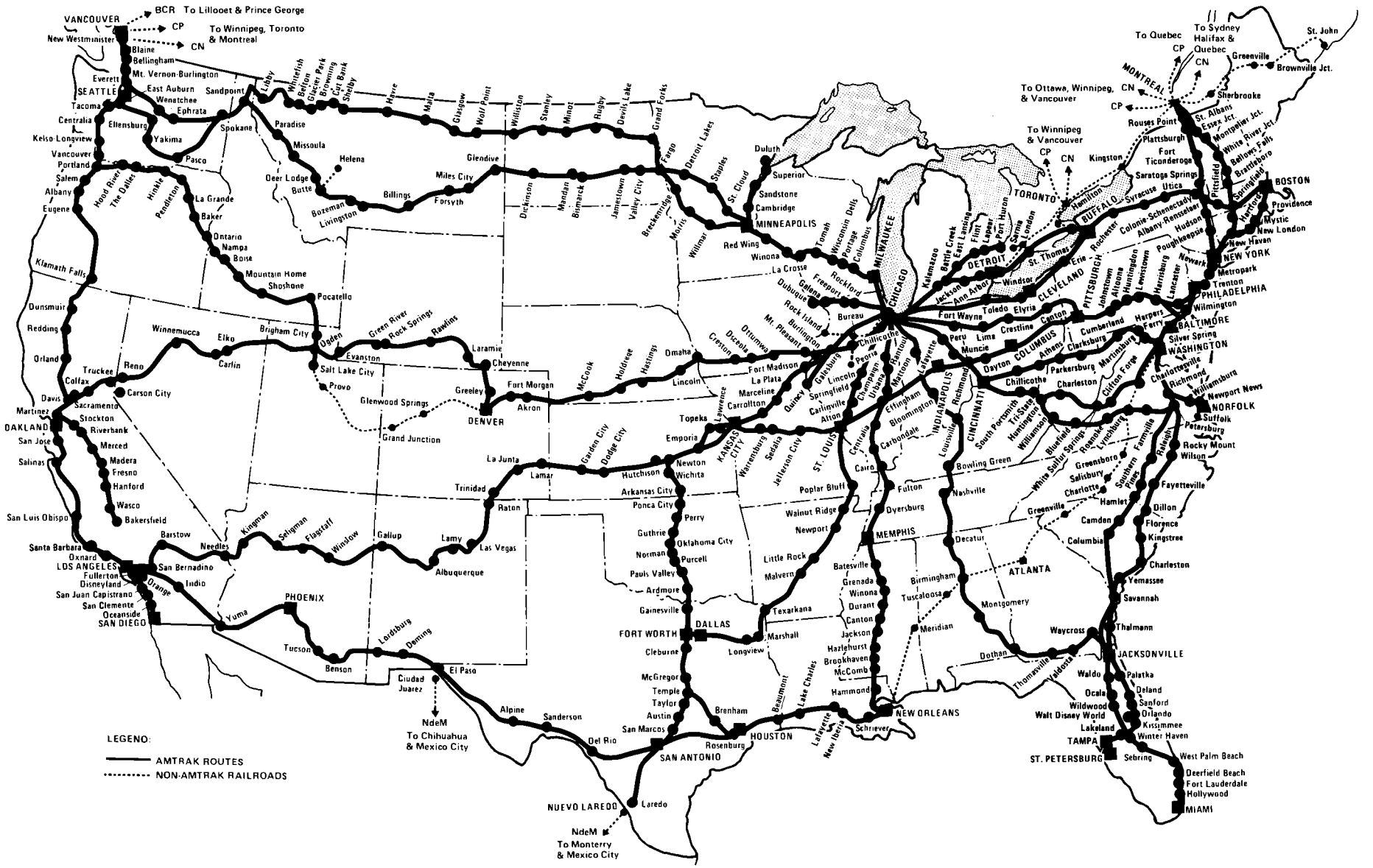


Table 3-1

Amtrak Routes

Routes	Operating Railroad	Basis for Addition to System
Northeast Corridor		
Metroliners	Amtrak	
NEC Conventionals	Amtrak	
New Haven-Springfield	Amtrak	
New York City-Harrisburg	Amtrak	
New York City-Philadelphia	Amtrak	
Philadelphia-Harrisburg	Amtrak	403(b)(partial)
Short Distance		
Chicago-Carbondale	ICG	403(b)(partial)
Chicago-Detroit	Conrail	403(b)(partial)
Chicago Dubuque	ICG	403(b)
Chicago-Milwaukee	Milwaukee	
Chicago-Port Huron	GTW, Conrail	403(b)
Chicago-Quincy	BN	403(b)
Chicago-St. Louis	ICG	403(b)(partial)
Los Angeles-San Diego	Santa Fe	403(b)(partial)
Minneapolis-Duluth	BN	403(b)
New York City-Buffalo/Detroit	Conrail	403(b)(partial)
New York-Montreal	Conrail, D&H, CP	403(b)
Oakland-Bakersfield	Santa Fe	Experimental/Other
Seattle-Portland	BN	
Seattle-Vancouver	BN/CN	International
Washington-Cincinnati(Cumberland)	B&O	Experimental/Other
Washington-Martinsburg	B&O	Experimental/Other
Long Distance		
Boston-Newport News	Amtrak, RF&P, C&O	Experimental/Other
Chicago-Florida	L&N, SCL	
Chicago-Houston	Santa Fe	
Chicago-Laredo	ICG, MP, MKT	International
Chicago-Los Angeles	Santa Fe	
Chicago-New Orleans	ICG	
Chicago-New York City/Boston	Conrail	Experimental/Other
Chicago-New York City/Washington	Conrail, Amtrak	
Chicago-San Francisco	BN, UP, SP	
Chicago-Seattle (via Havre)	BN, Milwaukee	
Chicago-Seattle (via Billings)	BN, Milwaukee	Experimental/Other
Chicago-Washington (Cincinnati)	C&O, N&W, SCL	Experimental/Other
Kansas City-New York City/Washington	MP, Conrail, Amtrak	
Los Angeles-New Orleans	SP	
Los Angeles-Seattle	SP, BN	
New York-Florida	Amtrak, RF&P, SCL	
New York-Savannah	Amtrak, RF&P, SCL	Experimental/Other
Seattle-Salt Lake	UP, BN	Experimental/Other
Washington-Montreal	Amtrak, B&M, CN, CV	International

Source: Official Guide of the Railways; Amtrak Public Affairs Dept., Background on Amtrak

AMTRAK EQUIPMENT, SHOPS, AND CAPITAL INVESTMENTS

To provide passenger service for its FY 1977 system, Amtrak owned 1,954 passenger cars, including self-propelled cars, and 353 locomotives. Table 3-2 shows passenger car and locomotive fleet composition by type, and Figure 3-2 shows equipment assignments over the national network. A dramatic change in the equipment situation will occur over the next few years when 284 newly purchased bi-level Superliner cars will be assigned to routes where clearances permit (primarily west of Chicago). To service its equipment, Amtrak owns or uses approximately 32 major servicing facilities (listed in Table 3-3).

In making equipment, shop, and other fixed facility acquisitions (e.g., purchase of the NEC from Conrail), Amtrak had by March 1978 spent, or received the approval of its Board of Directors for the expenditure of, $1.267 billion (as shown in Table 3-4).

AMTRAK'S ROLE IN THE NATIONWIDE TRANSPORTATION SYSTEM

In FY 1977, Amtrak generated about three-tenths of one percent of total intercity passenger-miles. As part of the common carrier system (air, rail, and bus), Amtrak generated 3 percent of the intercity passenger-miles. Preliminary travel estimates for those city pairs served by Amtrak indicate, however, that where Amtrak does operate it competes well, capturing approximately 4 percent of the total intercity passengers and passenger-miles, and 14.4 percent of the passenger-miles and 22.5 percent of the passengers carried by common carriers alone.[1]

RELATIONSHIP TO OTHER MODES

In general, Amtrak's trains operate in the more densely populated areas of the nation, thus providing service to the largest population centers. The certificated air carriers provide air passenger service to 592 cities compared with 532 Amtrak station stops. A significant number of Amtrak stops have no air service but there is bus service to over 15,000 locations, including almost every Amtrak stop.[2]

RAIL TRAVEL PATTERNS

Half of Amtrak's passenger-miles in FY 1977 were generated on long-haul trips of 500 miles or more, and trips of 750 miles or more generated 40 percent of the passenger-miles (Figure 3-3). The highest average trip lengths occurred on the Midwest-West Coast and West Coast-South transcontinental routes. Nevertheless, the 900-1,000 mile East-Midwest and Midwest-South runs have

---

[1] Rail and air patronage taken from CAB and Amtrak data; bus travel is estimated on basis of a modal split model.

[2] Number of service points by mode is from Civil Aeronautics Board, 10 percent origin/destination sample; Amtrak Public Affairs Department; and American Bus Association.

Table 3-2

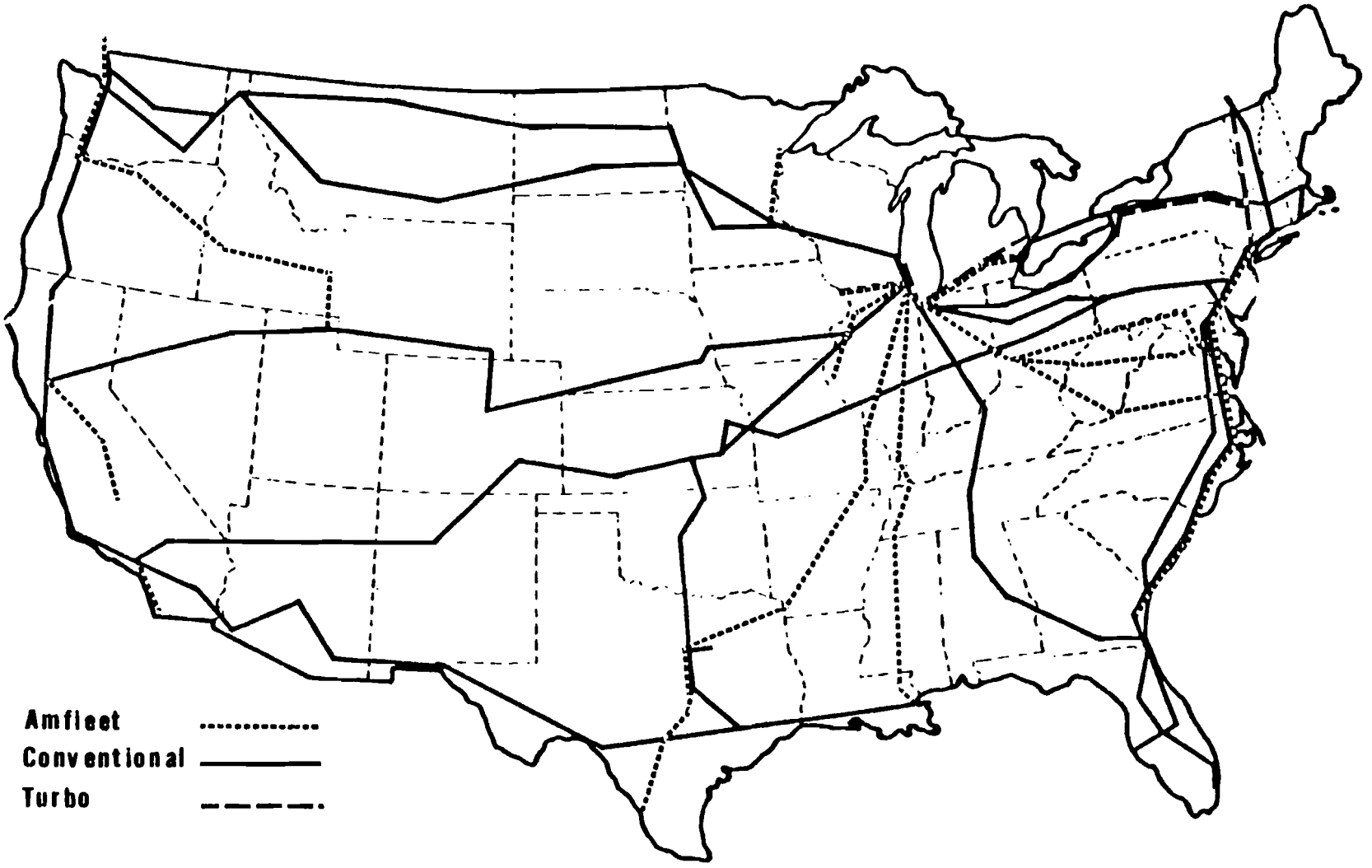
Amtrak Equipment Fleet at End of FY 1977

Equipment Types	Number in Fleet
Locomotives and related units:	
Diesel locomotives, steam-generating	188
Diesel locomotives, electric-generating	72
Electric locomotives, steam-generating	36
Electric locomotives, electric generating	20
Switcher/yard locomotives	12
Heater cars	17
Power cars	8
Total	353
Trailer cars, conventional and Amfleet:	
Conventional:	
Baggage	193
Baggage - dormitory	70
High-level coaches	61
Snack coaches	11
Standard coaches	419
Dome cars	41
Slumber coaches	23
Diners	130
Lounge/Parlor	100
Sleepers	268
Subtotal, Conventional	1,316
Amfleet:	
Amcoach	360
Amcafe	53
Amclub	40
Amdinette	37
Subtotal, Amfleet	490
Total	1,806
Multiple-unit and Tuboliner equipment:	
Silverliners	10
Rail diesel cars	12
Metroliners	61
Turboliner power coaches	26
Turboliner trailer coaches	39
Total	148
Grand Total, Amtrak Fleet Units	3,307

Source: Amtrak Morning Report, Section IV, October 1, 1977.

Figure 3-2

EQUIPMENT ASSIGNMENTS: NATIONAL OPERATIONS OCTOBER, 1977



Source: Amtrak, Five-Year Corporate Plan, 1977.

Table 3-3

Major Amtrak Servicing Facilities
(Number of pieces of equipment regularly assigned is in parentheses)

Location	Locomotive Overhaul	Locomotive Maintenance	Car Overhaul	Car Maintenance	Turbo Maintenance	Operator and Status
Chicago--21st St.		x (21)		x (348)		Amtrak--leased from ATSF
Chicago--12th & 16th St.		x (21)		x (236)		Amtrak
Chicago--Western Ave		x (3)		x		Milwaukee
Chicago-Brighton Pk					x (5 train sets)	Amtrak
New York--Sunnyside				x (137)		Amtrak
Philadelphia				x (302)		Amtrak
Wilmington		x (66)	x	x (61)		Amtrak
Rennselaer		x			x (7 train sets)	Amtrak
New Haven		x (35)				Amtrak
Boston				x (8)		Amtrak
Washington Ivy City		x (12)		x (69)		Washington Terminal Company
Harrisburg		x (23)				Conrail
Jacksonville				x		Amtrak
Jacksonville		x				SCL
Hialeah		x (30)		x (282)		SCL
St. Petersburg				x (5)		SCL
New Orleans		x (22)		x		Amtrak
Buffalo				x (35)		Amtrak
Harmon		x (19)				Conrail
Minneapolis		x (2)		x (11)		BN
Superior		x				BN
Milwaukee		x				Milwaukee
Duluth						BN
Paducah	x					ICG
La Grange	x					EMD
Beech Grove			x			Amtrak
Denver		x (16)				BN
Havre		x (30)				BN
Seattle		x (22)		x (244)		BN
Oakland		x		x (28)		SP
Los Angeles		x (52)		x (198)		Amtrak
Mira Loma			x			Rail Systems Inc.

Note: Excludes 500 mile inspection and servicing sites, as well as turnaround locations.

Source: Amtrak, Five-Year Corporate Plan, 1977.

Table 3-4

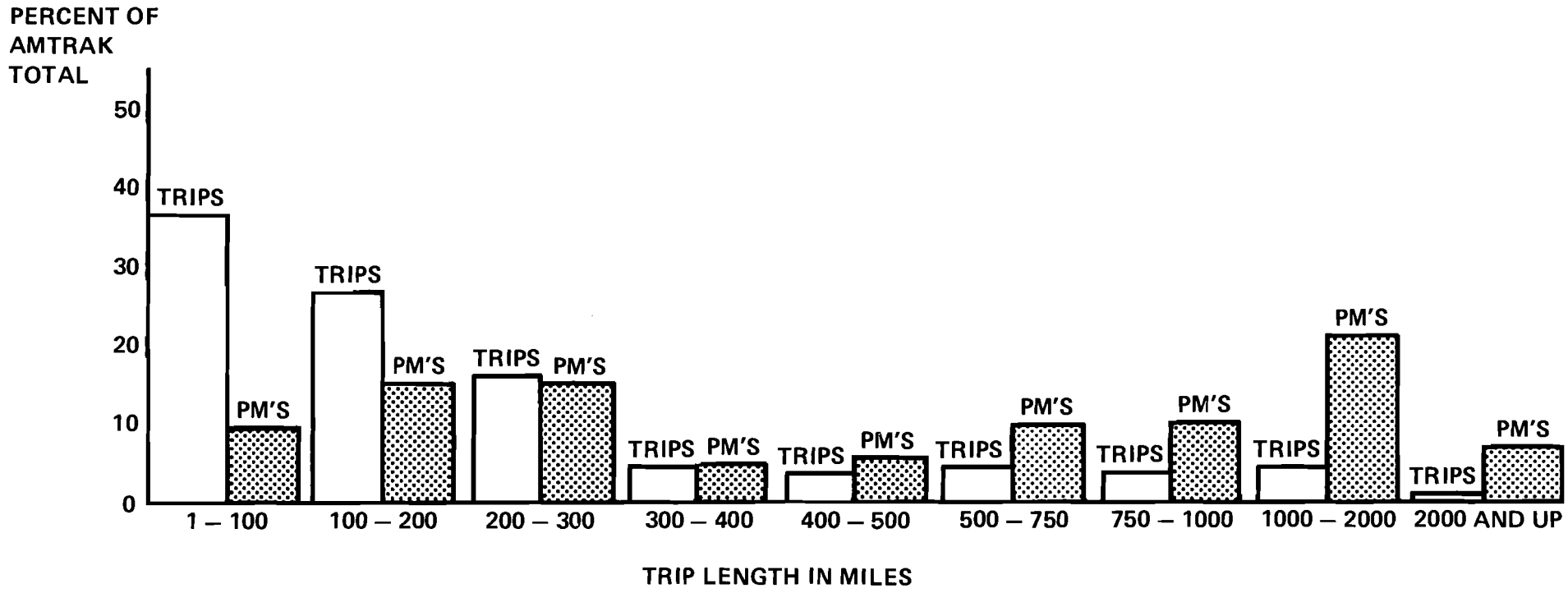
Amtrak Capital Investment Program: FY 1978 Plan and All Prior Years

Item	Capital Funding ($Millions)
Passenger Equipment	
Turbo Equipment	$ 63.4
Superliners	232.3
Metro Overhauls	20.1
Metro II Prototype	-
Amfleet	231.9
Used Metro Cars	5.9
Leased Conventional Cars	19.1
Modernized Used Cars	149.0
L. R. C. Train Sets	4.0
Convert Baggage Cars	2.8
Research Engineering and Design	0.1
Subtotal - Passenger Equipment	$ 728.7
Motive Power	
Diesel Electric Locomotives	113.1
Electric Locomotives	45.6
Diesel Switchers	7.3
Diesel Electric Overhaul	55.5
Research Engineering and Design	0.1
Subtotal - Motive Power	$ 221.7
Facilities	
Major	66.8
Minor	9.7
Repair	97.2
Baltimore/Airport	0.1
Subtotal - Facilities	$ 173.9
Right-of-Way	
Northeast Corridor	29.9
Other	19.9
Research & Development	3.7
Capitalized Interest	12.5
Capital Program Support	2.6
Special Purchase	
Northeast Corridor Purchase	70.0
Off-Corridor Purchase	4.1
TOTAL AMTRAK CAPITAL PROGRAM	$1,267.0

Source: Amtrak Financial Planning Report, Monthly Financial Status Report, March 9, 1978.

Figure 3 - 3

DISTRIBUTION OF AMTRAK PASSENGER-TRIPS AND PASSENGER-MILES BY LENGTH OF TRIP, FY 1977



SOURCE: Amtrak Matrix System

NOTE: Excludes "unknowns", mainly commuters, for whom exact trip lengths are not recorded.

high proportions of average trip length to total route length. For example, the average passenger on the Chicago to New Orleans route traveled 71 percent of the total route distance; the typical New York/Washington to Chicago passenger traversed 64 percent of that route, and the New York/Boston to Chicago traveler stayed on-board for 53 percent of the route. Table 3-5 provides further details on trip lengths on long-distance routes.

On the other hand, most of the passenger-trips (as opposed to passenger-miles) are for short distances. The average trip length over the entire Amtrak system is 225.8 miles and many routes average far less. Over 25 percent of the Amtrak passengers are carried on the NEC locomotive-hauled trains linking Boston, New York, and Washington. Other NEC routes bring the cumulative total to 54.9 percent (see Table 3-6).

Because of the high incidence of commuters and other repeat trips on these short-haul routes (particularly in the NEC), the number of individuals served in short-haul markets is not as great as the number of recorded passenger-trips.

FINANCIAL PERFORMANCE

Table 3-7 summarizes systemwide financial performance in FY 1977, during which total Amtrak revenue attained its highest level to date, $311 million. Fully 83 percent of this total represents ticket receipts. Food and beverage service contributed $27 million or approximately 7 percent to the total, while mail and package express contributed $11 million.

Total net system costs for FY 1977 were $841 million, also the highest level attained to date. The two largest cost components were maintenance of equipment and train operations, representing approximately 27 percent and 25 percent of the total, respectively. The next largest cost component, on-board services, accounted for only 11 percent of the total. Total system loss, including depreciation, was approximately $530 million.

It should be noted that about 10 percent ($95.2 million) of Amtrak's total gross operating costs of $936.3 million were reimbursed by other agencies, resulting in total net costs of $841.1 million. The reimbursements are mainly for services performed by Amtrak for State/regional commuter authorities and Conrail, particularly in the NEC. Such services can include equipment maintenance, trackage rights, allocated station expenses, and the use of the nationwide telephone reservation service.

The net costs shown in Table 3-7 include $318.2 million in payments to railroads, largely for train operations and equipment maintenance and servicing. These payments are shown by railroad company in Table 3-8. Of the total payments, $117.3 million, or 37 percent, are to Conrail.

Table 3-9 lists the routes operated by Amtrak and shows financial results by route as well as key operating statistics, and derivatives. Table 3-10 compares the relative importance of the three major route categories: NEC, Short-Distance and Long-Distance. By all measures except passenger-trips, the long-haul routes are preponderant in the existing Amtrak system. They

Table 3-5

RELATIVE IMPORTANCE OF LONG-HAUL TRIPS OVER 500 MILES, FY 1977

MARKET	AVERAGE TRIP LENGTH RANK	AVERAGE TRIP LENGTH MILES	PASSENGER MILES (MILLIONS)	% of AMTRAK TOTAL	CUMULATIVE % of TOTAL	ROUTE LENGTH	AVERAGE TRIP LENGTH AS % of ROUTE LENGTH
New York City - Los Angeles	1	2,347.1	9.6	0.2	0.2	3094[a]	75.9%
Chicago - Los Angeles	2	1,062.9	318.9	7.3	7.5	2223	47.8%
New Orleans - Los Angeles	3	1,001.5	107.3	2.4	9.9	2022	49.5%
Chicago - San Francisco	4	837.8	222.6	5.1	15.0	2404	34.9%
Chicago - Seattle (Havre)	5	817.7	180.1	4.1	19.1	2287	37.8%
Chicago - Seattle (Billings)	6	782.9	87.0	2.0	21.1	2228	35.1%
New York City - Florida	7	716.8	666.6	15.2	36.3	1385[b]	51.8%
Chicago - New Orleans	8	652.8	84.7	1.9	38.2	923	70.7%
Chicago - Florida	9	644.6	94.7	2.2	40.4	1601[b]	40.3%
New York City/Washington - Chicago	10	576.0	141.7	3.2	43.6	904[c]	63.7%
Seattle - Los Angeles	11	540.4	218.4	5.0	48.6	1364	39.6%
Chicago - Laredo	12	530.9	26.9	0.6	49.2	1449	36.6%
New York City/Boston - Chicago	13	505.5	103.1	2.3	51.5	961[d]	52.6%

SOURCE: Amtrak Marketing Department Tabulation 12/19/77

a - Route length is Via Kansas City
b - Route length is to Miami
c - Route length is from Penn Station, New York City, to Chicago
d - Route length is from Grand Central Terminal, New York City, to Chicago

Table 3-6

PASSENGER GENERATION BY MARKET, FY 1977

Market	Number of Passenger-Trips Rank	Millions	Percent of Amtrak Total	Cumulative Percent of Total	Average Trip Length	Route Length	Average Trip Length as Percent of Route Length
Northeast Corridor Spine [a]	1	5.3 [b]	27.3	27.3	128.7	456	28.2
New York City-Philadelphia	2	3.3 [b]	17.2	44.5	51.8	90	57.6
Metroliners	3	2.0	10.4	54.9	146.5	224	65.4
New York City-Florida	4	.9	04.8	59.7	716.8	1,385 [c]	51.8
Philadelphia-Harrisburg	5	.8 [b]	04.3	64.0	52.8	103	51.3
New York City-Buffalo-Detroit	6	.7	03.8	67.8	187.9	438 [d]	42.9
San Diego-Los Angeles	7	.7	03.6	71.4	88.0	128	68.8
Chicago-Detroit	8	.4	02.3	73.7	141.7	279	50.8
Seattle-Los Angeles	9	.4	02.1	75.8	540.4	1,364	39.6
Chicago-Milwaukee	10	.3	01.6	77.4	80.6	85	94.8

SOURCE: Amtrak Marketing Department tabulation--12/19/77

a - Locomotive hauled trains between Boston, New York, Washington
b - Includes Commuters
c - Route length is to Miami
d - Route length is New York City to Buffalo

Table 3-7

SUMMARY OF AMTRAK SYSTEMWIDE FINANCIAL PERFORMANCE, FY 1977

Revenue ($ in millions)

Category		
Transportation	$259.5	
Food and Beverage	21.3	
Mail, Express, & Other	11.3	
All Other Revenue	19.2	
TOTAL REVENUE		$311.3

Costs ($ in millions)

Function	Labor	Other[a]	Function Gross Total	Reimb	Function Net Total	
Train Operations	$21.0	$221.6	$242.6	$30.3	$212.3	
Maintenance of Equipment	93.7	144.2	237.9	6.6	231.3	
Maintenance of Way	52.0	25.8	77.8	37.0	40.8	
On-Board Services	64.5	26.5	91.0	.8	90.2	
Stations	43.6	30.3	73.9	16.4	57.5	
Marketing/Reservations	20.4	22.8	43.2	2.2	45.4	
Taxes	-	9.7	9.7	-	9.7	
Insurance	-	9.2	9.2	-	9.2	
Depreciation	-	32.3	32.3	-	32.3	
Interest	-	38.0	38.0	4.1	33.9	
General Support	31.0	26.7	57.7	2.2	55.5	
General & Administrative	12.3	10.6	22.9	-	22.9	
TOTAL COSTS	$338.5	$597.8	$936.3	$95.2		$841.1
TOTAL LOSS						$529.8
Less depreciation						$ 32.3
Items requiring subsidy						$497.5
Less items not requiring appropriation in FY 1977						$ 14.9
FY 1977 cash subsidy						$482.6

[a]Railroad labor which cannot be broken out in function detail is included under Other classification in the amount of $192.4 million.

Table 3-8

Amtrak Payments to Railroads, FY 1977 ($ millions)

Railroad	Amount
Conrail	$117.3
Burlington Northern	41.8
Seaboard Coast Line	41.8
Santa Fe	33.7
Southern Pacific	22.1
Milwaukee	9.5
ICG	17.5
Chessie	4.7
RF&P	6.6
All Others	23.2
TOTAL	$318.2

Source: Amtrak Financial Report "Statement of Payments to Carriers" for FY 1977 dated 12/30/77 as modified by Amtrak internal memorandum dated 4/6/78.

Table 3-9 ROUTE-BY-ROUTE PROFIT AND LOSS FY 77

Route	Train-Miles (Million)	Passenger Miles (Million)	PM/TM	Revenue ($Million)	Avoidable Cost ($Million)	Avoidable Profit/ (Loss) ($Million)	Avoidable P/(L) Per PM ($)	Fully Allocated Cost ($Million)	Fully Allocated Profit/ (Loss) ($Million)	Fully Allocated P/(L) Per PM ($)
Northeast Corridor:										
Metroliners	2.011	292.823	146	36.405	22.660	13.745	0.0469	53.698	(17.293)	(0.0591)
NEC Conventionals	3.170	544.764	172	43.989	40.528	3.461	0.0064	104.579	(60.590)	(0.1112)
New Haven-Springfield	0.259	8.829	34	0.596	1.500	(0.904)	(0.1024)	3.963	(3.367)	(0.3814)
NYC-Harrisburg	0.098	12.360	126	0.783	1.104	(0.321)	(0.0260)	2.955	(2.172)	(0.1757)
NYC-Philadelphia	0.604	158.327	262	8.426	11.286	(2.860	(0.0181)	25.365	(16.939)	(0.1070)
Phila-Harrisburg	0.716	43.510	61	2.473**	2.521	(0.048)	(0.0011)	7.507	(5.034)	(0.1157)
TOTAL NEC	6.858	1,060.613	155	92.672	79.599	13.073	(0.0123)	198.067	(105.395)	(0.0994)
Short Distance										
Chicago-Carbondale	0.312	23.844	76	1.907**	2.204	(0.297)	(0.0125)	4.114	(2.207)	(0.0926)
Chicago-Detroit	0.639	60.505	95	4.319**	6.282	(1.963)	(0.0324)	12.782	(8.463)	(0.1399)
Chicago-Dubuque	0.126	5.263	42	0.815**	0.868	(0.053)	(0.0101)	1.330	(0.515)	(0.0979)
Chicago-Milwaukee	0.256	21.630	84	1.436	3.613	(2.177)	(0.1006)	8.467	(7.031)	(0.3251)
Chicago-Pt. Huron	0.230	16.064	70	1.793**	2.819	(1.026)	(0.0639)	5.560	(3.767)	(0.2345)
Chicago-Quincy	0.191	14.836	78	1.710**	1.601	0.109	0.0073	2.650	(0.940)	(0.0634)
Chicago-St. Louis	0.383	33.560	88	2.606**	3.004	(0.398)	(0.0119)	5.734	(3.128)	(0.0932)
LA-San Diego	0.414	60.668	146	4.497**	4.737	(0.240)	(0.0040)	10.343	(5.846)	(0.0964)
Minneapolis-Duluth	0.106	10.850	103	0.995**	0.926	0.069	0.0064	1.784	(0.789)	(0.0727)
NYC-Buffalo/Detr	1.282	116.404	91	8.372**	13.660	(5.288)	(0.0454)	25.914	(17.542)	(0.1507)
New York-Montreal	0.282	24.906	88	2.745**	3.115	(0.370)	(0.0149)	6.077	(3.332)	(0.1338)
Oakland-Bakersfield	0.228	13.064	57	0.694	1.996	(1.302)	(0.0997)	3.386	(2.692)	(0.2061)
Seattle-Portland	0.229	20.373	89	1.024	2.446	(1.422)	(0.0698)	4.034	(3.010)	(0.1477)
Seattle-Vancouver	0.113	10.054	89	0.616	1.099	(0.483)	(0.0480)	2.031	(1.415)	(0.1407)
Washington-Cincinnati	0.314	10.238	33	0.636	2.056	(1.420)	(0.1387)	3.046	(2.410)	(0.2354)
Washington-Martinsburg	0.065	7.961	122	0.362	0.574	(0.212)	(0.0266)	1.445	(1.083)	(0.1360)
TOTAL SHORT DISTANCE	5.170	450.220	87	34.527	51.000	(16.473)	(0.0366)	98.697	(64.170)	(0.1425)

** This route includes state subsidy payments for 1 or more 403(b) trains.

SOURCE: Statistics are from Amtrak Financial Planning, National Operations, and Executive Planning Departments. Derivatives are by calculation.

Table 3-9 ROUTE-BY ROUTE PROFIT AND LOSS FY 77 -- CONTINUED

Route	Train-Miles (Million)	Passenger Miles (Million)	PM/TM	Revenue ($Million)	Avoidable Cost ($Million)	Avoidable Profit/ (Loss) ($Million)	Avoidable P/(L) Per PM ($)	Fully Allocated Cost ($Million)	Fully Allocated Profit/ (Loss) ($Million)	Fully Allocated P/(L) Per PM ($)
Long Distance										
Boston-Newport News*	0.411	82.370	200	5.792	5.129	0.663	0.0080	10.537	(4.745)	(0.0576)
Chicago-Florida	1.271	94.669	74	5.759	12.039	(6.280)	(0.0663)	21.227	(15.468)	(0.1634)
Chicago-Houston	1.000	113.223	113	6.708	12.529	(5.821)	(0.0514)	22.174	(15.466)	(0.1366)
Chicago-Laredo	0.785	44.742	57	2.688	6.401	(3.713)	(0.0830)	12.677	(9.989)	(0.2233)
Chicago-Los Angeles	1.622	324.576	197	18.572	25.808	(7.236)	(0.0223)	43.196	(24.624)	(0.0759)
Chicago-New Orleans	0.669	95.107	142	5.086	6.792	(1.706)	(0.0179)	11.600	(6.514)	(0.0685)
Chicago-NYC/Boston	0.845	119.840	142	7.420	12.118	(4.698)	(0.0392)	22.244	(14.824)	(0.1237)
Chicago-NYC/Wash.	0.824	141.690	172	9.776	13.060	(3.284)	(0.0232)	28.333	(18.557)	(0.1310)
Chicago-San Francisco	1.749	222.564	127	13.668	26.465	(12.797)	(0.0575)	42.025	(28.357)	(0.1274)
Chicago-Seattle (N)	1.627	193.858	119	11.576	24.913	(13.337)	(0.0688)	39.708	(28.132)	(0.1451)
Chicago-Seattle (S)	1.059	105.291	99	5.877	15.743	(9.866)	(0.0937)	24.237	(18.360)	(0.1744)
Chicago-Washington	0.995	60.006	60	3.039	9.412	(6.373)	(0.1062)	13.848	(10.809)	(0.1801)
Kansas City-NYC/WAS*	0.993	92.390	89	6.473	10.569	(4.096)	(0.0443)	22.012	(15.539)	(0.1682)
LA-New Orleans	0.631	107.307	170	5.632	9.782	(4.150)	(0.0387)	15.596	(9.964)	(0.0929)
LA-Seattle	0.999	225.007	225	12.981	19.706	(6.725)	(0.0299)	33.021	(20.040)	(0.0891)
New York-Florida	2.793	600.000	215	36.974	53.219	(16.245)	(0.0271)	98.655	(61.681)	(0.1028)
New York-Savannah*	0.596	96.167	161	6.551	7.232	(0.681)	(0.0071)	13.247	(6.696)	(0.0696)
Seattle-Salt Lake	0.251	21.895	87	1.117	1.886	(0.769)	(0.0351)	2.559	(1.442)	(0.0659)
Wash-Montreal*	0.497	70.483	142	5.253	9.852	(4.599)	(0.0652)	18.405	(13.152)	(0.1866)
TOTAL LONG DISTANCE	19.617	2,811.185	143	170.942	282.655	(111.713)	(0.0397)	495.301	(324.359)	(0.1154)
OPERATING TOTALS	31.645	4,322.018	137	298.141	413.254	(115.113)	(0.0266)	792.065	(493.924)	(0.1143)
UNALLOCATED				13.131				49.019	(35.888)	
GRAND TOTAL				311.272				841.084	(529.812)	

* Includes all patrons on those routes, even those within NEC.

SOURCE: Statistics are from Amtrak Financial Planning, National Operations, and Executive Planning Departments. Derivatives are by calculation.

Table 3-10

Relative Importance of Route Groupings, FY 1977
(percent)

	NEC	Short Distance	Long Distance	Total
Operating Revenues	31.3	11.6	57.3	100
Avoidable Costs	19.2	12.3	68.5	100
Passenger Miles	24.5	10.4	65.0	100
Passenger Trips	58.7	17.4	23.7	100
Train Miles	21.7	16.4	61.9	100
Fully Allocated Costs	24.5	12.5	62.9	100

Source: Derived from Table 3-9.

Note: Slight discrepancies are due to rounding.

account for the bulk of revenues, costs, and production in terms of passenger-miles and train-miles.

Tables 3-11 and 3-12 rank Amtrak's routes by two measures:

- Passenger-miles per train-mile (PM/TM), a measure of density of use; and
- Avoidable profit/loss per passenger-mile, a measure of financial performance.

The highest density occurs on the New York-to-Philadelphia route, while such long-distance routes as Los Angeles-to-Seattle, New York-to-Florida, and Chicago-to-Los Angeles show high densities as well. Financial performance, in terms of avoidable loss per passenger-mile, is best on the Metroliners. In both rankings the Washington-Cincinnati route shows the worst results, with 33 passenger-miles per train-mile and an avoidable loss of 13.87 cents per passenger-mile.

OPERATING RESULTS

Table 3-13 lists the routes by operating segments and presents some performance indicators for each. Outside the NEC, the best scheduled average speed (including all station stops) is achieved on the Chicago-to-West Quincy route, 56.3 mph. The worst performer in this regard is the Seattle-to-Vancouver route at 34.7 mph and the national average is 46.4 mph. On-time performance for the same month, November 1977, was widely divergent, ranging from 100 percent (Oakland-to-Bakersfield) to 14.4 percent (Chicago-to-Detroit).[1]

ENERGY EFFICIENCY

The energy efficiency of intercity rail passenger service is a function of such factors as fuel sources, train consists, train performance requirements, route terrain, passenger loadings, and the capacity and weight of the cars. The wide variations in these factors lead to wide fluctuations in Amtrak fuel efficiency on a route-by-route basis. Amtrak's present energy efficiency varies widely from high load factor, coach only, high capacity Amfleet equipment, to low load factor, lower density sleeping car, diner, lounge and coach consists of conventional equipment.

At best, Amtrak diesel powered operations outside the NEC are significantly more fuel efficient than the automobile and as fuel efficient as typical intercity bus operations. The San Diego-Los Angeles operation is an excellent example, with around 100 passenger-miles per gallon. At worst, Amtrak operations are much worse than even the automobile, let alone the bus. The Floridian, according to Amtrak estimates, used more fuel in FY 1976 than if everyone had traveled by automobile and the mail had been carried by truck.

---

[1] Amtrak National Operations Department and Official Railway Guide.

Table 3-11

Route Ranking by Density of Use (Passenger-Miles per Train-Mile), FY 1977

Route	PM/TM
New York City-Philadelphia	262*
Los Angeles-Seattle	225
New York-Florida	215
Boston-Newport News	200
Chicago-Los Angeles	197
NEC Conventional	172*
Chicago-New York City/Washington	172
Los Angeles-New Orleans	170
New York City-Savannah	161
Los Angeles-San Diego	146
Metroliners	146
Washington-Montreal	142
Chicago-New Orleans	142
Chicago-New York City/Boston	142
Chicago-San Francisco	127
New York City-Harrisburg	126
Washington-Martinsburg	122*
Chicago-Seattle (via Havre)	119
Chicago-Houston	113
Minneapolis-Duluth	103
Chicago-Seattle (via Billings)	99
Chicago-Detroit	95
New York City-Buffalo/Detroit	91
Kansas City-New York City/Washington	89
Seattle-Portland	89
Seattle-Vancouver	89
New York City-Montreal	88
Seattle-Salt Lake	87
Chicago-St. Louis	87
Chicago-Milwaukee	84
Chicago-Quincy	78
Chicago-Carbondale	76
Chicago-Florida	74
Chicago-Port Huron	70
Philadelphia-Harrisburg	61
Chicago-Washington (via Cincinnati)	60
Oakland-Bakersfield	57
Chicago-Laredo	57
Chicago-Dubuque	42
New Haven-Springfield	34
Washington-Cincinnati (via Cumberland)	33

* Includes significant commuter ridership.

Source: Derived from Table 3-9.

Table 3-12

Route Ranking by Profit/(Loss) Per Passenger-Mile, FY 1977

Route	Category[a]	Avoidable Profit /(Loss) per Passenger-Mile ($)	Rank	Fully Allocated Profit/(Loss) per Passenger-Mile Rank	($)
Metroliner	NEC	0.0469[c]	1	2	(0.0591)
Boston-Newport News	LD	0.0080	2	1	(0.0576)
CHI-Quincy	SD[b]	0.0073	3	3	(0.0634)
NEC Conventionals	NEC	0.0064[c]	4	17	(0.1112)
Minneapolis-Duluth	SD[b]	0.0064	5	7	(0.0727)
PHIL-Harrisburg	NEC[b]	(0.0011)[c]	6	18	(0.1157)
LA-San Diego	SD[b]	(0.0040)	7	13	(0.0964)
NYC-Savannah	LD	(0.0071)	8	6	(0.0696)
CHI-Dubuque	SD[b]	(0.0101)	9	14	(0.0979)
CHI-St. Louis	SD[b]	(0.0119)	10	12	(0.0932)
CHI-Carbondale	SD[b]	(0.0125)	11	10	(0.0926)
NYC-Montreal	SD[b]	(0.0149)	12	22	(0.1338)
CHI-New Orleans	LD	(0.0179)	13	5	(0.0685)
NYC-Philadelphia	NEC	(0.0181)[c]	14	16	(0.1070)
CHI-Los Angeles	LD	(0.0223)	15	8	(0.0759)
CHI-NYC/WAS	LD	(0.0232)	16	21	(0.1310)
NYC-Harrisburg	NEC	(0.0260)[c]	17	33	(0.1757)
WAS-Martinsburg	SD	(0.0266)	18	23	(0.1360)
NYC-Florida	LD	(0.0271)	19	15	(0.1023)
LA-Seattle	LD	(0.0299)	20	9	(0.0891)
CHI-Detroit	SD[b]	(0.0324)	21	25	(0.1399)
Seattle-Salt Lake	LD	(0.0351)	22	4	(0.0659)
LA-New Orleans	LD	(0.0387)	23	11	(0.0929)
CHI-NYC/Boston	LD	(0.0392)	24	19	(0.1237)
Kansas City-NYC/WAS	LD	(0.0443)	25	31	(0.1682)
NYC-Buffalo/Detroit	SD[b]	(0.0454)	26	29	(0.1507)
Seattle-Vancouver	SD	(0.0480)	27	26	(0.1407)
CHI-Houston	LD	(0.0514)	28	24	(0.1366)
CHI-San Francisco	LD	(0.0575)	29	20	(0.1274)
CHI-Port Huron	SD[b]	(0.0639)	30	38	(0.2345)
WAS-Montreal	LD	(0.0652)	31	35	(0.1866)
CHI-Florida	LD	(0.0663)	32	30	(0.1634)
CHI-Seattle (Havre)	LD	(0.0688)	33	27	(0.1451)
Seattle-Portland	SD	(0.0698)	34	28	(0.1477)
CHI-Laredo	LD	(0.0830)	35	37	(0.2233)
CHI-Seattle (Billings)	LD	(0.0937)	36	32	(0.1744)
Oakland-Bakersfld	SD	(0.0997)	37	36	(0.2061)
CHI-Milwaukee	SD	(0.1006)	38	40	(0.3251)
New Haven-Sprngfld	NEC	(0.1024)[c]	39	41	(0.3814)
CHI-WAS (Cin.)	LD	(0.1062)	40	34	(0.1801)
WAS-Cincinnati	SD	(0.1387)	41	39	(0.2354)

[a] Categories: NEC = Northeast Corridor; SD = Short Distance; LD = Long Distance

[b] All or some trains receive state funding under 403(b), which is included as part of revenues in the profit/(loss) computation of this route. The exact amount of state subsidy is calculated as half of the "solely related costs," a measure which differs from the avoidable costing methodology used here.

[c] Because certain major cost items (maintenance-of-way, yards, etc.) are not considered to be avoidable due to Amtrak ownership of the NEC and the volume of operation, NEC routes receive more favorable treatment when measured on an avoidable cost basis than many national system routes.

SOURCE: Amtrak Financial Planning Department.

Table 3-13

Scheduled Running Times and On-Time Performance, November 1977

Operating Route	Miles	Best Running Time	Average Speed (mph)	Percent On-Time
Northeast Corridor				
Metroliners	224	3:00	74.7	43.1
Boston/Washington	456	8:45	52.1	77.8
New York/Boston	232	4:40	49.7	59.0
Springfield/Washington	361	7:25	48.7	71.0
New Haven/Springfield	62	1:40	37.1	70.8
New York/Philadelphia	90	1:35	57.0	87.9
New York/Washington	224	4:00	56.0	78.2
Philadelphia/Harrisburg	103	1:49	56.6	75.9
New York/Harrisburg	192	3:19	57.8	92.9
NORTHEAST CORRIDOR TOTAL				69.5
Short Distance				
Oakland/Bakersfield	312	6:35	47.4	100.0
Minneapolis/Duluth	148	3:20	44.4	95.0
Seattle/Portland	186	3:50	48.6	91.7
Seattle/Vancouver	156	4:30	34.7	90.0
Los Angeles/San Diego	128	2:35	49.6	87.0
Chicago/Milwaukee	85	1:32	55.6	84.4
Chicago/West Quincy	263	4:40	56.3	83.6
New York/Newport News	414	8:45	47.3	83.3
New York/Buffalo	438	8:35	51.0	82.3
Washington/Martinsburg	73	1:29	49.3	81.4
Chicago/St. Louis	282	5:15	53.7	81.2
Chicago/Dubuque	182	4:15	42.8	75.0
Chicago/Minneapolis	421	8:55	47.2	75.0
Chicago/Port Huron	318	6:15	50.9	75.0
New York/Albany	141	3:00	47.0	74.7
New York/Syracuse	286	5:50	49.1	71.4
Chicago/Champaign	129	2:23	54.2	63.9
Detroit/Jackson	74	1:20	55.6	42.9
Chicago/Carbondale	310	5:45	53.9	33.3
New York/Montreal	382	9:05	42.1	31.7
Chicago/Detroit	279	5:35	50.0	14.4
TOTAL SHORT DISTANCE				72.0
Long Distance				
New York/Savannah	829	14:55	55.5	86.0
Seattle/Salt Lake City	1,081	23:00	47.0	83.3
New York/St. Petersburg	1,207	26:00	46.4	82.6
New York/Miami	1,398	26:15	52.9	79.5
Chicago/Boston	1,038	23:50	43.6	78.3
Washington/Cincinnati	545	14:34	37.1	78.3
Washington/Tri-State	592	15:40	37.8	78.3
Washington/Kansas City	1,302	31:55	40.7	76.9
Chicago/Los Angeles	2,223	40:05	55.5	76.7
New York/Kansas City	1,322	30:25	43.5	75.0
Washington/Montreal	670	16:35	40.4	71.7
New York/Detroit	676	13:55	48.6	73.3
Chicago/St. Petersburg	1,480	38:30	38.4	70.0
Chicago/Washington via Cincinnati	897	21:40	41.4	70.0
Chicago/Laredo	1,449	33:45	42.9	69.2
New Orleans/Los Angeles	2,035	45:00	45.5	69.2
Chicago/Miami	1,601	38.40	41.4	68.3
Chicago/Oakland	2,407	47:45	50.4	66.7
Chicago/New Orleans	923	18:35	49.7	65.0
New York/Chicago via Buffalo	961	20:40	46.5	61.7
Seattle/Los Angeles	1,365	31:50	42.9	61.7
New York/Chicago via Pittsburgh	904	19:05	47.4	60.0
Washington/Chicago via Pittsburgh	951	19:55	47.6	56.7
Chicago/Dallas	1,081	22:00	49.1	50.0
Chicago/Seattle via Billings	2,229	46:40	47.8	50.0
Chicago/Houston	1,369	27:15	50.2	48.3
Chicago/Seattle via Havre	2,288	47:15	48.4	41.2
TOTAL LONG DISTANCE				69.9
TOTAL SYSTEM				70.4

Overall, in FY 1977, non-Northeast Corridor routes used about 96 million gallons of fuel or about 23 million gallons more than would have been used if all passengers had traveled by car (at 2.5 people per car and 18 mpg) and if all the mail had moved by truck. If the extra fuel needed to pull and heat the sleeping and dining cars, which provide services not accounted for in auto consumption, is deducted, Amtrak fuel consumption outside of the Northeast Corridor is slightly better than the adjusted auto/truck equivalent.

Because of the wide variations in passenger loads and relative efficiencies, such an average calculation hides the fact that many services are more fuel efficient than the auto. As Figure 3-4 shows, a train with a consist like the Coast Starlight in winter needs around 150 PM/TM to match the auto's fuel efficiency. In fact, the Starlight carries a nominal average of 220 PM/TM, far more than required to match the auto. Figure 3-4 also shows the passenger-miles per gallon by PM/TM for several other typical Amtrak consists, including Amfleet, bi-level and turboliner equipment. Generally, Amfleet equipment is much more efficient than other equipment, because Amfleet is lighter overall per seat.

Based on the data displayed in Figure 3-5, it is estimated that for well-patronized short-hauls with Amfleet equipment (e.g., Chicago-St. Louis), the energy-related benefits may amount to approximately 0.3 cents per passenger-mile. This offsets about 25 percent of the "avoidable" deficit or about 3.2 percent of the "fully allocated" deficit of this service. For a service such as Los Angeles-San Diego, the benefit amounts to 0.54 cents, or about 5 percent of the fully allocated deficit (including 403(b) payments in both cases). In the conventional and bi-level consists shown in Figure 3-5, there is a substantial non-revenue component which reduces the potential for energy savings.

SAFETY

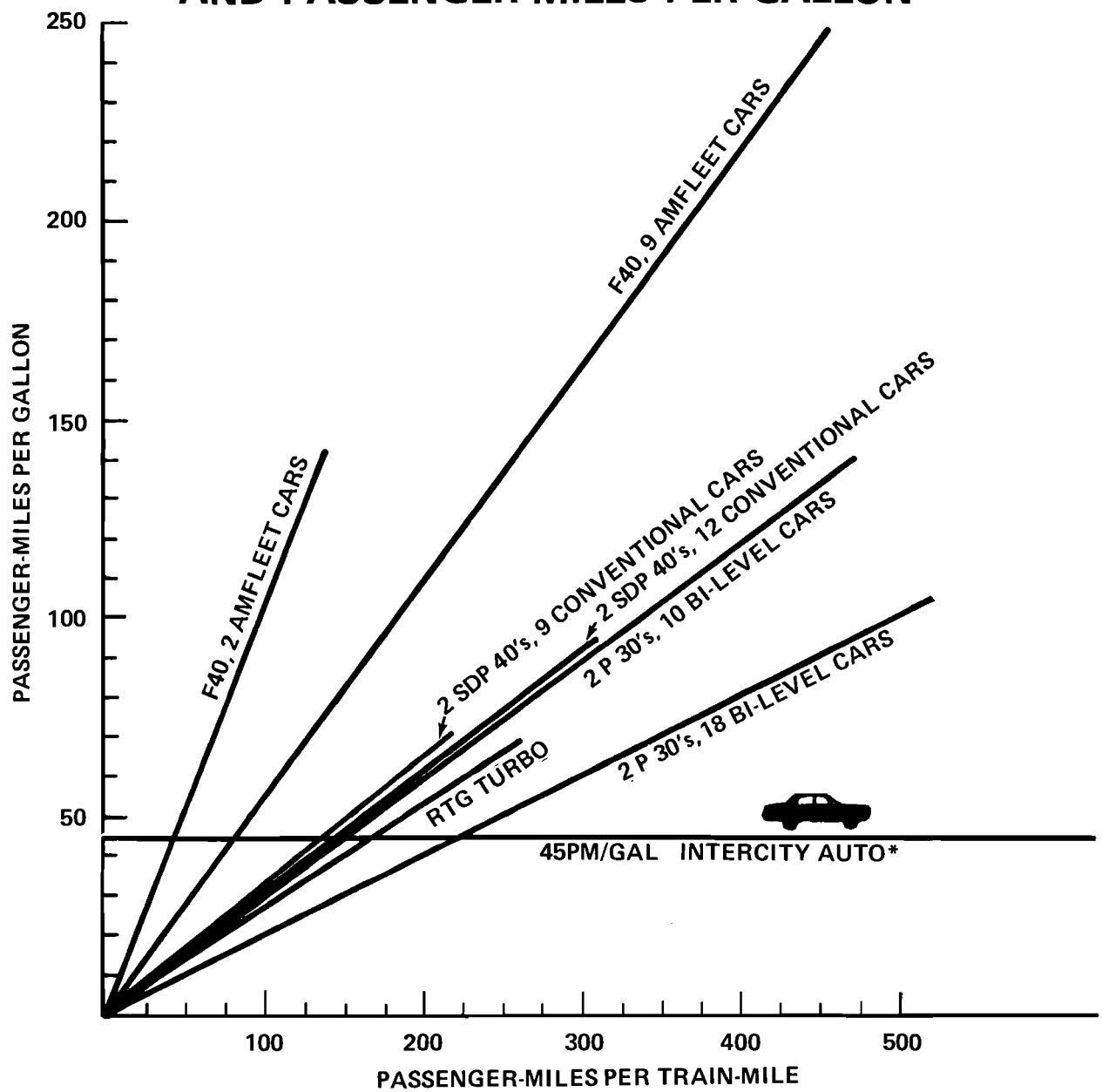
Travel by intercity passenger train is many times safer than travel by automobile. The safety record of Amtrak is also superior to those of the intercity bus industry and the airlines. Passenger fatality rates for each of the modes are shown in Table 3-14.

The net public safety benefit attributable to Amtrak should take into account a number of factors, including passenger fatalities, related non-passenger fatalities, injuries and property damage. Roughly comparable data exist only for passenger and related nonpassenger fatalities. These data suggest that Amtrak operations resulted in a net avoidance of approximately 22 fatalities in 1977, assuming all Amtrak passengers would have traveled by automobile in the absence of train service. Because a significant number of Amtrak passengers would choose to travel by air or bus or not travel at all were Amtrak not available, this figure overstates the number of fatalities avoided.

Although net safety benefits in the form of injuries and property damage avoided would appear to exist, the data available do not permit a reasonable estimate of their magnitude.

Figure 3-4

RELATIONSHIP BETWEEN PASSENGER-MILES PER TRAIN-MILE AND PASSENGER-MILES PER GALLON

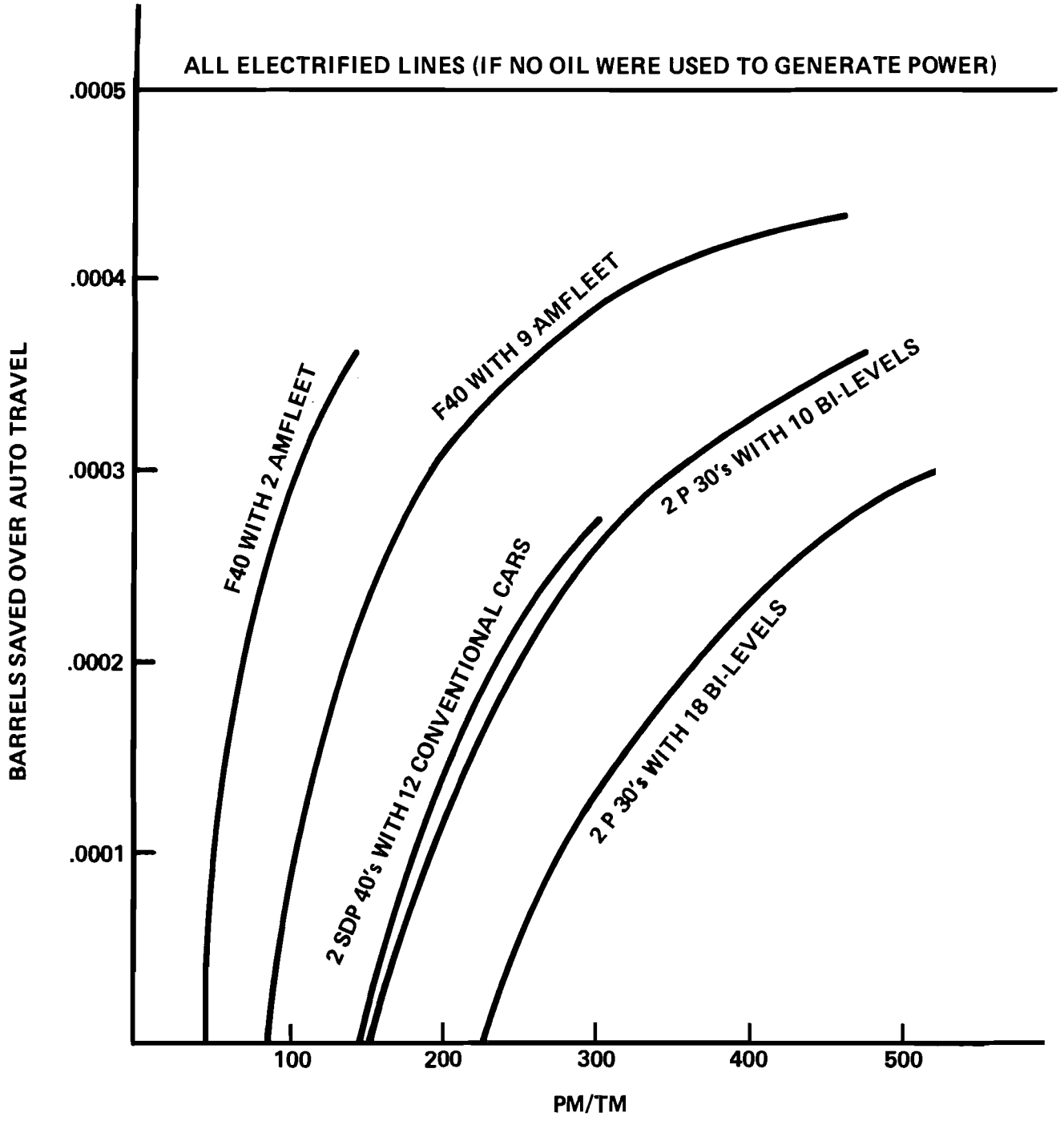


*Assumes average intercity occupancy rate of 2.5 people and 18 mpg.

SOURCE: Estimated from Amtrak fuel consumption records.

Figure 3-5

BARRELS OF OIL SAVED PER PASSENGER-MILE OVER AUTO TRAVEL BY VARIOUS CONSISTS AND PASSENGER LOADS



SOURCE: Estimated from Amtrak fuel consumption records.

Table 3-14

Comparative Fatality Rates of Transportation Modes

Mode	Passenger Fatalities per Billion Passenger-Miles
Amtrak[a]	0.1
All Rail[b]	0.7
Intercity Bus[b]	0.3
All Bus[b]	1.8
Scheduled Domestic Air[b]	0.6
Automobile and Taxi[b]	14.1
Auto-Related (includes non-passengers)[c]	22.6

NOTE: The maximum number of fatalities avoided annually through Amtrak operations can be estimated as follows: if all of Amtrak's 4.3 billion FY 1977 passenger-miles had been diverted to auto, then 97 auto-related deaths (4.3 X 22.6) might have occurred. On the other hand, Amtrak's operations in 1976 caused 75 fatalities, including 61 at grade crossings. So the net reduction in fatalities due to Amtrak would be 22 (i.e., 97-75).

---

[a]Average, 1974-1976, from Amtrak data.

[b]Averages, 1974-1976, from National Safety Council, Accident Facts, 1977.

[c]1976 data from National Safety Council.

Chapter 4

ANALYSIS OF ROUTE STRUCTURE ALTERNATIVES

In response to the Congressional request for a reexamination of the Amtrak route structure, the Department established five alternative systems for analysis. Individual routes were included in these systems on the basis of market and population requirements, with due regard to such other considerations as the need to allocate resources equitably, operating and capital costs, and energy conservation. The five scenarios ranged from a short-distance system centered in New York, Chicago, and Los Angeles to a larger-than-present system requiring extensive capital investment.

THE CONGRESSIONAL REQUEST

As explained in Chapter 1, the Department's efforts to develop a recommended Amtrak route structure were initiated in response to a November 8, 1977, request from the Appropriations Subcommittees that a ". . . comprehensive reexamination of Amtrak's route structure from a zero base should be undertaken. . . ." That request was repeated in the Conference Report accompanying the FY 1978 Supplemental Appropriations Act which was signed into law by the President on March 7, 1978 (P. L. 95-240). Specific guidance regarding the development of the preferred system was that it should be "national" and that it should be based upon "current and future market and population requirements".

During the course of the Department's route structure evaluation, three pieces of authorizing legislation were introduced in Congress, each of which would specifically direct the Department to conduct a reexamination of Amtrak's route structure and each of which would also specify that the Department's recommendations should be based upon "current and future market and population requirements." All three pieces of legislation would also direct the Department, in developing its recommendations, to consider certain additional factors, including the benefits of given intercity rail passenger services compared to the costs of providing such services and energy conservation.

The Department is in general agreement with the common thrust of the proposed legislative requirements that the recommended route structure should be primarily determined by current and future market and population requirements, and that other factors should be considered, where relevant. Those requirements were adhered to throughout the course of the Department's evaluation of various route structure alternatives.

THE DEVELOPMENT OF ALTERNATIVE ROUTE STRUCTURES

The basic methodology followed by the Department in designing a recommended route structure involved first, the definition of a series of system concepts, distinguished primarily by the scope of the services offered, and second, the design of a specific route structure for each system concept. The recommended system was then chosen from among those alternative route structures. The following discussion explains how the alternative route structures were developed.

DEVELOPMENT OF SYSTEM CONCEPTS

The Department initially developed five alternative system concepts distinguished from one another by their scope and the level of service offered:

- Short distance daytime services only--based in major population centers. No national linkage.
- Primary National System.
- Primary National, Interregional System.
- Modified Current System. (No Conceptual Service Pattern-Removal of Inefficient Routes).
- Primary National, Interregional System plus Secondary, Local Services.

Using these system concepts, the Department developed five alternative systems. The intent of the exercise was to specify systems that were distinct, if not unique, rather than to create a range of systems that simply represented various levels of funding. Clearly, the cost of operating a network of rail passenger service is a function of the size of the system and the levels of service offered. It should be noted, however, that various specific funding levels were not the starting point for the Department's analysis, but a by-product of the alternative system designs themselves.

EXAMINATION OF CANDIDATE ROUTES

The routes identified for consideration in various scenarios included all current Amtrak routes and numerous potential new markets proposed by Amtrak, the public and the Department's staff. Potential new markets included services operated prior to the advent of Amtrak as well as services which were never operated due to operational, institutional or other constraints.

A network model was developed to screen all services identified which are not presently being operated by Amtrak. Figure 4-1 depicts all potential rail services incorporated into the network model (including existing Amtrak routes). Although the model was not designed to simulate the operations of a rail passenger system, it did provide a measure of potential total travel desire between city-pairs and within markets. If there was little total travel desire in any market, then the potential for new rail service was concluded to be minimal and the market was eliminated from further consideration. The network model is described in more detail in Appendix A. A more complex rail network model being developed by Amtrak has the potential for refined routings in the final report and for continued long-range route structure planning by Amtrak.

Figure 4-1

POTENTIAL RAIL SERVICES EVALUATED

Also, practical considerations, such as the adequacy of fixed facilities and operating problems, were taken into account in the screening process, to the extent that such information was available.

DESIGN OF ALTERNATIVE SYSTEMS

In determining the specific routes and services to be included in each system, the primary focus was on the degree to which alternative specific routings satisfied market and population requirements. Other appropriate second order considerations were introduced to modify the market and population requirements.

Market Requirements

The market requirement was met by maximizing within each system the extent to which specific routes and services are expected to be used, as measured by ridership. The basic measurement index used was annual passenger-miles per train mile (PM/TM), which represents ridership weighted to reflect differing trip lengths. That index is extremely useful in comparing different markets, as it indicates the average number of passengers to be found on board a train at any point along an entire route.

The advantages of measuring markets by the use of ridership data include:

- Historical PM and TM data are reliable and available, permitting extensive analysis of all existing services;
- The data base allows the examination of usage and performance by route segment;
- Ridership provides a proxy of relative revenue levels when fare levels on routes are comparable;
- Origin to destination ridership data can be used to predict potential passenger diversions to or from additional frequencies (or trains on alternate routes).
- The existing general relationship of usage (in terms of PM/TM, origin/destination data, and station on/off counts) to on-line populations, quality of service, reliability, etc., can be used to predict the likely level of usage of new services.
- PM/TM also permits the establishment of a rail/auto energy efficiency threshold for different types of services.

The expected passenger-mile per train-mile usage level of potential services was estimated partly through the use of historic ridership data, and partly through the use of a rail passenger demand forecasting model which is described in Appendix B. Because PM/TM thresholds were lowered to include additional routes in the larger systems, for the most part, passenger-mile per train-mile values decreased for any particular type of service as the alternative systems progressed from the smallest to the largest.

Population Requirements

The population requirement guided the selection of endpoint cities and major intermediate points. Additionally, in several cases it influenced the inclusion of interregional routes, or lines of national routes, which were marginal performers when measured solely by utilization criteria.

Population and market requirements should not be viewed as identical. Rather, they are complementary but distinct considerations. Since there are extensive alternative forms of transportation also available in those parts of the country where the population is densest (an extensive highway network and frequent air and bus service), population and total travel desire do not necessarily reflect the market for rail service. Thus, it was considered appropriate to focus primarily on the market requirement and to incorporate the population requirement as described above.

Other Considerations

The primary population and market requirements were further tempered throughout the process of designing the alternative systems by certain other considerations, including the desire to allocate resources equitably, consideration of the operating costs of providing various types of services within each system, and capital costs. The application and balancing of these considerations was, of necessity, somewhat judgmental, yet within the constraints of each system it has been carried out in as objective a manner as possible.

Because the Amtrak system is supported by the general taxpayer, all systems other than the smallest, which was defined to be geographically concentrated in short-haul markets, were designed to provide some measure of geographical distribution. Based on estimated total travel desire alone, which is, in large part, a function of total population and population density, Amtrak service would be concentrated in certain areas of the country (the Northeast, the East Coast, the Great Lakes area, and the West Coast). There would be no linking of population centers nationwide and large areas of the country would be left unserved. This is explicitly the case in the smallest system evaluated by the Department (short distance, daytime services only). In addition, equity considerations suggested that the alternative systems represent not only a reasonable geographical distribution of services, but a mix of types of service as well (i.e., short and long haul services).

Care has to be taken in comparing the net financial performance of specific services. The best measure of financial performance is the per passenger-mile deficit, but there are several problems involved in using it to evaluate specific services. These primarily include problems in defining the extent to which total corporate costs should be considered as part of the cost of providing a specific service. Also, costs may not be a fixed function of the particular route but may be influenced by management decisions as to how the route should be operated, particularly as to the equipment to be assigned to the route. Accordingly, no absolute operating cost threshold for specific routes was estabished in developing alternative systems.

However, long haul and short haul services generally display a different relationship between usage and per passenger-mile deficits. As a rule, existing short haul services are able to achieve lower deficits per passenger-mile than long haul services with comparable passenger-mile per train mile levels (see Table 3-9). Further, there is some indication that the potential energy benefits of rail service can be realized at lower passenger loadings for short distance than long distance services. These considerations also argue for a mix between long and short haul services.

Capital costs were considered in evaluating specific route and service alternatives. Where specific trains have slow, unreliable service today, the cost of correcting those problems was carefully weighed against the anticipated increases in ridership, as well as the availability of alternative uses for those funds. New routes that would require major investment just to achieve basic levels of service were not included in any system.

PRESENTATION OF ALTERNATIVE ROUTE STRUCTURES

Figures 4-2 through 4-6 portray the five alternative route structures which were developed through the process described above. (Figure 3-1 presents the existing Amtrak system for comparison purposes.) The various systems may be briefly described as follows:

- Scenario A--Short Distance Service Only. This system, portrayed in Figure 4-2, consists of short distance, daytime services originating from three cities: New York, Chicago, and Los Angeles.

- Scenario B--National System. This system, portrayed in Figure 4-3, consists of those short distance services included in Scenario A as well as long distance service providing minimum connections between the east and west coasts through Chicago and a basic level of north-south service.

- Scenario C--National/Interregional System. This system, portrayed in Figure 4-4, builds on scenario B by providing an additional group of services which connect major regions of the country as well as providing services to major population centers and adding some short distance services.

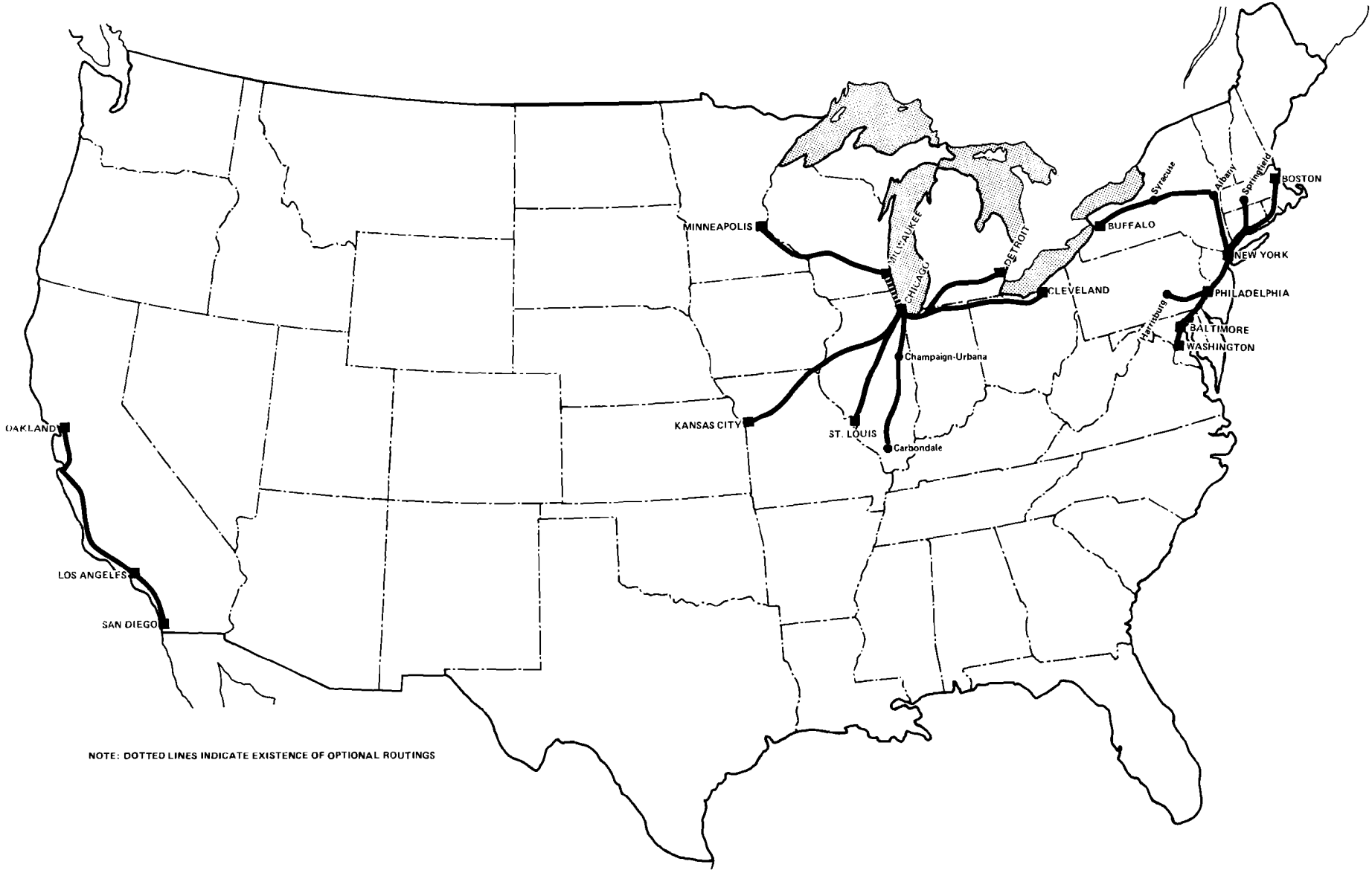
- Scenario D--Modified Current System. This system, portrayed in Figure 4-5, minimally adjusts the existing system to provide complete national and interregional service.

- Scenario E--National/Interregional/Intraregional System. This system, portrayed in Figure 4-6, builds on Scenario D by providing additional interregional and intraregional services of primarily local concern. It also incorporates route modifications which would require substantial capital expenditures.

Within all of the systems, the Northeast Corridor (NEC), including the feeder lines from Springfield, Massachusetts and Harrisburg, Pennsylvania, was kept in place. The NEC was subjected to a separate analysis presented in the Two-Year Report on the Northeast Corridor (U. S. Department of Transportation, February 1978). The results of that report, with appropriate modifications, were incorporated directly into the Department's evaluation.

Figure 4-2

SCENARIO A: SHORT-DISTANCE SYSTEM



NOTE: DOTTED LINES INDICATE EXISTENCE OF OPTIONAL ROUTINGS

Figure 4-3

SCENARIO B: NATIONAL SYSTEM

Figure 4-4

SCENARIO C: NATIONAL—INTERREGIONAL SYSTEM

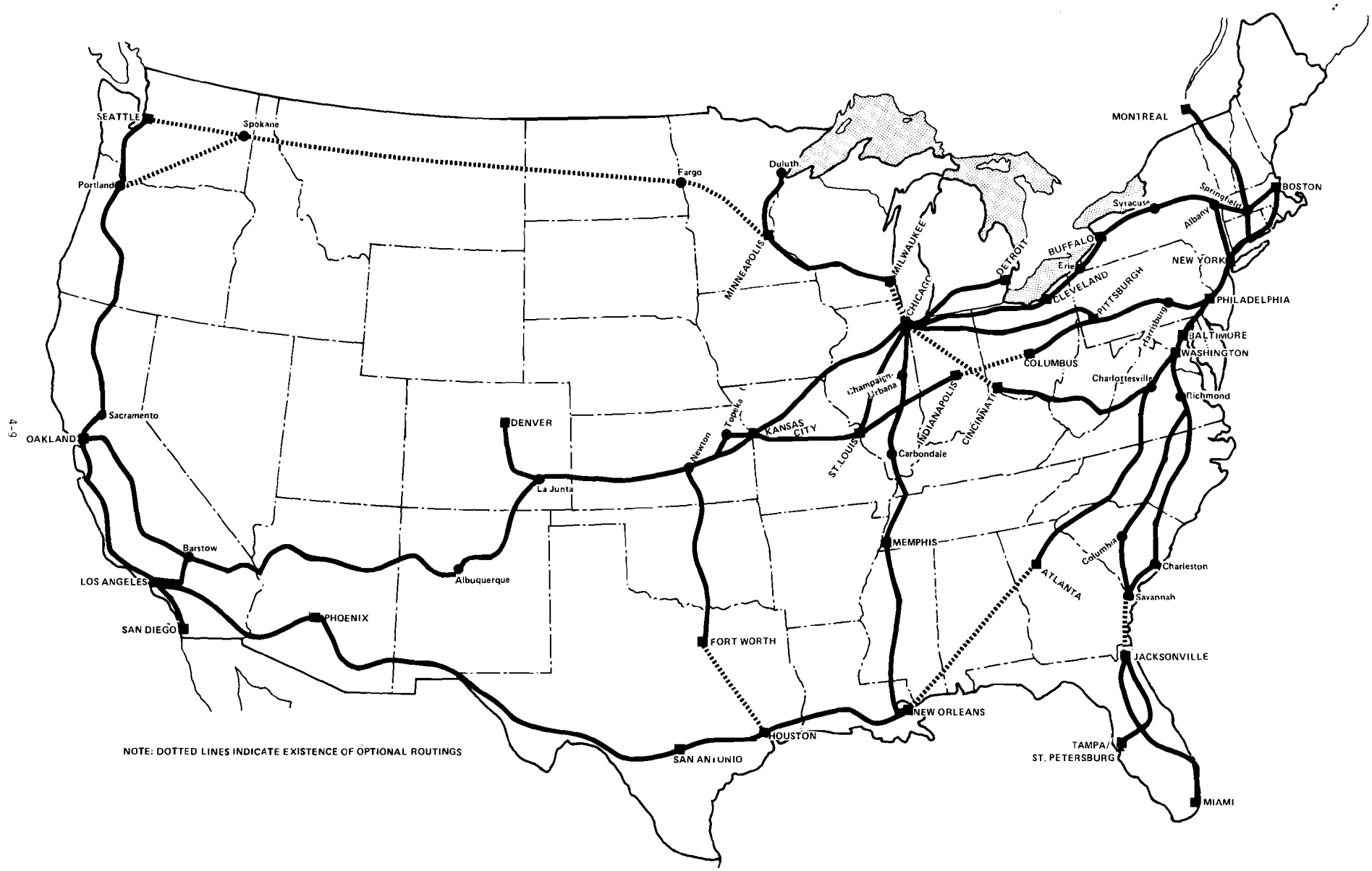
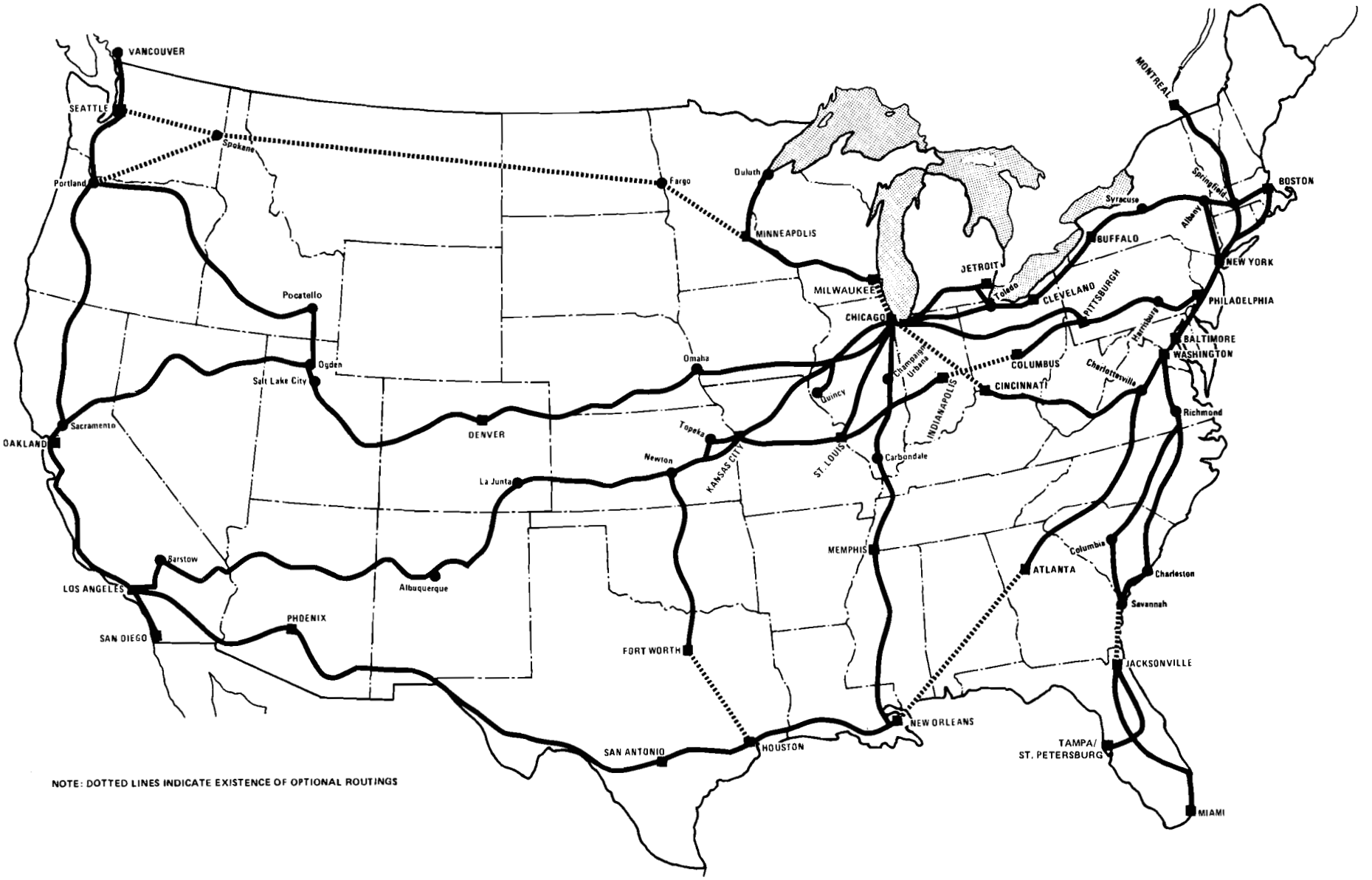


Figure 4-5

SCENARIO D: MODIFIED CURRENT SYSTEM



NOTE: DOTTED LINES INDICATE EXISTENCE OF OPTIONAL ROUTINGS

Chapter 5

RECOMMENDED ROUTE STRUCTURE

Linking the regions of the Nation, serving 160 major metropolitan areas including the 36 largest cities, and contributing to energy conservation, the Department's recommended national/interregional route structure will enable Amtrak to achieve patronage densities and financial results significantly superior to those achieved by the present system.

THE DEPARTMENT'S RECOMMENDATION

The Department of Transportation recommends the National/Interregional System which is discussed as Scenario C in Chapter 4. This 18,900 mile route structure, portrayed again in Figure 5-1, would provide basic national long distance east/west coast-to-coast service on both northerly and southerly routes, basic north/south service along routes on both coasts and in the Midwest, and a supplemental system of both interregional services and short distance services. The Department additionally recommends that all long distance service provided by the system be at least daily.

While the recommended system is statistically smaller than the currently operated system, the vast majority of current patronage would be retained in the recommended system while substantial reductions in the Amtrak deficit outside of the Northeast Corridor would be achieved. The recommended system, had it been operating in 1977, would have carried a total of 4 billion passenger-miles, or 90 percent of the passenger-miles generated by the existing system during that year. This level of usage would have been achieved by operating only 76 percent of the train-miles operated.

SERVICE VARIATIONS

Although the recommended system would terminate a few existing services, it would provide new services in areas of high market potential. Some of the major service variations are discussed below.

California-Midwest

In the recommended system, a link between Barstow and Bakersfield, California, would be added. This small extension would open up the major market of the San Joaquin Valley to the points traversed by the existing "Southwest Limited" operating between Chicago and Los Angeles and major connections throughout the Midwest, while at the same time retaining Midwest to San Francisco service on schedules no longer than those currently operated.

Figure 5-1

THE DEPARTMENT'S RECOMMENDED ROUTE STRUCTURE

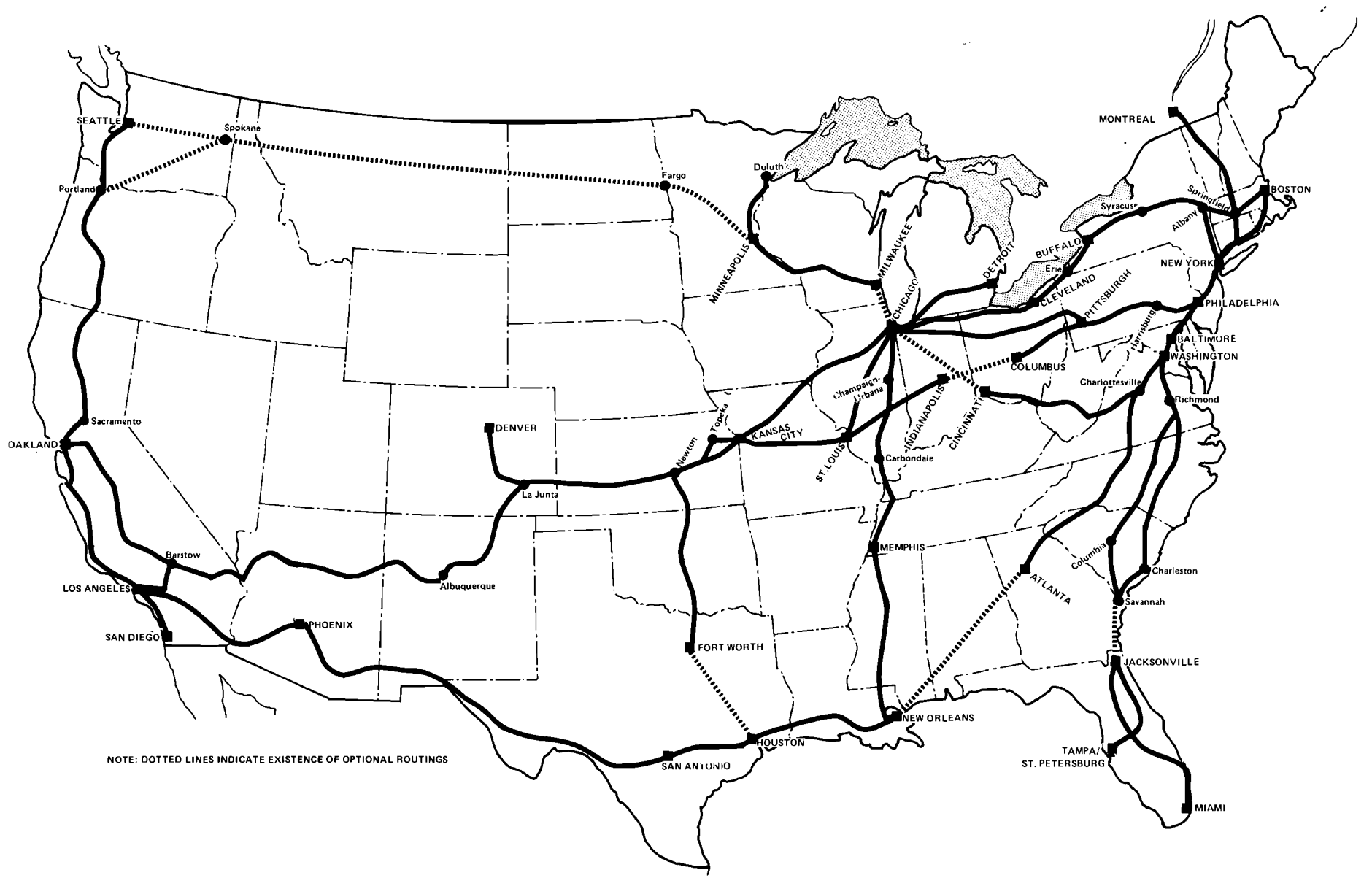


TABLE 5-1

ROUTE LEVEL PERFORMANCE OF RECOMMENDED SYSTEM
(Simulated Operations in FY 1977)

Route	Performance				Service	
	Passenger-Miles (Millions)	Train-Miles (Millions)	PM/TM	Revenue (Millions)	Frequency***	Class **
Short-Distance						
Chicago-Carbondale	18.60	0.226	82	1.16	1	C
Los Angeles-San Diego	66.65	0.467	143	4.35	5	C
Portland-Seattle	14.67	0.135	109	0.74	1	C
Chicago-Milwaukee	17.02	0.186	92	1.13	3	C
Minneapolis-Duluth	11.08	0.108	103	0.56	1	C
Chicago-St. Louis	35.52	0.412	86	2.76	2	C
Chicago-Detroit	58.16	0.611	95	3.93	3	C
New York-Buffalo	93.55	1.054	89	6.06	2-5	C
SUBTOTAL	315.25	3.199	99	20.69		
Long-Distance						
Los Angeles-New Orleans	216.38	1.476	147	11.29	1	S
Los Angeles-Seattle	224.92	0.995	226	12.98	1	S
Los Angeles/San Francisco/Denver-Chicago	526.04	2.091	252	29.74	1	S
Chicago-Seattle/Portland	273.70	1.790	153	15.96	1	S
Chicago-New Orleans	98.35	0.674	146	5.27	1	S
New York-Florida *	519.03	2.538	205	32.32	2-3	S
Washington-Chicago	65.84	0.654	101	3.33	1	S
New York-Chicago/Kansas City	184.07	1.307	141	12.78	1	S
Chicago-New York/Boston	121.58	0.861	141	7.52	1	S
New York-New Orleans	136.80	1.006	136	7.91	1	S
Chicago-Houston	104.64	0.999	105	5.96	1	S
Washington/New York-Montreal *	48.62	0.489	99	3.62	1	S
SUBTOTAL	2,519.97	14.880	169	149.68		
SYSTEM TOTALS	2,835.22	18.079	157	170.37		

* Excludes intra-NEC passenger-miles and revenue but includes NEC train-miles.
** Explanation of codes: C = coach only; S = coach and sleeping car
*** Frequency is expressed in daily roundtrips by route. Frequency on short distance routes does not include any long distance frequencies between those end-points.
NOTE: This table does not include the NEC

TABLE 5-2

ROUTE LEVEL PERFORMANCE OF BASE CASE EXISTING SYSTEM
(Simulated Operations in FY 1977)

Route	Performance				Service	
	Passenger-Miles (Million)	Train-Miles (Million)	PM/TM	Revenue ($ Million)	Frequency ***	Class **
Short Distance:						
Los Angeles-San Diego	66.65	0.467	143	4.35	5	C
Chicago-Carbondale	24.08	0.320	75	1.51	1-2	C
Seattle-Vancouver	10.12	0.113	90	0.62	1	C
Portland-Seattle	14.67	0.135	109	0.74	1	C
Chicago-Quincy	14.84	0.192	77	0.94	1	C
Minneapolis-Duluth	11.08	0.108	103	0.56	1	C
Chicago-Dubuque	5.46	0.132	41	0.32	1	C
NYC-Montreal	24.82	0.279	89	1.66	1	C
Boston-Newport News*	16.49	0.472	35	1.16	1	C
NYC-Buffalo-Detroit	118.65	1.331	89	7.69	1-6	C
Chicago-Detroit	58.97	0.665	89	3.97	3-4	C
Chicago-Port Huron	16.20	0.232	70	1.08	1	C
Washington-Cincinnati	12.44	0.451	28	0.77	1-2	C
Chicago-St. Louis	35.52	0.412	86	2.76	2	C
Chicago-Milwaukee	21.08	0.248	85	1.40	4	C
Oakland-Bakersfield	12.91	0.227	57	0.69	1	C
Total	463.98	5.784	80	30.22		
Long Distance:						
Los Angeles-Seattle	224.92	0.995	226	12.98	1	S
Chicago-Seattle (N & S)	297.95	2.672	112	17.38	1-2	S
Chicago-Oakland	222.80	1.755	127	13.67	1	S
Los Angeles-New Orleans	107.31	0.631	170	5.63	0.4	S
Chicago-Dallas/Houston	115.01	1.021	113	6.83	1	S
Chicago-Laredo	41.79	0.717	58	2.52	0.4-1	S
Chicago-Los Angeles	324.58	1.622	200	18.57	1	S
Chicago-New Orleans	96.10	0.674	143	5.14	1	S
Chicago-Florida	100.73	1.377	73	6.13	1	S
New York-Florida	700.35	3.610	194	45.71	3-4	S
Salt Lake City-Seattle	57.92	0.789	73	2.96	1	S
Washington-Montreal*	48.62	0.489	99	3.62	1	S
New York/Washington-Chicago	142.75	0.832	172	9.84	1	S
New York/Washington-Kansas City	111.53	1.075	104	7.81	1	S
New York/Boston-Chicago	121.58	0.861	141	7.52	1	S
Washington-Chicago via Tri-State*	64.14	1.085	59	3.29	1	S
Total	2,778.08	20,205	137	169.60		
System Total	3,242.06	25,989	125	199.82		

* Excludes intra-NEC passenger-miles and revenue but includes NEC train-miles

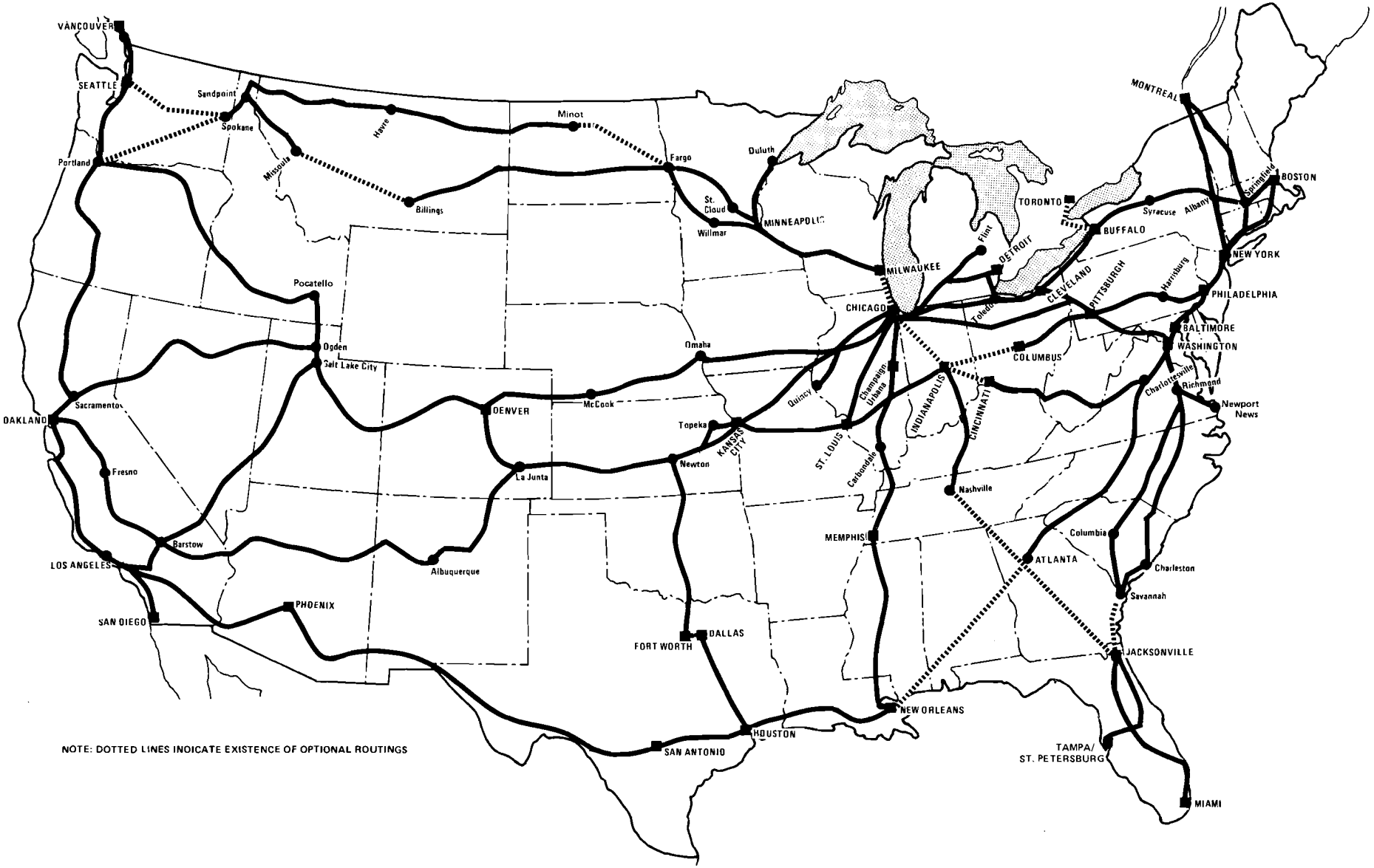
** Explanation of codes; C = coach only; S = coach and sleeping car

*** Frequency is expressed in daily roundtrips by route. Frequency on short distance routes does not include any long distance frequencies between those end-points.

NOTE: This table does not include NEC routes.

Figure 4-6

SCENARIO E: NATIONAL—INTERREGIONAL—INTRAREGIONAL SYSTEM



Denver to the Lower Midwest

The other major market presently handled by the Chicago-San Francisco service is from the Midwest to Denver. Service between these points would be retained and expanded by the operation of a separate section of the "Southwest Limited" which would, in addition, provide service to the significant population centers of Pueblo and Colorado Springs, Colorado and between Denver and lower Midwest points such as Kansas City and connecting points beyond.

Northeast to Southwest

The recommended inclusion of "The Southern Crescent" between New York and New Orleans in the Amtrak system, together with the recommended increase to daily frequency on the Atlanta-New Orleans section of that train and the provision of daily frequency on "The Sunset Limited" between New Orleans and Los Angeles, would provide daily service between the Northeast and Southwest-Los Angeles area via Atlanta, New Orleans and Houston.

Portland to Midwest

The two existing services linking Chicago and Seattle would be combined and one daily service operated linking Chicago and Minneapolis with Portland and Seattle. Nearly one-half of the passenger-miles of travel on the service being deleted would be accommodated on the service recommended for operation. Thus, one relatively strong long distance service would replace two marginal ones, and one direct Chicago-Minneapolis to Portland service would be added.

Sacramento to Southern and Northern West Coast Points

Currently, the West Coast train, the "Coast Starlight," does not operate through the major California city of Sacramento. The recommended system calls for operation of this train through that city.

OTHER BENEFITS

In addition to providing those new services, the recommended system would have the following benefits over the existing system:

- It would provide a uniformly well utilized service (recognizing differences in utilization of various types of services provided).

- The average estimated patronage level for this system would be over 150 PM/TM and equivalent to the Northeast Corridor patronage level. It would eliminate currently existing routes which are, and can be expected to continue to be, poor performers.

- Amtrak management would be able to focus attention on promising routes, rather than having to spend time turning poor routes into mediocre performers.

- It is estimated, based on patronage levels indicated, that were appropriate equipment assigned, all of the services included could make a positive contribution to energy conservation.

- The system would provide service to about 160 Standard Metropolitan Statistical Areas, including the 36 largest such population centers.

- The size of the system is such that Amtrak's present or on-order equipment would be well-utilized.

The performance of individual routes in the recommended system, had the system been in place in FY 1977, is set forth in Table 5-1. For comparison purposes similar information for the base case existing system is provided in Table 5-2 and for the other alternative systems studied in Tables D-8 through D-11(Appendix D).

ALTERNATIVE ROUTINGS WITHIN THE RECOMMENDED ROUTE STRUCTURE

As may be noted in Figure 5-1, in several locations a specific recommended routing is not presented but end points or key intermediate points to be served are connected with a straight line (e.g., Chicago-Seattle via Milwaukee, Minneapolis, Fargo and Spokane). In these instances the need for service has been identified but a tentative preferred routing has not. Additional analysis is required prior to selection of a preferred routing. The Department hopes that information will become available through the public comment process to assist in that analysis. The Department's final recommendations will include definitive routings between city points, including intermediate points.

The route structure does not identify service which is considered within the context of the Northeast Corridor and its spurs. However, consideration should be given to restructuring the New Haven-Springfield service to incorporate through service between New Haven and Boston. Finally, the recommended system does not include services which may be of interest to specific States and are appropriate candidates for State funding or combined Federal/State funding. The Department does not intend to preclude the provision of such services but has focused in its recommended system only on routes which should be 100 percent Federally funded. The funding of such State interest services is discussed in Chapter 6.

Any new services presented must be considered subject to the development of satisfactory operating and financial arrangements with the railroad company ultimately involved in the specific routing. All routings will, in the interim between presentation of preliminary and final recommendations, be subjected to more detailed analysis of costs and revenues and potential operating problems.

COMPARISON OF THE RECOMMENDED SYSTEM'S PERFORMANCE WITH THE BASE CASE EXISTING SYSTEM

Prior to comparing the recommended system and the base case existing system (as well as other alternative systems) a review of several key points will aid in understanding the relationship between the base case existing system and the actual Amtrak system, as well as between the other alternative systems evaluated.

- The base year cost and revenue estimates for the base case existing system (and other systems) are not actual 1977 statistics but are estimates of 1977 performance if the new bilevel cars already on order had been in place and no unusual problems had plagued operations (such as the slow orders imposed by the SDP-40 locomotive and the train annulments resulting from the severe winter weather).

- Cost and revenue estimates reflect existing Amtrak operating and pricing practices.

- Reliable on-time performance was assumed in all system alternatives.

- Although the introduction of new equipment can be expected to have some positive impact on ridership, it was not possible to substantiate the extent of such an increase based on experience to date. Thus, patronage estimates do not reflect any assumptions concerning the impact of new equipment on ridership.

Table 5-3 compares the base year (1977) simulated performance measures for the recommended and the existing (base case) systems, including the extent of service provided (in passenger-miles), the revenues generated and the costs of the service, including the NEC.

The Federal subsidy of $402.1 million which would have been required to operate the recommended system in FY 1977 is approximately $90 million less than it would have cost to operate the existing system over all current routes for a full year, with the new bilevel Superliner equipment in service.

Table 5-4 compares the projected subsidy required for the recommended system and the base case existing system for the years 1979 through 1984. The projections assume:

- That train-miles outside the NEC will remain constant over the projection period.

- A projected passenger-mile increase of 3 percent between 1977 and 1984 is due entirely to population growth and is expected to neither increase nor decrease the deficit. In the financial projections, therefore, neither costs nor revenues were adjusted to reflect ridership growth. All revenue increases reflect only increased yield due to fare increases.

- There will be no changes in productivity over the projection period.

The inflation and yield factors by which costs and revenues were adjusted in the projections are presented in Table 5-5.

The total estimated 6-year operating subsidy for the recommended system is about $770 million less than for the existing system (see Table 5-4). The expected savings in capital funding are over $100 million.

This capital cost savings, however, will tend to be offset by the potential labor protection payments to employees displaced by the recommended route and service modifications. It has so far proven to be impossible to estimate such payments reliably due to the complex process involved in the actual implementation of employee displacements. The initial estimates of such potential payments for the recommended system range from $70 million to $300 million, depending on the assumptions used. These estimates will be greatly refined in connection with the Department's final route structure recommendations.

Table 5-3

Base Year (FY 1977) Comparison of Recommended System with Base Case[1]

Performance Measures	Existing System (Base Case)	Recommended System (National/Interregional System)
Train Miles (Millions)	32.9	25.0
Passenger Miles (Millions)	4426	4019
PM/TM	135	161
Revenues (Millions)[2]	310.1	280.7
Total Operating Cost (Millions)[3]	839.3	717.8
Net Operating Deficit (Millions)[3]	529.2	437.1
Operating Deficit/PM ($)	0.120	0.109
Federal Subsidy Required (Millions)[1]	490.9	402.1
Subsidy/PM	0.111	0.100

[1]Base case is current system with all routes operated for a full year and with new bilevel Superliner equipment in service. Therefore, Federal subsidy differs from actual FY 1977 subsidy provided ($482.6 million).

[2]Revenues do not include state 403 (b) reimbursement.

[3]Includes non-cash operating costs such as depreciation.

NOTE: This table includes the NEC.

Table 5-4

Projected Operating and Capital Subsidy Required for Recommended System Versus Existing System (Base Case)

(Millions of Current $)

System	Base Year (1977)	FISCAL YEAR 1979[a]	1980	1981	1982	1983	1984	Total 1979-1984
Operating Cost								
Existing	$ 490.9	604.8	665.2	722.2	797.9	892.6	976.3	$ 4659.0
Recommended	402.1	568.7	547.2	592.4	653.1	731.2	798.9	3891.5
Saving	88.8	36.1	118.0	129.8	144.8	161.4	177.4	767.5
Capital Cost								
Existing	N/A	101	304	259	308	144	157	1273
Recommended	N/A	113	263	231	270	140	153	1170
Saving	N/A	(-12)	41	28	38	4	4	103

[a]The FY 1979 funding needs reflect 8 months of operation under the existing system and 4 months of operation under the proposed system.

Table 5-5

Cost and Revenue Projection Factors

Fiscal Year	Percent Increase Over Prior Year	
	Cost [1/]	Revenue [2/]
1978	9.0	5.2
1979	8.8	3.5
1980	8.3	4.8
1981	9.1	6.2
1982	10.2	5.6
1983	10.0	5.0 [3/]
1984	9.1	5.0 [3/]

1/ Taken from Amtrak Memorandum to DOT - 3/28/78. Applied to both operating costs and capital costs.

2/ Amtrak Marketing Projection of 11/11/77--yield (revenue per passenger-mile).

3/ Extrapolation of average projected increase over previous 5 years.

OTHER SYSTEMS CONSIDERED

The recommended system was chosen by the Department over the other systems evaluated because of the positive attributes discussed earlier. Additional reasons for not choosing any of the other four alternative systems are discussed below.

SHORT DISTANCE ONLY (Figure 4-2)

This minimal service system would incorporate segments of existing routes and could be operated without significant capital investment and at a much reduced deficit. The fixed cost associated with the isolated corridor services would make such services very uneconomical in terms of the deficit per passenger carried, however. Extending this system to include other isolated short distance services would be even more uneconomical. While more extensive analysis might well refine the projections of operating costs, at this point such a system appears to have little promise. Further, the huge labor protection payments associated with this sytem would, for the next several years, require very substantial levels of appropriation.

NATIONAL SYSTEM (Figure 4-3)

This system, which would provide a minimal level of national interconnected service would have several advantages. It would provide for coast-to-coast service and for basic north-south service. Such a system would enable travelers to reach the extreme corners of the country via rail connections. It would have significant potential for fare adjustments while still operating reasonably sized trains over those routes. The Department's analysis to date indicates that the revenue to cost ratio of this system would be less than larger systems but that the average patronage levels of these trains would be higher than in a larger system. This system would not provide the highly desirable direct interregional and some national linkage provided by larger systems, however. Additionally, it would require substantial appropriations for labor protection payments.

MODIFIED CURRENT SYSTEM (Figure 4-5)

This system essentially would provide for minimal modifications to the existing system to eliminate routes and services which are extremely poor performers or are to a large extent duplicative of other services. The additional services provided by this system would be operated at relatively high costs, would be of primarily local interest, and would not, in the Department's view, be appropriate for full Federal funding. Such services could best be provided by the States involved negotiating directly with Amtrak for the service on a 403(b) or other cost-sharing arrangement.

NATIONAL/INTERREGIONAL/INTRAREGIONAL SYSTEM (Figure 4-6)

This system would build upon the modified current system by adding a substantial number of intraregional services, all of which are considered by the Department to be appropriate candidates for state funding participation. The system would include reroutings of existing services which involve heavy capital expenditures for track improvements. Given the current tenuous financial condition of intercity passenger service, the Department strongly

opposes any such major capital investments until Amtrak can be put on a more solid financial foundation.

The base year (1977) performance measures of these systems, as well as of the base case and recommended system, are summarized in Table 5-6. The projected operating deficits of the various systems are summarized in Table 5-7. Additional data on these systems are presented in Appendix D.

METHODOLOGY

The methodology and assumptions used in estimating patronage, revenue, operating costs, capital costs, and employee protection payments for all systems were refined to the degree permitted by the time available to prepare the preliminary report. They are considered fully adequate for arriving at the preliminary route structures presented in this report. A detailed discussion of the methodology is set forth in Appendixes B, C and D.

Table 5-6

Base Year[1] (FY 1977) Comparison of Alternative System

Scenario: / Performance Measures	SYSTEM DESCRIPTION					
	Base Case	A Short Distance Only	B National System	C National/ Interregional System	D Modified Current System	E National Interregional/ Intraregional/ System
Train-Miles (Millions)	32.9	10.8	15.0	25.0	29.3	35.1
Passenger-Miles (Millions)	4,426	1,553	2,525	4,019	4,473	5,269
Passenger-Miles per Train-Mile	135	144	168	161	153	150
Revenues (Millions $)[2]	310.1	134.4	192.1	280.7	309.5	360.0
Total Operating Cost (Millions $)[3]	839.3	444.0	551.7	717.8	811.0	896.4
Net Operating Deficit (Millions $)[3]	529.2	309.6	359.6	437.1	501.5	536.4
Operating Deficit/PM($)	0.120	0.199	0.142	0.109	0.112	.102
Federal Operating Subsidy (millions $)[4]	490.9	293.2	333.6	402.1	466.7	508.3
Operating Subsidy/PM	0.111	0.189	0.132	0.100	0.104	0.096

[1]Base case is current system with all routes operated for a full year and with new bilevel Superliner equipment in service. Therefore, Federal subsidy differs from actual FY 1977 subsidy provided.

[2]Revenues do not include state 403(b) reimbursement.

[3]Includes non-cash operating costs such as depreciation.

[4]Operating subsidy is net operating deficit less depreciation.

NOTE: This table includes the NEC.

Table 5-7

Projected Federal Operating Subsidy Requirement
for Alternative Systems

(Millions of Current $)

Scenario	Alternative System	Base Year (1977)	1979 1/	1980	1981	1982	1983	1984	Total 1979-1984
	Base Case	490.3	604.8	665.2	727.2	797.9	892.6	976.3	4659.0
A	Short Distance Only	293.2	520.9	387.1	412.6	446.8	494.8	531.7	2793.9
B	National System	333.6	538.8	446.4	479.6	523.9	583.5	632.8	3214.0
C	National/Interregional System	402.1	568.7	547.2	592.4	653.1	731.2	798.9	3891.5
D	Modified Current System	466.7	595.2	634.0	688.2	760.4	851.2	931.1	4460.1
E	National/Interregional/ Intraregional System	508.3	612.8	692.6	753.6	834.8	935.4	1025.2	4854.4

1/ FY 1979 operating subsidy projections reflect the cost of transitioning from the current system to each of the alternative systems.

Chapter 6

TOTAL FUNDING NEEDS AND SOURCES

If the Department's recommended route structure is implemented, according to the schedule contained in authorizing legislation which is being considered by Congress, the transition from the existing to the new system will begin midway through FY 1979. Total Amtrak funding requirements, including operating subsidies and capital costs for FY 1979, are estimated at $736 million. In the absence of successful measures to improve revenue production and cost efficiency, the recommended system will require an estimated $876 million in FY 1980, growing to about $1 billion in FY 1984. The Department is evaluating alternative funding mechanisms for services of local or regional interest which have been excluded from the recommended national/interregional route structure, and will make appropriate recommendations in its final route study report.

FUNDING NEEDS

The recommended national system presented in Chapter 5 was developed without consideration of funding sources or cost sharing arrangements. The estimated total Federal operating and capital subsidy requirements for FY 1979-1984 to enable operation of the Northeast Corridor and the services recommended in Chapter 5 are set forth in Table 6-1.

The cost to operate the system during FY 1979 depends upon the implementation schedule. Assuming that the December 31 final recommendations are accepted by the Congress and become effective by April 1, 1979, Amtrak has up to one year from then to implement the results. It is reasonable to expect that Amtrak would move to discontinue services not included in the new system on or about May 1, 1979. Where service is being modified or added, the speed with which this change can be implemented will depend upon (1) reaching satisfactory agreement with the railroad involved, and (2) completion of any new construction required to enable initiation of the service. Capital funding is recommended in FY 1979, subject to acceptance of the final recommendations, for such construction. However, planning, negotiation with the railroads, design, right-of-way acquisition and construction can be expected to require several months.

For that reason, the operating subsidy level which is identified for FY 1979 would be sufficient to operate the existing system for eight months and the system with the enumerated service deletions for four months. This

Table 6-1

Estimated Total Funding Needs for the Recommended System

(Millions of Current Dollars, Fiscal Years)

	1979[b]	1980	1981	1982	1983	1984
National Services						
Operating Subsidy[a]						
NEC	179	199	209	223	249	265
Non-NEC	390	348	383	430	482	534
Total	569	547	592	653	731	799
Capital Cost						
NEC	32	146	106	220	105	115
Non-NEC	81	117	125	50	35	38
Total	113	263	231	270	140	153
Other Costs						
State Supported Services[c]	5	5	10	10	15	15
Debt Retirement[d]	25	25	50	50	50	50
NEC Purchase Payment	24	37	0	0	0	0
Grand Total	736	877	883	1003	936	1017

NOTE: This table does not reflect funding required for labor protection due to implementation of the recommended system.

---

[a]Does not include depreciation.

[b]The FY 1979 funding needs reflect 8 months of operation under the existing system and 4 months of operation under the proposed system.

[c]Federal contribution to State-supported services.

[d]Not a net Federal cash expenditure.

level is estimated at $575 million.[1] It is assumed that most of the new and modified services will be in place by October 1, 1979, and the operating cost and revenue estimates for FY 1980 are thus based on the recommended system as fully implemented.

ALTERNATIVE SOURCES OF FUNDING--STATE/LOCAL INTEREST ROUTES

The recommended national system outlined in Chapter 5 (Scenario C) calls for the deletion of a significant number of intercity rail passenger routes and services. The analyses supporting the recommendation did not distinguish among routes comprising the basic system and those that are state-assisted services under section 403(b) of the Act or experimental services under section 403(c). In fact, several current services (Los Angeles to San Diego and Minneapolis to Duluth) which are partially funded by the states under section 403(b) have been included in the recommended system. The exclusion of other 403(b) services is not to be taken as a recommendation that they be terminated. The Department recognizes that state and local transportation priorities may be such that some state and local governments will desire the continuation of rail passenger service over routes not included in the preliminary recommended national system. Scenarios D and E in particular reflect the addition of routes and services which, in the Department's judgment, may be of sufficient state or regional interest to warrant local funding.

Amtrak currently provides service in markets not included in the national system, under the provisions of section 403(b) of the Act. Any state, regional or local agency may request Amtrak to initiate service on new routes or expand service on existing routes if it is willing to reimburse Amtrak for 50 percent of the solely-related cost of providing the service. Amtrak is required to provide the service if costs can be offset "with the resources available" and if the total amount requested under section 403(b) does not exceed the maximum limit authorized under section 601(a) of the Act. The Department believes that the current 403(b) funding mechanism requires review to ensure that the decision to commit Federal resources to services which are primarily of local interest is made in an appropriate manner. The Department also believes that such resources, once provided, should not be melded with resources provided to fund the national interest intercity passenger system, to the detriment of both. In that connection (and as indicated in DOT's testimony before the House Subcommittee on Family Farms, Rural Development and Special Studies on April 19, 1978), the Department is currently reviewing all local transportation assistance programs with a view towards creating a single source of assistance to state and local authorities which would permit them greater latitude in making modal selection decisions. The provision of Federal assistance to support intercity rail passenger service which is primarily of local interest is being reviewed as part of that larger effort.

---

[1] If it were possible to operate the recommended system only during all twelve months of FY 1979, then the Amtrak operating subsidy would amount to an estimated sum of less than $500 million, not including 403(b) routes.

In addition to reviewing the 403(b) program in that context, the Department expects to make a recommendation in the final route study report that will ensure the provision of sufficient funding to continue, on an improved basis high priority local interest rail passenger services such as those currently funded under section 403(b). Pending development of a final recommendation we have indicated a tentative fixed amount for each of the fiscal years FY 1979-84 in table 6-1.

Chapter 7

ADDITIONAL ISSUES FOR PUBLIC COMMENT

While the primary focus of this report is on recommending a new Amtrak route system, it must be recognized that no route system can be operated in a vacuum. There are various public policy-related issues concerning Amtrak which are not directly related to the physical structure of the system, but which should be resolved before the restructured Amtrak route system is finally implemented. In varying degrees, the resolution of those issues will determine the future amount of Federal subsidy necessary to maintain the new system as well as the extent to which the system properly serves the public, just as much as will the shape of the system itself.

Upon presenting a final route structure recommendation to the Congress, the Department intends also to provide recommendations as to the proper resolution of many of those issues. In the belief that the Department's recommendations will, in their formulation, benefit significantly from receipt of the views of the public, this chapter presents and discusses a series of such issues. No definitive solutions are espoused and no final recommendations are made. Where the Department does have a view on the elements of any particular issue, that view is expressed in the body of the discussion.

Public comments on the issues discussed in this chapter are requested, as are comments on any other public policy issues which are felt to be relevant to the future proper operation of the Amtrak system. Issues discussed herein include:

- *Fare Policy*
- *The Proper Market for Intercity Rail Passenger Service*
- *The Provision of Additional Corridor Service*
- *The Provision of Commuter Services by Amtrak*
- *Sleeping Car and Related Services*
- *Amtrak's Institutional Arrangements*

FARE POLICY

One of the keys to improving the financial performance of the Amtrak system is to develop an optimum fare structure. The current trend of revenues covering a smaller portion of total costs as time goes by (shown in Figure 2-3) cannot be permitted to continue if intercity rail passenger service is to survive without an unacceptable continued acceleration of Federal subsidies. The extent to which fares should be raised, lowered, and differentiated to maximize net revenues and to stabilize the deficit must be determined. Developing an optimum fare structure for Amtrak is not a simple matter. The task is further complicated by the fact that Amtrak competes in varying degrees with private-sector competitors that do not receive direct Federal subsidies. The issue of equitable treatment of those competitors is very real.

The basic objectives of an optimum Amtrak fare structure must be determined. Several alternative fare structures are available which achieve different ends:

- Price to maximize ridership;
- Price to minimize the deficit;
- Relate the fare structure to the passenger cost of travel via alternate modes;
- Relate the fare structure to the cost of the service; and
- Minimize the deficit per passenger-mile or other unit of output.

Key considerations concerning the Amtrak fare policy which should be addressed in the public forum and as to which the Department will make specific recommendations in its final report include: the objectives of the fare structure; the emphasis that should be used to develop fares (i.e., mileage vs. market); and the extent to which more pronounced peak and off-peak pricing should be used.

Historical Context of Amtrak Fares

The current Amtrak fare structure consists principally of base, or regular fares between points on the same route, and round-trip excursion fares, which are reductions from the regular fares with special conditions on use. There are also accommodation charges which are added for parlor (club) or sleeping-car accommodations.

Pre-Amtrak Fares

Pre-Amtrak fares were regulated by the Interstate Commerce Commission. The fare structure in existence when Amtrak assumed the service previously operated by thirteen different railroads on May 1, 1971, contained many irregularities and inconsistencies between regions of the country and between railroads. There were variations in the relationship between first-class and coach fares and in the fare rates per mile between routes and within a given route. Fares were generally higher in the East than in the South and West. There was little apparent connection between such variations and market conditions.

Amtrak Period

In the intervening seven years, with its fare structure not regulated by the Interstate Commerce Commission, Amtrak has taken several steps to rationalize it. It has abolished the former joint fares between points on different routes, has equalized fares in opposite directions, has lowered the children's age for paying half-fare from five to two, and has ended discounts for regular roundtrip fares. It has also standardized tariff rules for family-plan fares nationwide, where they had formerly varied by region or railroad. Most significantly, Amtrak has made selective percentage increases and decreases in fares on a route-by-route basis--sometimes on only a portion of a route--which tended to narrow the previous variations among some of the routes.

Today, Amtrak coach fares range from approximately five cents to ten cents per mile, while fares for travel in roomettes range from approximately eight cents to 17 cents per mile.

Amtrak has introduced a completely new tapered scale of fares on a few existing routes (e.g., Chicago-New Orleans), as well as on new routes such as Washington-Montreal. However, nonmarket-based irregularities on other routes, such as Chicago-San Francisco (Table 7-1) have not been changed, although Amtrak's marketing department has plans for examining and adjusting such irregularities in the future.

Different ratios of coach to sleeping-car fares on different parts of the Amtrak system also exist as a carryover from the pre-Amtrak fares. Following are two examples representative of the difference:

	April 1978 Base Rail Fare	Additional Roomette Charge	Miles
New York - Effingham, Illinois (National Ltd.)	$62.00	$51.00	945
Chillicothe, Illinois - Trinidad, Colorado (Southwest Ltd.)	64.00	39.00	942

The two rail fares for these similar distances are only three percent apart, but the accommodations charge on the "National Limited" between New York and Effingham is 31 percent higher than the charge on the "Southwest Limited" between Chillicothe and Trinidad.

	April 1978 Base Rail Fare	Additional Roomette Charge	Miles
New York - Chicago (Broadway Ltd.)	$56.00	$49.00	904
Chicago - Pauls Valley, Okla. (Lone Star)	55.00	31.50	903

Table 7-1

Example of Pre-Amtrak Irregularities Still in the Amtrak Rate Structure:

	(1)		(2)			(3)		(4)		
	FROM CHICAGO					FROM OMAHA				
	Apr 78 Fare	Rate	May 71 Fare	Rate	Mile	Apr 78 Fare	Rate	May 71 Fare	Rate	Mile
Omaha	$ 38.00	7.7¢	$22.00	4.4	496	$ --	--¢	$ --	--¢	--
McCook	54.00	6.9	32.25	4.1	779	22.50	8.0	12.25	4.3	283
Denver	70.00	6.8	42.00	4.1	1034	39.00	7.2	22.25	4.1	538
Laramie	79.00	6.6	47.00	3.9	1198	43.00	6.1	25.00	3.6	702
Rock Springs	91.00	6.4	56.00	3.9	1433	55.00	5.9	34.00	3.6	937
Ogden	104.00	6.4	62.75	3.9	1624	68.00	6.0	41.00	3.6	1128
Reno	121.00	5.6	89.00	4.1	2164	107.00	6.4	70.00	4.2	1668
Sacramento	121.00	5.2	91.75	4.0	2318	107.00	5.9	74.00	4.1	1822
Oakland	121.00	5.0	91.75	3.8	2408	114.00	6.0	74.00	3.9	1908

NOTE: 1978 fares from Chicago to a sampling of points successively farther west along the Chicago-San Francisco route (Col. 1) decline in rate per mile as they ascend in amount, but 1978 fares from Omaha to the same points follow a different pattern (Col. 3). The rate per mile descends to a low at Omaha-Rock Springs and then ascends to Omaha-Reno, after which it again descends.

This unusual pattern in today's fares from Omaha was present in only slightly different form in the pre-Amtrak structure from both Chicago and Omaha (Col.'s 2 and 4). The rate per mile descended for fares to points successively farther west of Omaha as far as Rock Springs, then ascended to Reno, then descended again.

Thus, the pre-Amtrak pattern is preserved today in the fares from Omaha, although it has disappeared in the fares from Chicago.

Again, the two rail fares for these similar distances differ by only two percent, but the two accommodation charges differ by 56 percent.

These accommodation charges, which are higher on the former Penn Central routes than on western routes, are vestiges of the pre-Amtrak higher first-class fares in the East. First-class fares generally were 160 percent of coach fares in the East, while in the West, first-class fares were as low as 125 percent of coach fares. A market-by-market evaluation of such fares is necessary to determine whether such differences are appropriate or are in need of modification. Amtrak management has stated that it intends to engage in such a market-by-market evaluation.

Outside the NEC, the variation in yield[1] among markets ranges from about 4.2 cents per passenger-mile to about seven cents per passenger-mile (see Table 7-2). The gap between coach fare and yield has widened since 1974 suggesting an increasing reliance on special fares, including U.S.A. rail passes, excursion fares, children's fares, etc. This relationship is shown graphically in Figure 7-1.

Figure 7-2 depicts the trend in the relationship between Amtrak per revenue passenger-mile yields and those of air and bus. It can be seen that over time Amtrak yields have been increasing at a comparable rate to airline yields and less rapidly than bus yields.

Excursion Fares

The Rail Passenger Service Act of 1970 encourages "innovative marketing and pricing concepts" by Amtrak. Amtrak's marketing department has, since 1975, experimented with numerous innovative and creative roundtrip coach excursion fares.

Excursion fares are by their nature lower than regular fares, usually with more restrictive conditions on their use. Their objective is to increase Amtrak's net revenue by filling existing seats at a fare level which is expected to more than cover their incremental cost. At a minimum, excursion fares are intended to reduce the deficit per passenger-mile. Innovation with excursion fares cannot substitute for a sound regular fare structure.

If an excursion fare attracts so much new traffic that extra cars or extra trains must be operated, causing substantial additional costs, it may have defeated its original purpose and lack justification. Thus, the establishment of excursion fares, military or group fares should be accompanied by a careful pre- and post-assessment of their impact, to insure that the objective of an increase in net revenue is met.

Alternative Fare Policy Objectives

In setting Amtrak's fares, the following strategies are available, all of which are not mutually exclusive.

---

[1] In discussing revenue, it is important to distinguish between the terms, "regular fare" and "yield." Yield represents the transportation revenue per passenger-mile derived from the actual fare paid, including regular fares, children's fares, special reduced fares and additional accommodation charges for sleeping cars. (Total revenue includes food and beverages, mail and express, and transportation revenue.)

Table 7-2

Market-by-Market Average Yield for FY 1977

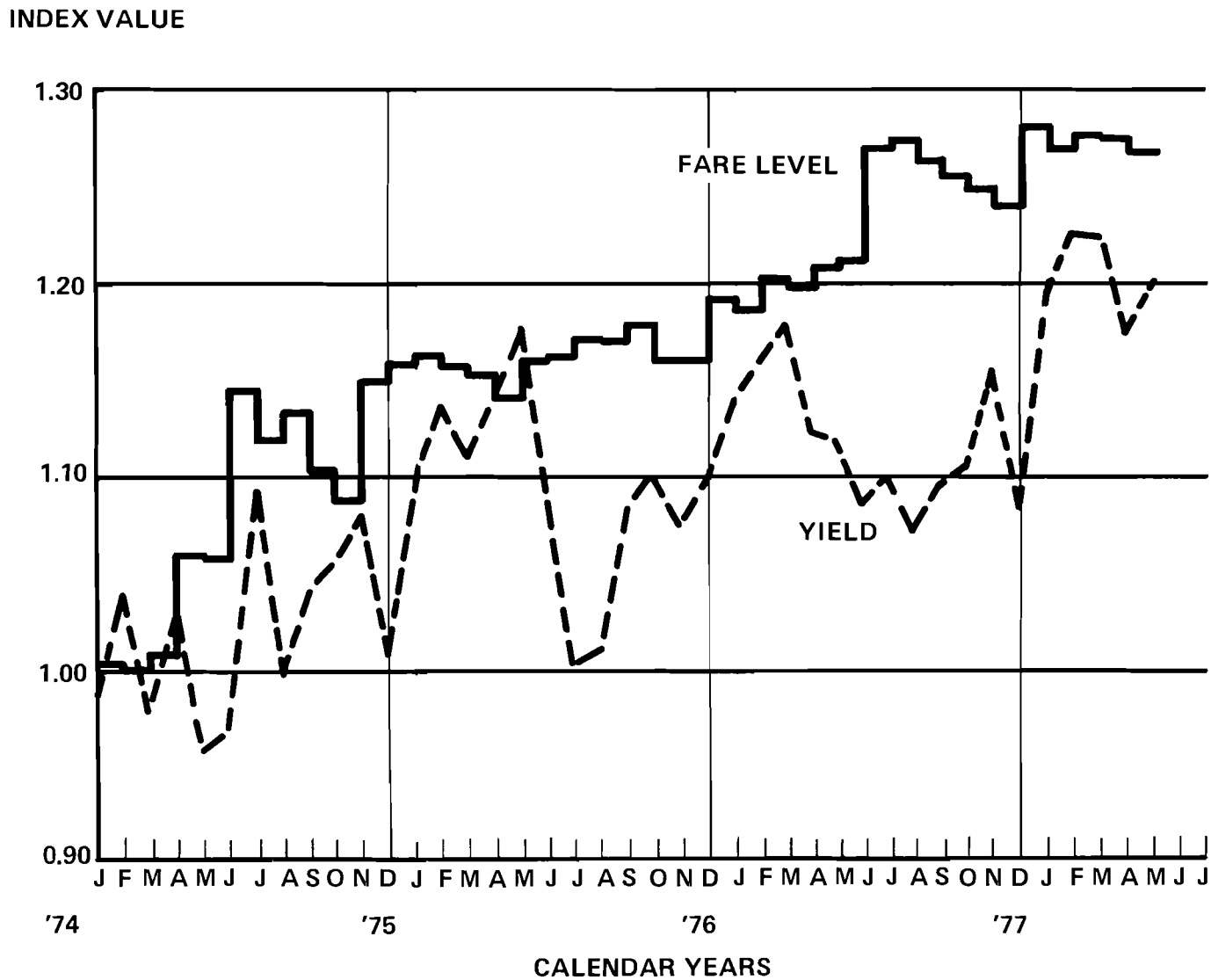
Market	Average Yield Dollar Value	Rank
Metroliners	.1163	1
Boston-New York-Washington Conventional	.0707	2
Washington-Cincinnati via Cumberland	.0692	3
Washington-Newport News	.0648	4
Washington-Montreal	.0616	5
Chicago-Detroit	.0605	6
Chicago-Milwaukee	.0603	7
Chicago-Port Huron	.0594	8
Chicago-Quincy	.0580	9
New York-Miami	.0578	10
New York-Albany-Buffalo-Detroit	.0576	11
New York-Montreal	.0571	12
Chicago-St. Louis	.0562	13
San Diego-Los Angeles	.0556	14
Philadelphia-Harrisburg	.0552*	15
Chicago-Carbondale	.0549	16
New York/Washington-Chicago via Pittsburgh	.0533	17
New York/Boston-Chicago via Buffalo	.0533	18
Chicago-Dubuque	.0533	19
New York-Philadelphia	.0532*	20
Vancouver-Seattle	.0521	21
Salt Lake City-Seattle	.0518	22
New York/Washington-Kansas City	.0516	23
Chicago-Houston	.0511	24
Chicago-Twin Cities	.0495	25
Chicago-Laredo	.0487	26
Chicago-Seattle via Billings	.0483	27
New Orleans-Los Angeles	.0474	28
Chicago-Seattle via Havre	.0474	29
Washington-Cumberland	.0473	30
Minneapolis-Duluth	.0469	31
Seattle-Los Angeles	.0469	32
Chicago-San Francisco	.0467	33
Chicago-Los Angeles	.0466	34
Chicago-New Orleans	.0453	35
Oakland-Bakersfield	.0452	36
Chicago-Miami	.0447	37
Washington-Cincinnati-Chicago via Charleston, WV	.0426	38
Washington-Tri-State Station	.0424	39
Seattle-Portland	.0424	40

* Diluted by significant commutation traffic.

Source: Amtrak Marketing Department Tabulation, September 27, 1977.

Figure 7 - 1

FARE LEVEL VERSUS YIELD
INDEX OF COACH FARE CHANGES
COMPARED WITH INDEX OF YIELD
(BASIS OF INDEX: JAN. 1974 VALUES = 100)

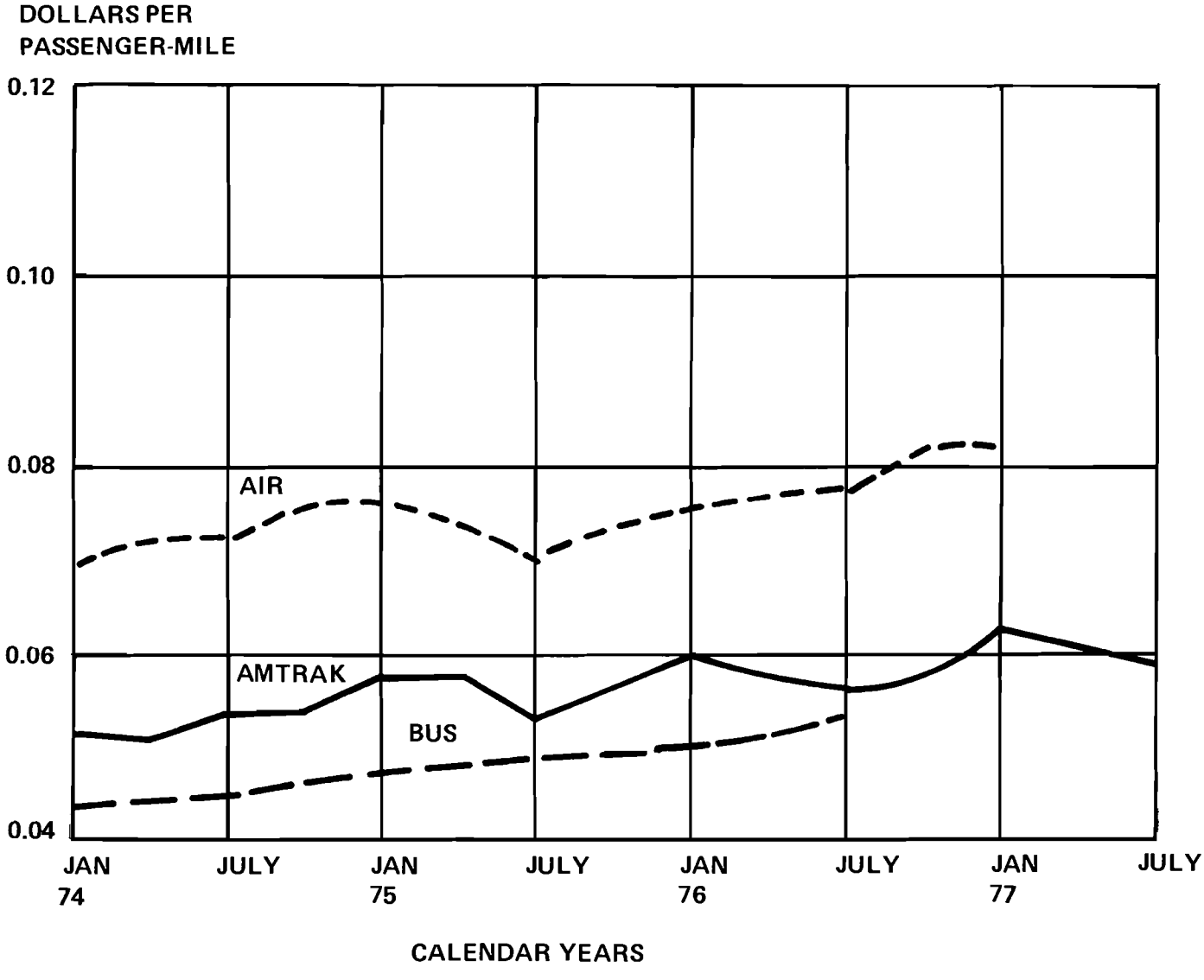


SOURCE: Amtrak Marketing Department

Figure 7 - 2

RELATIONSHIP OF AMTRAK YIELDS TO OTHER MODES

COMMON CARRIER YIELDS
AIR TRUNK CARRIERS, BUS, AMTRAK.



SOURCE: Amtrak Marketing Department

. Maximize Riders. Since ridership tends to increase as fares decrease, such a strategy would--in the extreme case--imply a free system generating many times more passenger-miles than are produced today. The financial results would be predictable: operating costs would soar, capital costs would multiply (to provide capacity to handle more pronounced peaks), deficits would skyrocket, and other, private sector, modes might suffer financial losses (at least over major portions of their system). Such a result would clearly not be consistent with good public policy. Through the use of moderated fare reductions in selected markets, coupled with peak/off-peak pricing, less extreme results are possible and ridership can be maximized within reasonable cost limits.

. Minimizing the Deficit. Despite general fare increases, supplemented by additional increases in particularly strong markets, Amtrak has not raised fares enough to stabilize the revenue to cost ratio, much less lower deficits. As a result, the relationship between revenues and costs has deteriorated to the point that, in 1977, Amtrak revenues covered only 37.4 percent of costs. Theoretically, and assuming no diversion in ridership, in order for fares to cover 100 percent of 1977 costs they would have had to be 2.67 times their present levels. As examples, the Chicago to Los Angeles coach fare would be $315 instead of $118 and the New York to Miami fare would be $230 instead of $86. It is likely, however, that raising fares to such theoretical break-even levels would cause traffic to drop off sharply and the goal of breaking even would not be attained. Notwithstanding the impossibility of achieving a break-even, the objective of significantly reducing the deficit should remain as a public policy goal.

. Relate Fares to Fares of Alternate Modes. Rail fares could be related to the fares charged by other modes and to increases in those fares as reflected in the Consumer Price Index of transportation prices. This method is part of the current Amtrak approach to fares. This approach results in a fare which is not related to rail passenger service's costs and may or may not reflect market conditions. Such a strategy is sound only if all common carrier markets are similar and all common carrier costs change in the same manner.

. Relate Fares to Operating Costs. As an alternative to a break-even fare, a fare related to the costs of the service provided might require the users of a particular route to pay a fixed portion of the operating costs of that route. Thus, as operating costs increased, fares would be increased in proportion to the cost increase. This approach, however desirable at a system level, does not allow for the optimum development of each market, either in a ridership or a deficit reduction sense.

. Minimize Deficit Per Passenger-Mile. There is a theoretical optimum level for the rail fare between any two points, below which more people will ride but not in sufficient numbers to avoid a decrease in revenues, and above which the revenue loss resulting from the decrease in people choosing to ride will more than offset the greater per-capita fare payments, so that a net decrease in revenues will also result. Since costs normally vary with capacity provided (and to a small degree with passengers carried), the establishment of an optimum fare level aimed at minimizing the deficit per passenger-mile requires analyzing the change in incremental costs associated with changes in ridership levels and capacity needed due to the fare adjustment.

Fare Structure Options

There are a variety of methods for actually designing the fare structures that might result from the implementation of the strategy selected.

Establish Market-Based Regular Fares

Under this method, as it has been developed by British Railways, fares are established between individual key city-pairs based on market evaluation. Fares to smaller in-between points are scaled in. No particular consistency in rate-per-mile is sought among the fares. The principal restriction is that the fares to more distant points may not be lower than the fares to intermediate points from the same origin. Also, as with all fare structure options discussed here, fares in opposite directions between the same city-pair are the same.

This is a sophisticated and analytically complex method for setting fares. It possesses the most potential for minimizing either the total deficit or the deficit per passenger-mile. It has the disadvantage of requiring more attention than any other type of fare structure, both to establish it and after it is in place, since the characteristics of each city-pair market are not only unique, but will change with time. Staffing limitations may make it difficult to maintain properly, once established, but automation can have a major impact on reducing the problem to manageable proportions. Such an approach seems to permit the most careful matching of fares to individual city-pair markets and cost conditions.

Establish Mileage-Based Fares

Mileage-based fares are set at a flat rate per mile throughout the system, or at different flat rates in different regions or on different routes.

This is probably the simplest approach to setting fares. It does not reflect the lower costs per mile that the carrier may experience in carrying passengers longer distances as compared with shorter distances nor the different elasticities of markets. This type of fare structure most closely resembles that in place on United States railroads at the inception of Amtrak in May 1971. It is easy to "manage" but does not reflect differences among markets and does not provide the needed flexibility and sensitivity to maximize revenues or minimize deficits.

Establish Mileage-Based Fares Declining with Distance

A variation on a mileage-based fare system is to set fares at higher rates per mile for shorter trips and allow them to decline as distance increases. The basic level of rates per mile as well as the steepness of the "curve" or "taper" for distance may be the same throughout the system or may be different in different regions or on different routes.

For example, the fare for a journey of 100 miles might be calculated at eight cents per mile, a journey of 125 miles at 7.9 cents per mile, 150 miles at 7.8 cents per mile, and so on.

This fare-setting method represents a compromise between the simple straight mileage-based fare and the more complex market-based method which seeks to respond to the unique characteristics of hundreds or thousands of different markets. It is characteristic of much of Amtrak's present fare structure.

As with any of the methods described in this section, excursion fares in specific markets are appropriate if used to stimulate traffic in certain local or temporary situations

Variable Pricing

The variable pricing approach has been tried by Canadian National Railways and the Baltimore and Ohio Railroad (pre-Amtrak) and, to a limited extent, by Amtrak. In recognition of marked "peaks" and "valleys" of travel demand, lower regular (not merely excursion) fares can be charged at predetermined periods, days, or hours of low demand than at times of high demand. Travel on mid-week days might, for example, be priced lower than travel on weekends and travel in the summer might be priced higher than travel in the winter. For short-haul and Northeast Corridor services, travel at the noon hour might be cheaper than travel at 5:00 P.M.

Three reasons can be given why Amtrak should probably seriously consider the establishing of a multi-level regular fare system such as variable pricing over part or all of its system. First, because a number of cars are only required to carry traffic on long distance trains for relatively short periods of the year and their periodic maintenance charges must be recovered over only a part of the year, costs per seat-mile or per berth-mile tend to be higher at times of peak demand. (See Table 7-3)

Second, the market appears to be strong enough in certain cases to bear a peak surcharge at least sufficient to meet the higher peak costs involved. However, such a surcharge would need to be applied with considerable discrimination since the number of potential passengers denied space at peak periods varies both from route to route and between coach and sleeping-car accommodations. In this respect, each route may have different characteristics, although avoidance of complexity may make it desirable to limit differentiation among routes and services.

Finally, the cost profiles indicated in Table 7-3 also show that there is potential for heavily discounted fares to be marketed off-peak, provided that they can be sold in such a way that losses in revenue from those passengers already traveling at higher fares can be more than offset by significant volume increases at heavily discounted rates. Means of preventing dilution of the higher fares already paid by those currently traveling off-peak include marketing discounted group travel off-peak (Amtrak is already approaching the skiing market in this way), and carefully limiting the discounts.

Table 7-3

ECONOMICS OF PEAK/OFF-PEAK EQUIPMENT UTILIZATION

	AVERAGE COST OF OPERATION		MARGINAL COST OF RUNNING STOCK CURRENTLY UNUSED OFF-PEAK
	FOR STOCK RUNNING THROUGH THE WHOLE YEAR	FOR ALL STOCK RUNNING IN THE PEAK THREE MONTHS	
COACH	1.2	1.4	0.6
SLEEPER	3.2	4.0	2.2
	FIGURES ARE CENTS PER SEAT/BERTH MILE		

NOTE: The routes analyzed were Chicago-Los Angeles; Chicago-Seattle via Havre; Seattle-Los Angeles; New York/Washington-Chicago; Washington-Cincinnati-Chicago; Chicago-New Orleans and New York-Florida. An approximation of the costs per seat-mile and per berth-mile for these sample services has been constructed on the following basis:

- Approximately 50% of the coaches and 70% of the sleeping cars are used throughout the year; approximately 30% of the coaches and 20% of the sleeping cars are used for only one quarter of the year; the remaining 20% of coaches and 10% of sleeping cars are used for intermediate periods.

- The maintenance costs (other than maintenance costs related to mileage and trips) are assumed to be recovered in that part of the year in which the vehicle was being used.

- Reference to the "peak three months of operation" does not necessarily imply three months of continual operation; it normally implies a fairly substained period of operation in the summer months plus a few very short periods of operation during the remainder of the year (e.g., Thanksgiving, Christmas, etc.).

Source: Transmark analysis of the economics of Amtrak operations.

THE MARKET FOR INTERCITY RAIL PASSENGER SERVICE

The development of an optimum route structure requires a thorough understanding of the market for intercity rail passenger service. Decisions about the types of services to be provided and the prices to be charged for these services also relate directly to market conditions. This section discusses the existing market for Amtrak service, reviewing recent research in the field. It next expands on that discussion to consider Amtrak's future market potential. Having identified existing and potential markets, this section concludes by considering the potential impact of Amtrak operations and marketing strategies on competing private sector carriers.

Amtrak's Existing Market

Between May and June of 1976, Amtrak's consumer research unit conducted a passenger assessment survey on 21 trains (13 Western, and 8 Eastern). While the results of the survey do not provide a statistically reliable basis for describing Amtrak's total market they do represent a good indication of who uses Amtrak services.

In general, the survey indicates that Amtrak's passengers are drawn from a broad cross section of the American public: only 14 percent were upper income (over $25 thousand annual income), while 46 percent were below average income (under $12 thousand annual income); 26 percent were engaged in professional, technical or managerial occupations; 50 percent were married; 39 percent were 45 or older; 62 percent were traveling for vacation or recreation; and 46 percent had ridden Amtrak previously. The results of the individual train surveys are summarized in Table 7-4.

To the extent that the results of the survey may be considered to reflect the true nature of Amtrak's market, they indicate that rail passenger service appeals to many segments of the public and is not patronized predominantly by any single identifiable group. One common characteristic identified in the survey appears to be trip purpose, which in the majority of the cases appears to be for discretionary vacation or recreation travel. This may be in part because the surveys were administered just before the summer peak season. The non-specificity of Amtrak's general patronage patterns makes it difficult without more detailed market research to suggest specific means of further expanding Amtrak's current market, except for the price sensitive traveler. The questions of fare policy and the impacts of fare adjustments on the market and on Amtrak's financial performance are discussed in detail elsewhere in this Chapter.

Amtrak's Potential Markets

Theoretically, the entire population is a potential market for intercity rail service. In practice, however, Amtrak today serves only 532 stations, many of them very small towns, in a country which has 1,967 incorporated cities with 10,000 or more inhabitants. Cities with Amtrak stations had a total population of 66 million in 1970, only 32 percent of the national population of 208 million. (Of course, Amtrak market areas extend beyond the corporate limits of cities in which stations are located.) Fully one-quarter of the nation's population lives in rural areas with an average population density of 15 people per square mile--areas often far removed from the 27,000-mile Amtrak network, but often well-served by the 267,756-mile Federal-aid

Table 7-4

PASSENGER ASSESSMENT SURVEY RESULTS

Respondents	Percent of Total
Sex	
Male	41%
Female	60
Marital Status	
Married	50
Single	34
Widowed	8
Other	8
Education	
College or More	57
High School	39
Grade School or Less	4
Age Group	
Under 18	7
18-24	21
25-34	21
35-44	13
45-54	12
55-64	13
65 and over	14
Occupation	
Students	14
Housewives	15
Craftsman, Service, etc.	10
Clerical, Sales	11
Prof., Technical, Mgmt.	26
Retired	11
Other	13

SOURCE: Amtrak Marketing Department

Respondents	Percent of Total
Source of Information	
Newspaper	10%
T.V./Radio	8
Travel Agent	12
Friends	33
Other	36
Household Income (1976)	
Under $5,000	16
5,000-7,999	12
8,000-11,999	18
12,000-14,999	14
15,000-24,999	26
25,000 and over	14
Class of Service	
Coach	93
First-Class	6
Other	1
Nights Away	
None	16
one	17
Two-Three	22
Four-Nine	19
Ten or More	26
Repeatability	
First-Time Amtrak	54
Two-Five	30
Six-Nine	6
Ten or More	10
Tour Group	
Yes	5

Respondents	Percent of Total
U.S.A. Rail Passengers	
Yes	13%
Reason for Riding Amtrak	
By Choice	88
Purpose	
Business or Work	9
To and From School	3
Vacation or Recreation	62
Personal Affairs	17
Other	9
Persons Traveling With on Trip	
Traveling Alone	40
1 other	27
2 other	11
3-4 other	16
5 or more	6
Means of Transportation Used on Trip	
Bus (local)	8
Bus (non-local)	10
Air	7
Taxi	9
Rental Car	8
Own Car	25
Other	32
Type of Lodging	
Commercial	24
Own home, cabin, trailer	11
Friends or relatives	55
Other	10

primary highway system. Of the 116 Standard Metropolitan Statistical Areas of 300,000 or more population, 20 receive no intercity rail passenger service. From a marketing standpoint, therefore, the nation can be divided into two categories: those who live close enough to Amtrak service to avail themselves of it on a regular basis, and those to whom Amtrak is essentially unavailable. Since total travel by all modes, including auto, between city-pairs served by Amtrak accounts for less than 10 percent of total national intercity travel, the latter group is significant.

Improved Surface Intercity Connections

One of the means of enhancing the accessibility of the Amtrak system to the traveling public and thereby expanding the market would be to achieve better integration among all common carrier transportation modes. In particular, the Department believes that the potential exists for Amtrak and the nation's intercity bus industry to cooperate in an effort to integrate their respective services more fully, the impact of which would be to expand for certain elements of the traveling public, the service area of the intercity rail passenger network. Many regions of the country which currently do not exhibit demographic or other characteristics conducive to supporting direct intercity rail passenger service do support regular intercity bus service. A Department study indicates that integrating those existing bus services and Amtrak rail services wherever possible would be a much more cost-effective means of providing rural and small urban communities with a link to the nation's rail passenger system and hence the nation's major activity centers than would the alternative of providing direct rail transportation.1

There are three principal categories of intermodal connection between rail and bus service: dedicated service, fully integrated regular route service, and coincidentally connecting service.

- Dedicated Service makes the bus trip wholly an extension of the train trip. The scheduling of the connecting buses is entirely dependent on the arrival and departure times of the train. Furthermore, the bus carries only passengers traveling to or from the train station and makes only those stops selected by the railroad management as points to be served. The obvious advantage to this approach is that it ensures maximum reliability for the connection and also enables the quality of service (e.g., communities served, location, and nature of pickup or delivery points) for the bus portion of the journey to be tailored to meet the demands of interlining passengers.

The principal drawback to dedicated service lies in its exclusivity, since the entire operating cost plus profit for the connecting bus company must be covered solely by rail-bus passenger fares. Based on an investigation of prevailing operating characteristics, operating costs, and tariffs, between 17 and 20 passengers per trip appears to be the minimum number required to offset the operating costs of the average intercity bus. Populations of under 100,000 are unlikely to generate sufficient traffic to enable a dedicated service to achieve these break even loads. Thus, for rural areas, dedicated service does not appear to be a practical alternative if the service is required to be self-sustaining.

---

[1]U.S. Department of Transportation, Federal Railroad Administration, Report on the Potential for Integrating Rail Service Provided by the National Railroad Passenger Corporation with Other Modes, May 1, 1976. Available through the National Technical Information Service.

• Fully Integrated Service establishes a true connection between existing bus and rail services involving schedule modifications and, for the bus operator, possible route modifications to bring buses to intercity rail stations. Such an arrangement generally would be based on an interline agreement specifying fares, division of revenues, the amount of time each carrier would wait if the connecting carrier was late, allocation of joint costs, etc.

Integrated service is less appealing than dedicated service for several reasons. Its reliability is lower because neither carrier is totally committed to making the connection and since both are operating on schedules established with other markets as primary objectives. Because the bus portion of the trip frequently serves local traffic, there are the additional problems of unreserved seating and often a less direct route to the point of destination. On the other hand, given the probability of relatively low ridership in rural areas, an integrated service, despite its drawbacks, appears to offer the most cost-effective means of implementing connecting service.

• Coincidentally Connecting Service simply describes a situation where both carriers serve a common locality. None of the characteristics of an interline intermodal exchange exist and it is up to the traveler to obtain schedules, tickets, and transfers between station locations, get there--and wait. For most locations coincidentally served by both rail and bus, the connection appears to offer little or no inducement to the auto traveler or the discretionary non-auto traveler.

Accepting the objective of providing additional common carrier service, on a self-sustaining basis, of sufficient quality to attract auto travelers and discretionary non-auto travelers from cities of under 100,000 population, integrated service appears to be the most practical alternative.

Ridership levels in rural areas on any of the alternative methods of integrated service cannot be expected to be large. Integrated service will not, in most instances, provide expanded or new intercity bus service. Thus, the vast number of people who are not prone to use any form of surface common carrier transportation cannot realistically be expected to divert in large numbers to the integrated system in light of their relatively low patronage of existing single mode service.

The service and institutional aspects of integrated service would limit its widespread utilization. In order to achieve its full potential, the integrated service must minimize the inconveniences inherent in station and baggage transfers, long layovers due to conflicting schedule demands, multimode ticket purchasing, and the need to seek information from multiple sources. The extent to which the inconveniences associated with these activities are alleviated will, in large part, determine the cost of integrated service, as well as its utilization.

Users of Other Modes

The other general market segment to which Amtrak can appeal are those who have access to the Amtrak system but do not currently use it. A recent Louis Harris poll of public attitudes toward intercity travel undertaken for Amtrak underscores the public's ambivalent attitudes toward rail in comparison to other common carrier modes (see Table 7-5). Of the 2,100 people polled nationwide

Table 7-5

BEST WAY TO TRAVEL, 1972-1978
(Base: Total)

	Air		Train		Bus		Not Sure	
	1972 %	1978 %	1972 %	1978 %	1972 %	1978 %	1972 %	1978 %
Cost of trip	29	36	13	15	44	38	14	11
Personal comfort	67	66	19	20	6	8	8	6
Safety	35	38	36	29	10	18	19	15
Chance to look out and see interesting things	15	11	38	35	39	47	8	6
Reaching destination quickly	86	81	5	7	3	7	6	6
Flexibility on when to leave	50	54	8	11	19	22	23	13
Knowing you will arrive on time	52	61	16	14	10	12	22	12
Friendly, helpful attendants	66	66	11	11	5	8	18	16
Place of departure easy to reach	34	45	15	15	31	30	20	10
Luggage handling facilities	48	51	14	14	11	17	27	18
Fast reservations and information facilities	65	63	9	9	6	12	20	16
Going to the place you want to go*	X	51	X	10	X	27	X	13

* 1978 only.

Note: In each category, the score of the preferred mode is highlighted. Figures may not add to 100 percent because of rounding.

SOURCE: Louis Harris and Associates, Inc., Final Report to Amtrak, March 1978.

60 percent wanted more and better rail passenger service, and 51 percent want the Federal Government to spend more money to improve rail passenger service. On the other hand, of 12 attributes of intercity travel, a cross-section of the general public felt air to be superior in 10, bus in 2, rail in none. Similarly, when Americans were asked which means of travel would likely be their first choice and their second choice, "realistically speaking", if they were taking a trip of 100 miles or more in the next few weeks, they overwhelmingly chose air and auto. Since the results were influenced by geography and modal availability, a further sample was taken, this time restricted to rail corridors. Even there, however, air and auto received overwhelming preference.

In a recent study conducted for the Department of Transportation,[1] intercity travelers by automobile were asked their opinions about rail travel. When asked possible reasons for using rail on a future intercity trip of 100 miles, almost half responded that they would either have no reason to travel by train or would do so only as a last resort. On the other hand, however, when asked for particular reasons why they might not travel by rail on a future trip, only 13 percent said they would have no reason not to travel by rail. Despite these responses the general attitude of the respondents toward intercity train travel in this study was neutral-to-positive, thus indicating at least some potential for diversion from auto to rail. The study suggested a number of actions to encourage such a diversion.

- Accommodate multiple destinations without imposing significant penalties in terms of cost and/or inconvenience upon the traveler;
- Facilitate the carrying of large and/or numerous pieces of luggage;
- Provide a packaged travel plan which combines bus and rail travel with low-cost rentals at the destinations;
- Provide family or group travel packages.
- Provide packaged travel plans for businessmen that focus upon taking along family members;
- Focus on public campaigns to modify existing negative attitudes toward bus and rail use and increase traveler awareness of the availability of service;
- Establish a national clearinghouse for public carrier transportation information;
- Provide on-board support services to businessmen such as secretarial and telephone services.

Such initiatives would result in varying degrees of increased capital and operating expenses, and should therefore be subject to careful scrutiny by Amtrak management prior to implementation.

---

[1] Applied Management Sciences, Survey of the Attitudes of Intercity Automobile Travelers Toward Intercity Public Transportation, for U.S. Department of Transportation, December 1977.

Another suggestion frequently made is that Amtrak should initate auto-transport-type services in major intercity passenger markets. Auto-carrier services, able to make use of the Interstate System as feeders to major termini, might well-deserve future study from the standpoint of overall economics and public cost/benefits. Because of the higher capital investment, operating expense, and fares required, such services may not represent an attractive alternative to large segments of the public, however. In addition, to operate a publicly subsidized service that is by its nature patronized primarily by relatively high-income individuals may represent a less than desirable allocation of public resources.

Impact of Rail Market Expansion on Competing Carriers

Aside from the public expense of any such initiatives, the overall public benefits to be derived from a significant increase in Amtrak ridership must be assessed. A balancing consideration here relates to the impact of Amtrak ridership gains on competing carriers, since Amtrak represents only one of several means of intercity common carrier passenger transportation. In many aspects, intercity rail, bus, and air travel possess unique characteristics designed to appeal to different segments of the intercity travel market. There tends to exist, however, some overlap among the markets served by rail, bus, and air; thus, Federal financial assistance for intercity rail passenger service has the potential to affect competing modes. Intercity bus is one such mode.

The nation's privately-owned and operated intercity bus industry provides regularly scheduled service to approximately 15,000 communities over a route network comprising 276,000 miles of highway. For approximately 14,000 of these communities, bus is the only form of intercity common carrier passenger transportation available. The industry serves virtually all communities with populations in excess of 5,000 and approximately 96 percent of all communities with populations between 2,500 and 5,000. In 1976, approximately 350 million revenue passengers were transported on regular route, charter and special, and local and suburban services, more than the number of passengers carried by the nation's domestic airlines and Amtrak combined.

Historically, the intercity bus industry has been profitable and relatively stable. Greyhound and many of the Trailways affiliates have been in existence since the 1930's. Many of the smaller operations are family-owned and have been providing intercity bus service for an equally long period of time. While the fortunes of the regular route portion of the industry tend to follow the ups and down of the nation's economy, the development of more stable or growing profit centers (most notably charter service and package express service) has tended to prevent wide swings from large profits to large losses. Recent years, however, have seen a steady decline in industry profitability.

Over the past year and a half, the condition of those firms heavily involved in regular route operations generally has failed to respond positively to the slow recovery of the economy. Ridership has continued to decline and revenues have not kept pace with rising expenses in spite of rate increases that have on the average exceeded 10 percent per year over the last 3 years.

With the exception of 1974, the year of the Arab oil embargo, intercity bus regular route ridership has declined steadily over the past decade. Among

the class I carriers, regular route intercity ridership fell off by approximately 18 percent between 1969 and 1976, declining from 136 million passengers to 112 million. Patronage of charter and special services has displayed no discernible trend over the same period, remaining steady at around 19 million passengers annually for the class I carriers.

The intercity bus industry has frequently cited Federal subsidies of competing services as a primary reason for their recent financial problems. Amtrak and local service air carriers receive direct Federal assistance and compete with the bus industry in certain markets for intercity passengers. Within their service areas, publicly-funded urban mass transit systems compete for charter and sightseeing passengers and even regular route passengers in some cases.

The bulk of the intercity bus industry's arguments have recently been directed against Amtrak, which is perceived as its closest competitor. The potential effects of Amtrak on intercity bus operations generally are twofold: passenger diversion, and depressed revenues resulting from subsidized price competition. These effects are, of course, market specific and, to the extent they have occurred, have been concentrated in the larger markets most frequently served by Greyhound Lines and the Trailways organization, although several regional carriers (e.g., Indian Trails in Michigan) are faced with head-to-head competition from Amtrak as well.

It is not possible to determine with precision the magnitude of the effects of competition by Amtrak on the intercity bus industry. Unfortunately, bus industry proprietary data is closely held and the Department has been unable to obtain the market-by-market data that is needed to assess those effects.

A review of the available aggregate intercity bus data fails to show any measurable increase in total intercity bus passenger miles in 1971, an increase that might have been expected to materialize when the private railroads ceased operations and intercity rail traffic fell off by approximately two billion passenger-miles (see Table 7-6).Neither does the rate of decline in regular route passenger-miles for class I intercity carriers reflect a positive response to the significant cutbacks in rail passenger service in 1971. While regular route passenger-miles for class I carriers declined at a more rapid rate during the six-year period of Amtrak operations (1971-1976) than it did during the immediately preceding six-year period (1966-1971), it is impossible to isolate Amtrak competition as the sole or principal cause of these declines.

The pattern emerging for the regular route portion of the intercity bus industry does not appear unlike that followed by rail passenger service prior to the formation of Amtrak or by the privately-owned and operated urban bus systems that went public during the 1960's--declining ridership followed by declining investment, higher fares, service deterioration, leading to potentially non-viable private sector carriers. A series of operating and financial trends for the intercity bus industry are contained in Table 7-7 for the period from 1971 through 1976. Of particular note is the precipitous decline in regular route passengers and passenger-miles that occurred following the surge in patronage in 1974 due to the effects of the Arab oil embargo. These declines followed closely major general fare increases (see Table 7-8) that total approximately 40 percent between 1974 and 1976 and cannot be linked to competition from Amtrak.

Table 7-6

TRENDS IN PASSENGER MILES, INTERCITY BUS CARRIERS

Year	All Intercity Bus Carriers, Passenger-Miles (Billions)	Class I Carriers, Regular Route Revenue Passenger-Miles Only[1] (Billions)
1966	24.6	15.7
1967	24.9	15.3
1968	24.5	14.6
1969	24.9	14.3
1970	25.3	14.2
1971	25.5	14.1
1972	25.6	13.8
1973	26.4	13.9
1974	26.6	14.7
1975	25.5	13.2
1976	25.1[2]	12.6[2]

[1]1966 through 1968 Class I Regular Route Revenue passenger-miles were extrapolated using the relationship of Class I to All Bus Carriers. Statistics from Interstate Commerce Commission.

[2]Preliminary. Source: Transportation Association of America, Transportation Facts and Trends, Thirteenth Edition, December 1977, ICC Annual Reports.

Table 7-7

OPERATING AND FINANCIAL TRENDS OF CLASS I INTERCITY BUS CARRIERS, 1971-76[1]

Performance Measures	Years					
	1971	1972	1973	1974	1975	1976
Operating Revenues ($ Millions)	758	775	815	933	943	990
Operating Expenses ($ Millions)	664	690	738	859	880	946
Net Income ($ Millions)	65	59	58	56	56	39
Revenue Passenger-Miles, Regular Routes (Millions)	14,104	13,576	13,898	14,667	13,240	12,560
Passenger-Trips, Total (Millions)	167	164	155	169	152	146
Passenger-Trips, Regular Routes Only (Millions)	129	127	119	126	118	112
Total Vehicle Miles Operated (Millions)	856	846	850	886	849	838
Vehicle Miles Operated, Regular Routes Only (Millions)	727	707	704	725	689	672

[1] Contains preliminary measures of some values.

Source: ICC Annual Reports.

Table 7-8

GENERAL INTERSTATE BUS FARE INCREASES GRANTED BY THE ICC, 1971-78

	Years							
	1971	1972	1973	1974	1975	1976	1977	1978
Total Increases Per Year, Percent	5	5	3	22	10	9	11	5
Index	100.0	105.0	108.2	131.9	145.1	158.2	175.6	184.4

Source: National Bus Traffic Association.

Clearly, the intercity bus industry might expect to benefit from a total cessation of intercity rail passenger service, particularly in the highly competitive Northeast Corridor. However, it appears that any short-term gains realized by the industry would do little to stem the steady erosion of the intercity bus market share or the decline of regular route traffic. The evidence available to the Department does not support the contention that Amtrak has been the principal causal factor in the decline of the intercity bus industry, given Amtrak's current market and usage patterns. However, Amtrak's potential adverse impacts on competing carriers, particularly the intercity bus industry, must not be ignored. Consideration of the impacts must become an integral factor in the development of future Amtrak marketing and fare policies.

EMERGING CORRIDORS

A key consideration in discussing the future of rail passenger service is the existence of potential high speed passenger corridors, like the Northeast Corridor (NEC), where the quantifiable public benefits offset the public cost. The NEC not only meets the geographical requirements for a corridor, but enjoys a physical plant and rail operating pattern perfectly fitted to high-frequeccy, high-density operations. The NEC Improvement Project, now underway, will further upgrade Amtrak's facilities and services in the highest-density corridor in the nation. This investment was originally recommended because it was determined that it was less expensive than the costs of providing capacity to meet expected growth in other modes, i.e., highway and air. It is relevant to ask whether there are other potential corridors besides the Northeast Corridor where the alternate public resource costs justify the large capital investment implied in corridor development.

This discussion postulates a set of minimum corridor standards which must be met before a short-haul route becomes a true corridor and also indicates key factors to be addressed in measuring the public benefits associated with a particular proposed corridor investment. The principal corridor studies performed to date are summarized and criticized in light of the standards proposed. Finally, the conclusion is reached that none of the existing studies support additional investment in other corridors, and areas requiring further analysis are identified.

The majority of city-pairs suggested for examination as potential corridors are already operational Amtrak routes. The critical elements in route-to-corridor conversion or in the emergence of a new corridor are: (1) determination of the minimum standards of speed and frequency needed to define a corridor; and (2) relationship of the quantifiable public benefits to the required public investment.

Corridor Standards

A rail passenger corridor must have certain minimum definable characteristics if it is to be seriously considered as an alternative to expanding highway and air capacity. The following characteristics are suggested:

- Speed: Block Speed - 60 mph

  Track Upgrading - Maximum 79 mph

  Rationale: The suggested speed is intended to generate diversion of automobile ridership to the train. Competition with high speed air travel, with the exception of the Northeast Corridor, is impractical and inadvisable for many reasons and should not be attempted. The relative low speed of 60 mph requires the minimum of track upgrading and maintenance costs vis-a-vis the potential benefits. The recommended speed and its maintenance standards are somewhat compatible with slower and heavier freight operations using the same track.

- Frequency: Minimum of 10 trains daily in each direction

  Rationale: Most city-pairs subject to becoming corridors are receiving some level of service by long and/or short-haul trains. Such service is too often typified by infrequent and inconvenient departure times which are not amenable to the need of either the time or fare sensitive traveler. In general, frequency and scheduling should be structured to meet the demand of the traveler desiring to make a one-day round-trip with sufficient time at the point of destination. To provide an alternative to automobile transportation, and limited diversion from air travel, a minimum of five (5) a.m. and five (5) p.m. daylight departures should be scheduled. A variable in the p.m. departure schedule would be an evening train where demand demonstrates such a need. The recommended frequency considers the relative high frequency and volume of other modes of public transportation in suggested corridors. It also assumes that the fare sensitive/nonbusiness automobile traveler is secondary in importance to the higher income business trip traveler. This assumption, nevertheless should not detract from the benefits received by the fare-sensitive passenger and other rider. The suggested frequency represents a minimum level of service for an emerging corridor and is keyed to the frequency level in the Northeast Corridor at which significant diversion began to occur.

- Corridor Location and Distance Boundaries

  The supporting documents vary in their recommendations vis-a-vis corridor dimensions and city-pair characteristics. While a number of routes are examined and evaluated as potential corridors, no final recommendations identifying specific city-pairs are made. Distance between end-points ranges from a minimum of 85 miles (Chicago-to-Milwaukee) to a high of 425 miles (Los Angeles-to-San Francisco). For the purpose of planning, it is recommended that a proposed corridor's maximum length not exceed 250 miles. This prescribed distance is not arbitrarily selected. It is consistent with the accepted premise that a corridor is typified by a high volume of one-day round trips allowing sufficient time during the day at destination.

  An important consideration in the future selection of corridors is population density and distribution along a corridor route. The demand in the NEC is amplified by the concentrated population centers along the route. Conversely, the San Francisco to Los Angeles route is virtually void of major intermediate centers. Thus, the San Francisco-Los Angeles route is less attractive as an emerging corridor than less densely inhabited city-pairs which pass through well-populated urban areas. The West German Republic's 1974 study of the benefits of investments in different types of transportation in three emerging corridors concluded that density of population along the route was of paramount importance to the success of rail passenger transportation. Equally as important is the presence of sufficient total travel demand to provide acceptable load factors to economically justify the minimum rail frequencies necessary to achieve diversion from other modes. Another contributing factor to the development of emerging corridors is the capacity of

other modes to effectively meet travel demands. Sufficient congestion and dwindling energy resources will substantially effect the costs of other modes to the point where rail investments may represent the least public cost.

Measurement of Public Benefits

The decision to expand or build new facilities for the various transportation modes will require heavy investments of public funds. Public sector decisions to make such investments must be based on the comparative costs and benefits of various modes of transportation. In this regard, heavy new investment in corridor rail passenger service may offer some measurable advantages over other modes if sufficient diversion occurs. It is assumed that the advantages of rail will result from the comparison of such rail investments to measurable direct dollar investments required by other modes to adequately meet anticipated corridor travel demands. Indirect benefits, derived from more intangible, but nevertheless beneficial, characteristics such as environmental and safety considerations may under certain circumstances favor rail transportation.

Direct Cost Factors

Airport and highway congestion are publicly perceived as problems requiring resolution. Invariably, their solution will require considerable public sector investment. None of the studies of potential rail corridors surveyed for this report attempted to establish a methodology to comparatively consider the magnitude, advantages, and disadvantages of public investments in alternate transporation modes.

In order to undertake such an analysis properly, the following key cost factors must be precisely identified:

- Basic Costs
  - -- Construction
  - -- Operations, maintenance and administration
  - -- Debt service
- User Financial Contribution
  - -- Percentage distribution by type of use
  - -- Percentage distribution by financial contribution
  - -- Total relationship of user financial contribution to current and projected costs
- Nonuser Financial Contribution
  - -- Tax base diversion to subsidize costs
  - -- Projected nonuser revenue

Indirect Benefits

It is not possible to calculate accurately the economic value of the indirect benefits to the user and to the general public resulting from improved rail passenger service. Nevertheless, the considerations listed below form the nucleus of the economic value of emerging corridors.

- Energy Considerations. Various sources of research have quantified the projected national energy savings resulting from increased rail ridership. The reduced use of energy in transporting passengers by the different modal splits is evidenced in the findings of the Aerospace Corporation's recent Energy Savings Resulting From Modal Shifts to Corridor Rail, and DOT's analyses of Amtrak operations. In both instances, however, the energy savings have so far been more theoretical than actual.

- Accident Rates and Costs. The U.S. National Safety Council has attempted to quantify the overall costs associated with the various modal splits and has conceded that uncertainties make quantification of losses difficult. Table 3-14 provides a comparison of the relative safety of rail transportation over other modes.

- Land Use. The value of right-of-way access has extensive value and represents a major national asset. It is perceived that rail's unencumbered access to the center-city and isolated right-of-way location will be instrumental in relieving urban congestion.

- Environmental Considerations. Extensive utilization of intercity rail passenger service will result in lessening air and noise pollution problems.

- Social Mobility and Access. Rail passenger transportation, with its centralized depot locations, serves the transportation needs of disadvantaged urban dwellers and those citizens who are either unable or unwilling to use air transportation

A Review of Corridor Studies

System Development Plan - Amtrak Five-Year Plan

Amtrak's Five-Year Plan presented a summary of a year long, detailed study of three potential corridors:

- Chicago to Detroit
- Los Angeles to San Diego
- Dallas-Fort Worth-Houston-San Antonio

For the first two, different speed and frequency assumptions were presented with the estimated ridership increases and increased costs. The best option from an operating point of view is Chicago-to-Detroit with a forecast reduction in the total per passenger-mile deficit of 17.1 percent, from 19 cents to 16 cents, with an increase in the overall deficit of 63 percent. Capital costs would be $47 million. In the Los Angeles-San Diego case, where several of the

corridor attributes are already in place (e.g., six round trips a day), the best option, increasing speed to 55 mph and frequencies to seven per day, would decrease the avoidable deficit per passenger-mile in constant dollars by 30 percent. The total deficit would increase 52 percent, and capital costs would amount to $16.9 million.

The quantifiable public benefits of the necessary investments to achieve Amtrak's best case were not evaluated. The corridors may be acceptable as trade-ups, but detailed analysis is needed.

Aerospace Study[1]

Aerospace used a complex economic and statistical approach to calculate the cost/benefit ratios and National Net Economic Benefits of upgrading ten corridors, selected on the basis of SMSA populations, Amtrak ridership data, and potential ridership demand. The upgrading costs of the selected corridors were obtained from NEC, CALTRANS, and USRA and were calculated with the assumptions that all track was upgraded to a maximum speed of 150 mph, the entire system was electrified, and that all track was refurbished with concrete ties. The findings of Aerospace indicate that with the exception of NEC, where population density is extremely high, the Net National Economic Benefits are negative for all corridors considered. The validity of this conclusion may be questioned in light of the fact that the cost of upgrading track increases proportionately with the speed desired. It appears that the speed and level of upgrading associated with the Aerospace study is not needed to divert ridership from the automobile, which presumably carries the majority of the

United States Railway Association Study[2]

Appendix G of the USRA's Preliminary System Plan proposes an interconnecting network of 18 corridors with their respective frequencies. Of the 18 corridors proposed, six are now without rail service. The strategy behind the proposed network is to create diversion from the price-sensitive automobile market by providing reasonably fast service (slightly higher than 55 mph) and fares. Some emphasis is placed on diverting ridership from the time-sensitive business sector by providing low sensity seating parlor cars and selecting routes where it is assumed downtown to downtown elapsed times compare favorably with those of air travel. The economic benefits derived emanate from increased ridership calculated and projected from the 65 percent load factor of the Chicago-Detroit route, and an assumed lower deficit per passenger-mile. The document addresses the issue of upgrading the right-of-way but does not establish costs of upgrading nor does it suggest a block speed for the improved right-of-way.

None of the studies reviewed were supportive of the economic feasibility of rail passenger corrdiors. It may be concluded from them that the prospects for emerging corridors, with the exception of the Northeast Corridor, are not encouraging under prevailing conditions. This determination should be balanced by the consideration that all of the studies were conceptual and preliminary.

---

[1]Aerospace Corporation for FRA, Passenger Rail Corridor Upgrading Study, November 1977.

[2]United States Railway Association, Preliminary System Plan, Volume I, Appendix G. "Concept for Improved Passenger Service."

The documents reviewed concentrated extensively on the economic implications and feasibility of rail passenger services in emerging corridors. They did not comparatively consider the public costs, benefits, and advantages of rail service versus other transportation modes. No effort was made to assess the impact of future travel demands or the limitations of energy and congestion on other modes of transportation and how these factors may influence rail passenger travel.

The recommendations of all of the studies in the Department's judgment, display insufficient concern with controlling upgrading and maintenance costs and confining competition to the private automobile. Whether any corridors should be selected for increased and upgraded rail service, and if so, what corridors, is in the view of the Department still open to question.

COMMUTER SERVICE

The Rail Passenger Service Act of 1970 as amended states that Amtrak will provide intercity rail passenger service (Section 301). In Section 102, the phrase intercity rail passenger service is defined as "all rail passenger service other than commuter and other short-haul service in metropolitan or suburban areas, usually characterized by reduced-fare, multiple-ride and commutation tickets, and by morning and evening peak-period operation." Thus, Congress appeared to exclude Amtrak from the provision of commuter and suburban trains which may link various cities with their suburbs. Although the legitimate interests and needs of commuters and suburban passengers are obviously of equal importance to those of intercity passengers, it was felt in 1971 that other agencies and instruments than Amtrak should have responsibilities toward them.

Nevertheless, in inheriting and perpetuating the operating patterns and practices of its predecessor carriers, and in developing new service of its own, Amtrak has raised some commuter-related questions which deserve public scrutiny and comment. These questions include:

- Does Amtrak provide commuter services?
- If so, should Amtrak be allowed to continue to provide such services?
- If Amtrak is to continue as a commuter carrier, should the incremental losses and incremental capital investment pertaining to commuter service continue to be funded from intercity funds supplied by the general taxpayer?

History

In 1971, a division took place between suburban trains (which remained the responsibility of such private railroad companies as the Penn Central) and intercity trains, which became Amtrak's responsibility. However, in such areas as the Harrisburg-to-Philadelphia and Philadelphia-to-New York routes, Amtrak inherited intercity trains on which commutation discount tickets had been accepted for many years.

On its trains traversing routes over which suburban services were concurrently operating, Amtrak elected to continue the practice of accepting the commutation discount tickets sold by the railroads operating suburban trains. In addition, Amtrak established new services which supplemented existing suburban operations (for example, Washington-to-Cumberland; New York-to-Harrisburg) and on which discount commutation tickets were accepted. Amtrak also established new trains (for example, Jackson-to-Detroit) on which it issued its own commutation-type tickets.

The Current Situation

By accepting commuter discount tickets on its own trains, by incurring the incremental cost of providing the capacity to handle those commuters, and by continuing its own, recently-established commuter trains, Amtrak definitely provides commuter services. In the NEC, Table 7-9 shows that the heavily commuter New York-Philadelphia trains have overall financial results far worse than other locomotive-hauled trains (primarily Boston-Washington), which handle a small number of commuters. One reason for this performance gap is the revenue per passenger-mile, which is 35 percent lower on New York-

Philadelphia than on other locomotive-hauled trains, despite single fares higher than on most routes. Likewise, on the Washington-Martinsburg run, the revenue per passenger-mile (1977) is 4.5 cents, 35 percent below the Amtrak average of 6.9 cents.

Not only does the acceptance of commutation tickets lower yields, but it also implies significant capital investment. A 14-car train from Philadelphia to New York in the morning, on which half the passengers are commuters, requires the purchase of seven cars just to handle the commuter trade. Because of the peak nature of the commuter business, the length of the trip, the flow of the traffic, and other NEC equipment considerations, these seven cars are likely to be idle for the rest of the day. Similar situations exist elsewhere; virtually all of the Washington-Martinsburg equipment (serving a route comprising 80 percent commuters) is a commuter investment. Both the operating and the capital cost implications of Amtrak's commuter policies are therefore significant.

On May 1, 1978, Amtrak plans to establish a local passenger train from Philadelphia to Washington in the morning, returning in the evening, providing service from ten stations (including seven not now served by Amtrak) to Baltimore and Washington, and return. This train appears to be intended largely for commuters, although commutation-type fares have not at this writing been established from all stations. A local passenger train similar to the above is planned to run from New Haven and New London to Providence and Boston in the morning and back in the evening.

Implications of Amtrak Commuter Operations

The Department of Transportation considers the question of Amtrak commuter operations to merit careful scrutiny. The following aspects of the issue should be taken into consideration, among others:

- There are other Federal and State programs to help support commuter service, including Federal aid available to the States and commuter authorities under section 5 of the Urban Mass Transportation Act of 1964, as amended.

- Commutation traffic is not always compatible with providing optimum intercity service. For example, the heavy commutation travel on Amtrak's Philadelphia-New York trains may have prevented the mounting of the best possible intercity service at standard fares between these two large cities. Much or most of this commutation traffic is from stations in New Jersey to Newark and New York, entirely within the Trenton-New York commuter zone. The additional stops and heavy loadings, not to mention the different ambiance of a train of commuters as compared with a train with mostly single-fare, occsional riders, many with luggage, may be enough to render the trains unattractive to through passengers between Philadelphia and Newark/New York paying regular fares.

- Fares low enough to enable commutation (daily travel to and from work) are widely agreed to be unremunerative. Furthermore, owing to the low commutation fares, commuters receive a disproportionately large subsidy per mile as compared with Amtrak's regular-fare passengers.

Table 7-9

Comparison of Results for NEC Trains

Route	Ratio of Commuter Passenger-Trips to Total	Revenue per Passenger-Mile (Cents)	Avoidable Cost Per Passenger-Mile	Avoidable Profit (Loss) per Passenger-Mile
NYC-Philadelphia	.57[a]	5.3	7.1	(1.8)
Other NEC Loco-Hauled[b]	.11	8.1	7.4	0.6

[a]Commuter trips are mostly from Trenton, Princeton Junction, and New Brunswick to Newark and New York--comparatively few are from Philadelphia.

[b]Amfleet trains between Boston, New York, and Washington.

SOURCE: Passenger-trip ratio is from ICC, Effectiveness of the Act. Other figures are from Amtrak Financial Planning Department.

NOTE: Minor discrepancies are due to rounding.

- The carrying of commuters is a different business from the carrying of intercity passengers. Its marketing, scheduling and equipment requirements are all different from intercity requirements.

Departmental Perspective

In view of the considerations outlined above, the Department submits for public comment the following perspective on Amtrak-provided commuter services.

- The incremental costs associated with the operation of commuter trains and with the acceptance of commutation discount tickets on intercity trains are not legitimate uses of intercity rail passenger subsidies funded by the general taxpayer.

- A mechanism is needed for the orderly transfer of existing Amtrak commuter-type trains to operation by the appropriate State or local authority.

- Nevertheless, Amtrak may, under certain specific circumstances, be in a position to conduct commuter operations and transport commutation ticket-holders more efficiently than could other carriers.

- Therefore, mechanisms should also be established to permit State, local or regional commuter authorities to reimburse Amtrak for the difference between the prorated commutation ticket amount per ride and Amtrak's one-way fare for the same journey.

- A detailed study should be conducted by the Department and Amtrak to isolate the incremental capital and operating costs of Amtrak commuter service and to develop reimbursement formulas. The study will include the impact of Amtrak handling commuters under contract for State and local authorities.

- Pending the establishment of the necessary mechanisms and reinbursement policies, Amtrak should not, under the circumstances, expand its existing commuter operations, much less add new services dedicated primarily to commuters.

SLEEPING CAR AND AUXILIARY SERVICES

Introduction

The provision of sleeping car and auxiliary services, which include any service on a long-haul train other than ordinary coach services, has a significant impact on Amtrak's operating budget. "Sleeping car and auxiliary services" principally include:

- Sleeping car and slumbercoach service.
- Food and beverage service (diners, lounges, etc.).
- Baggage and mail service.

The extent to which Amtrak should be providing such services, the types of services which should be provided and the ways in which their financial performance can be improved will be considered by the Department in formulating final route structure recommendations to the Congress. A primary objective in developing such recommendations will be to establish a fare structure associated with first class services designed to generate sufficient revenues to cover the incremental costs of providing those services.

Existing Situation

The results of an analysis of sleeping car and auxiliary services on seven long-distance routes are set forth in Tables 7-10 and 7-11. The services examined accounted for 57 percent of the total revenue earned from Amtrak long-distance service in FY 1977 and incurred 54 percent of the fully allocated costs of such service.

The costing approach taken assumed that the train would run in coach-only service and that no added engine power or train crew would be required to run a sleeping car, dining or lounge car, or baggage/mail service car. Also, "off the train" costs (e.g., station costs, payments for maintenance of way, administration costs, etc.) were not considered nor were any additional fuel consumption or switching costs due to additional vehicles. Most importantly, it was assumed that adequate equipment was available and no depreciation charges for that equipment were reflected.

Using this direct cost approach, only 35 percent of fully allocated costs were taken into account; the remaining 65 percent of costs would, broadly speaking, be unaffected by a decision on whether or not to run a sleeping car or other auxiliary services, provided there is sufficient equipment available.

Coach Service

It may be noted from Tables 7-10 and 7-11 that coach service yields much better financial results than any other category of service. However, this does not mean that a coach-only service should be operated to the exclusion of other types of service. Provided that existing sleeping cars and baggage/mail cars yield a positive contribution over their direct costs of operation, then it is appropriate to continue to operate trains in more than coach-only service. The provision of catering services, while incurring a substantial loss itself, will have a material effect on the total volume of traffic carried. Thus, some form of catering service should also continue although prices need to be adjusted.

Table 7-10

Estimated Annual Cost and Revenue
During FY 1977 for Routes Analyzed

Item	Type of Car: Coach	Sleeper	Dining and Lounge	Baggage	Total
Revenue ($000's)	63,252	20,820	8,268	3,828	96,168
Direct Costs ($000's)	29,628	18,324	41,616	3,756	93,324
Contribution ($000's) (Parentheses denote a deficit)	33,624	2,496	(33,348)	72	2,844
Revenue/Cost Ratios	2.13	1.14	0.20	1.02	1.03

Table 7-11

Contribution Per Car
During FY 1977 for Routes Analyzed

Item	Type of Car: Coach	Sleeper	Dining and Lounge	Baggage	Total
Total Car Requirement[1]	281	121	133	70	605
Contribution Per Car ($) (Parentheses denote a deficit)	119,658	20,628	(250,737)	1,029	4,700

[1]The number of cars is that required to operate the peak service. It includes a protect factor for maintenance. Cars required for a very small number of journeys at high peaks are assumed to come out of the protect factor.

NOTE: The trains analyzed were: Trains 3 and 4 (Chicago-Los Angeles); Trains 7 and 8 (Chicago-Seattle (N)); Trains 11 and 14 (Seattle-Los Angeles); Train 41 (New York/Washington-Chicago); Train 51 (Washington-Chicago); Train 59 (Chicago-New Orleans); and Trains 81, 83, 85 and 87 (New York-Florida).

Sleeping Cars

Provided that: (1) most current sleeping car passengers ceased to travel by rail were sleeping car service withdrawn; and, (2) the deficit on catering services is lower with these sleeping car passengers than it would be without them, then it will pay to retain most sleeping car routes.

With reference to Table 7-12, the reasons for sleeping cars performing less satisfactorily than coaches are:

(1) The cost of providing a berth-mile in a sleeping car is 2.2 cents higher than the cost of providing a seat-mile in a coach; but

(2) The revenue per berth-mile in a sleeping car is only 1.3 cents higher than the revenue per seat-mile in a coach; hence

(3) The much lower contribution from sleeping cars than from coaches.

Sleeping car performance could be improved if:

(1) Surcharges were imposed on some routes in peak periods where (a) there is evidence of substantial frustrated demand for sleeping accommodations and (b) sleeping car equipment is not available elsewhere in the Amtrak system.

(2) Stricter controls were placed on railroad pass ridership in sleepers at peak periods.

(3) The catering facilities were charged the full cost (in terms of traffic revenue foregone) of blocking-off space in sleeping cars for certain catering staff.

(4) Better off-peak load factors could be achieved by means of discount prices on sleeping accommodations where the market indicated that this might increase total revenues.

Dining and Lounge Services

Expanding the costs and revenues associated with existing dining and lounge services as set forth in Table 7-10, it is estimated that Amtrak incurred an incremental loss of $60 to $65 million from the operation of dining and lounge services on long-distance routes during 1977. The costs are estimated to be composed of 40 percent labor, 40 percent maintenance of equipment and 20 percent supplies.

It was not possible to isolate the relative ratios of revenue to incremental costs for lounge cars as opposed to dining cars. While lounge cars have much lower staffing requirements than diners, they cost a similar amount to maintain and earn far less revenue.

It does appear that Amtrak's on-board food and beverage prices over the last few years have not kept pace with cost increases or other price increases.

Despite their heavy direct financial losses, total removal of dining and lounge services would probably gravely damage ridership on long-distance

Table 7-12

Estimated Revenues per Passenger Mile
and Revenues, Costs and Contributions per Seat/Berth-Mile
During FY 1977 for Routes Analysed

Item	Sleeper	Coach	Sleeper compared with Coach (Index: coach=100)
Revenue per Passenger Mile (cents	7.6	4.6	165
Load Factor (%)	53 [1]	58	91
Revenue per Seat/Berth Mile (cents)	4.0	2.7	148
Fully-Allocated Costs per Seat/Berth Mile [2] (cents)	10.5	9.1	115
Direct contributions per Seat/Berth Mile (cents)	3.5	1.3	269
Contributions per Seat/Berth Mile (cents)	0.5	1.4	36

Notes : [1] In the case of sleeping car berths, the load factor is computed after deducting space blocked off for the use of on-board staff.

[2] Includes all other costs not specifically attributable to sleeper or coach (i.e. dining and luggage service and other indirect costs), which have been spread between coach and sleeper in proportion to passenger mileage.

trains. However, actions should be taken to rationalize the service offered and to contain and reduce the losses being incurred. Possible actions to contain and reduce the deficit on dining and lounge services include:

- Experiment, where appropriate, with reduced or modified forms of dining and lounge service.

- Increase prices on food and drink served on trains, particularly where full attendant service is retained.

- Design any new dining cars so that they can be operated with a minimum staffing level commensurate with the service being offered.

The whole question of a potential long-distance passenger's awareness of the services available and the prices he is likely to be charged for food and drink needs study in terms of that potential passenger's motivation to ride a train.

Baggage and Mail Services

Tables 7-10 and 7-11 indicate a modest net contribution to overhead from the baggage/mail cars on the seven routes examined during FY 1977--given the costing approach used.

It may be concluded that mail and express service has the potential for increasing net revenues if:

(1) Fully depreciated equipment is available.

(2) Adding baggage/mail cars will not require added power or replace passenger equipment generating greater net revenues.

(3) Containerization enables the economics of Amtrak mail service to be improved.

New Equipment

An important constraint on the conclusions drawn from an analysis of the current situation on long-haul routes is the planned introduction by Amtrak of a fleet of new Superliner cars to cover the Western long-haul routes. These new cars (ignoring capital charges) should improve the day-to-day financial position of these services. Particular points of comparison between the Superliners and the older low-level cars are:

- On some routes there will be a significant change in the capacity of a train and in the proportion of available revenue seats to available sleeping berths.

- The configuration of the new Superliner sleeping car differs from older sleeping cars in that no single units will be specifically offered. This will require the single traveler seeking a private sleeping accommodation to be accommodated in a twin berth accommodation. However, more total passengers can be accommodated.

- A careful study will be needed of the different characteristics of each Superliner car type as compared with the conventional low-level car type it replaces. The final allocation of cars by car type to the different routes and the pricing patterns developed must be complementary. The object should be to maximize the contribution per car per annum.

- Within the sample of long-haul services examined it was not possible to isolate the effect of the more modest dining and lounge services on routes where Amfleet equipment was introduced during Fiscal 1977 (Chicago-New Orleans and Chicago-Washington). On the Chicago-New Orleans service there is some evidence that the ratio of revenue to incremental costs has improved; on the Chicago-Washington service too many other factors changed at the same time to determine with any precision the effect of the Amfleet equipment on the dining and lounge services.

- The cost of food service in diners could change significantly with the introduction of Superliner cars. It is essential that the cost of food service be reduced on the train without an offsetting increase in commissary expenses. In this area one possibility for experimentation might be to offer two types of food service where practicable, namely:

  -- A limited accommodation full food service facility offered at higher prices.

  -- A higher volume self-service food facility at somewhat lower prices.

Any experimentation with a split level of service concept as outlined above might be constrained by the layout and design of existing cars and of the new Superliner cars under construction. However, the idea merits further exploration both in this context and for any future proposal for new low-level cars for the Eastern long-distance services.

AMTRAK: INSTITUTIONAL ARRANGEMENTS AND PROBLEMS

Background

The Rail Passenger Service Act established Amtrak in 1970 as a for-profit, District of Columbia corporation and mixed-ownership corporation under the Government Corporations Control Act. Amtrak is governed by a thirteen-member board of directors, comprised of three members elected by Amtrak's railroad shareholders, eight members appointed by the President of the United States subject to Senate confirmation, the Secretary of Transportation and the President of Amtrak. While represented on Amtrak's Board of Directors in the person of the Secretary of Transportation, the Executive Branch casts but one vote among the current thirteen.

Originally, to facilitate the achievement of profitability, Amtrak was freed of many of the rules and regulations applied to other common carriers and to other programs funded and administered by the Federal Government. In the first several years of Amtrak's existence, those freedoms were extended by the Congress, principally as a result of policy and budget-related conflicts between the Executive Branch and Amtrak. Today, the Department has little substantive control over the Amtrak budget and less over Amtrak's use of funds. While Federal assistance for Amtrak is appropriated to the Secretary, Amtrak submits its budget requests concurrently to the Congress without the Department's review or concurrence.

The Problem

Given the original expectation for eventual profitability, Amtrak's corporate structure and institutional relationship with the Federal Government may have been appropriate. They must be reconsidered, however, in light of the realization that there is no longer any reasonable prospect that Amtrak will be able to sustain its operations from revenues, and that the need for public financial assistance is likely to continue to increase. On the one hand, because Amtrak is, of necessity, so heavily subsidized by Federal funds, the Corporation lacks both the flexibility and independence typically exhibited by private, for-profit corporations as well as the incentives for innovation and fiscal discipline provided by the interplay of competitive market forces. On the other hand, because of its institutional relationships, Amtrak has not received the type of policy and fiscal guidance from either the Executive Branch or the Congress which a normal Federally funded program receives through the budget process.

The effects of the current arrangements have been many, principal among them being:

- The Department of Transportation, which receives appropriations for Amtrak and is accountable to the President and the Congress for adhering to the Federal budget, has limited control over the expenditures of Amtrak.

- The Amtrak Board of Directors, which controls Amtrak's expenditures, is not technically accountable for adherence to the Federal budget once funds are advanced to them. Further, because Amtrak is not directly subject to the Anti-Deficiency Act, management has the leeway to incur a level of expense or indebtedness in excess of available appropriations, subject to Executive Branch control only to the extent that it can be exercised through the quarterly apportionment process.

- The Congress and the Administration are often put in the untenable situation of having to provide supplemental subsidies or have the trains stop running.

This set of circumstances substantially aggravates the many difficult problems already confronting Amtrak's management and Board in the normal course of maintaining daily operations.

It has become evident that the Amtrak Board, operating within its current framework, cannot and should not be expected to consider and resolve the many broad public policy issues concerning Federal financial assistance for intercity passenger transportation; e.g., the effects of subsidized competition on other modes, efficiency in allocating limited Federal transportation resources, and energy conservation. Yet, as the Federal commitment to support Amtrak's intercity rail passenger operations has grown, both relatively and absolutely, these public policy issues have rightfully assumed far greater importance. Today, these issues are perceived by many to be equal in consequence to those relating directly to the technical operation of Amtrak as a railroad.

The Options

Taking into account these considerations, it would seem to be both desirable and proper for the Federal Government to exert greater control over Amtrak's budget and to have more ability to influence the policy framework within which management's decisions are made. Various degrees of increased Federal Government control and accountability are suggested by the options summarized in Table 7-13 and outlined below, not all of which are mutually exclusive.

In considering the options, there are several matters which are fundamental to achieving an acceptable solution: (1) The present institutional arrangements are no longer appropriate in view of Amtrak's dependence on Federal support; (2) proper lines of accountability to the Federal Government for the proper management of Federal funds must be established; (3) Federal Government policy direction and control must be more clearly focused; and (4) to the extent possible consistent with achieving the above, the flexibility of the corporate form should be retained.

Option 1. Retain the same basic corporate structure for Amtrak, but give the Government stronger financial controls by strengthening the spending, capital, and budgetary "guidelines" provisions of sections 601 and 602 of the Rail Passenger Service Act. This alternative would extend

Table 7-13
COMPARISON OF PRINCIPAL FEATURES OF INSTITUTIONAL ALTERNATIVES

Option	Corporate Structure	Size and Compositon of Board	Role of Board	Control of Corporation Management	Budget Related Accountability	Funding Mechanisms
1 "Guidelines"	No Change	No Change	No Change	No Change	No Change	No Change
2 "Finance Committee"	Wholly Owned Government Corporation	Retire common stock. Replace stockholder members with public members. Add Secretary of Treasury	Finance Committee controls budget. Remainder of Board role unchanged	No Change	Corporation subject to Anti-Deficiency Act	Fund full expenses through DOT. Revenues go to general fund of the Treasury
3 "TVA"	"	Retire common stock. 3-5 member full fime Federal Board	No Change	No Change	"	Same as above except funds appropriated directly to Corporation
4 "Three Man Board"	No Change	3 member Board composed of Secretaries of Treasury and Transportation and one member elected by stockholders	No Change	No Change	No Change	No change except revenues deposited with Treasury in a revolving fund with deficit appropriation and disbursed as needed
5 "St. Lawrence Seaway"	Wholly Owned Government Corporation	Retire common stock. Abolish Board	-	Administrator of Corporation would report to Secretary of Transportation	Same as other Federal Agencies	Fund full expenses through DOT. Revenue deposited in general fund of Treasury
6 "Government Corporation"	Wholly Owned Government Corporation	Retire common stock. Replace 3 stockholder members with industry representatives	No Change	No Change	Corporation subject to Anti-Deficiency Statute	Fund full expenses through DOT. Revenue deposited in general fund of Treasury
7 "Federal Agency"	Abolish Corporate structure. Employees become Civil Servants	Retire common stock. Abolish Board	-	Secretary of Transportation	Same as other Federal Agencies	Fund full expenses through DOT. Revenue deposited in general fund of Treasury

a minimum of control over Amtrak. It would give Amtrak somewhat clearer guidance from the Executive Branch and would give the Executive Branch and Congress a better picture of Amtrak's likely prospects (on the assumption that Amtrak's budgetary planning would improve). It would not make the Amtrak Board of Directors accountable for the public funds Amtrak receives.

Option 2. Make Amtrak a wholly-owned Government corporation and place the Government in control of Amtrak's budgetary and financial affairs. Amtrak's finances could be controlled by a finance committee of the Board of Directors which would comprise the Secretary of Transportation, the Secretary of the Treasury, and one other director (this would necessitate adding the Secretary of Treasury to the Board). The finance committee would formulate Amtrak's budget and control its finances; the full Board would be unable to overrule decisions of the finance committee. Amtrak's expenses would be paid entirely from appropriations and all revenues would be deposited in the general fund of the Treasury.

This alternative would make Amtrak fiscally accountable for living within the Federal budget. The uncertainty associated with forecasting revenues would be eliminated from the budget process and Amtrak's management throughout any given fiscal year would have to operate the system in such a manner as to live within appropriated funds. With Congressional approval to treat Amtrak as a Federal agency for all financial purposes, Amtrak would receive benefit from much more detailed policy and fiscal guidance from the Executive Branch. On the other hand, this arrangement has the potential of involving the Executive Branch excessively in Amtrak's daily operations.

Option 3. Restructure Amtrak as a wholly-owned Government corporation having a structure similar to the Tennessee Valley Authority. The Board of Directors would comprise three to five full-time members appointed by the President. The Secretary of Transportation would not be a member of the Board. Amtrak's budget would be submitted through the Department, but that would be the full extent of the formal relationship between Amtrak and the Department. Amtrak's expenses would be funded entirely from appropriations (unlike TVA) and its revenues would be deposited in the U.S. Treasury.

This arrangement would also make Amtrak fiscally accountable for living within the Federal budget. A full-time Board of Directors would be able to monitor and control Amtrak's activities to a degree that a part-time board cannot match. The Executive Branch and Congress would give policy guidance only through the budget process. This option would entail major changes in Amtrak's organization and working arrangement with the Federal Government.

Option 4. Change Amtrak as proposed in H.R. 11089 (pending before the Congress). The Board of Directors would consist of the Secretary of the Treasury, the Secretary of Transportation and a Director elected by the stockholders. Amtrak's expenses would be paid from an operating account in the U.S. Treasury, into which all Amtrak revenues and all appropriations for Amtrak would be deposited.

This approach would not provide the detailed oversight that could be given by full-time directors. Neither would it eliminate the necessity of speculating about the next year's revenues in order to determine the correct amount to appropriate for that year. The Board would lack the diversity of membership and perspective that now exists. The Executive Branch would become deeply involved in the management of railroad operations.

Option 5. Restructure Amtrak into a wholly-owned Government corporation like the St. Lawrence Seaway Development Corporation. There would be no Board of Directors. A Presidentially appointed Administrator would be responsible for key decisions and their implementation. The Administrator would be directly responsible to the Secretary of Transportation. Amtrak would be funded like a Federal agency. There would be an outside advisory council to assist in policy formation.

This approach offers the greatest administrative flexibility and the most direct policy guidance. Responsibility for living within the Federal budget would be achieved. It would be less likely, however, for a variety of views to be taken into account in the formulation of programs and the development of routes and services.

Option 6. Make Amtrak a wholly-owned Government corporation. Retain the current Board of Directors, with the exception of the three directors elected by the shareholders. Funds would be appropriated directly to Amtrak. All Amtrak expenses would be paid from appropriations and all Amtrak revenues would be deposited in the Treasury.

This arrangement would make Amtrak responsible for living within the Federal budget while retaining diverse representation on the Board of Directors. The Executive Branch and Congress could provide suitable policy guidance through the budget process.

Option 7. Make Amtrak a subagency of the Department of Transportation. This alternative would make Amtrak responsible for living within the Federal budget and would insure direct and effective policy guidance from both the Executive Branch and Congress. It presents serious implementation problems, however, because Government agencies are not structured to operate common carriers efficiently. Amtrak's employees would become civil servants, and the flexibility of the corporate form would be lost.

Implementation

In order to accomplish any of the alternatives requiring Amtrak to be a wholly-owned Government corporation, a number of legislative actions are required. First, the Government Corporations Control Act must be amended to add Amtrak to the list of wholly-owned Government corporations and to strike Amtrak from the list of mixed-ownership Government corporations. Second, the Rail Passenger Service Act must be amended to effect the change in the corporation's character and the changes, if any, in its Board of Directors and officers, to require the retirement of the outstanding stock, to subject

and its employees to the Anti-Deficiency Act, to reflect the changes in Amtrak's funding mechanism and spending authority, and to require Amtrak to deposit its funds in the general fund of the Treasury. It would also be desirable to legislatively exempt Amtrak from the Federal Tort Claims Act.

Appendix A

ROUTE SELECTION SCREENING PROCESS

As part of the route study process, total intercity travel potential in the United States was reviewed in order to identify markets with high or low potential for intercity rail passenger service.

As background for this effort the state-of-the-art in intercity travel demand forecasting was reviewed to identify the sensitivities of passenger demand to demographic and service variables. This work led to the conclusion that no single modeling effort would yield definitive results. However, it was felt models giving a general indication of demand could be useful in identifying potential service markets.

The market screening process was carried out in two phases. They have been termed market analysis and system analysis.

MARKET ANALYSIS

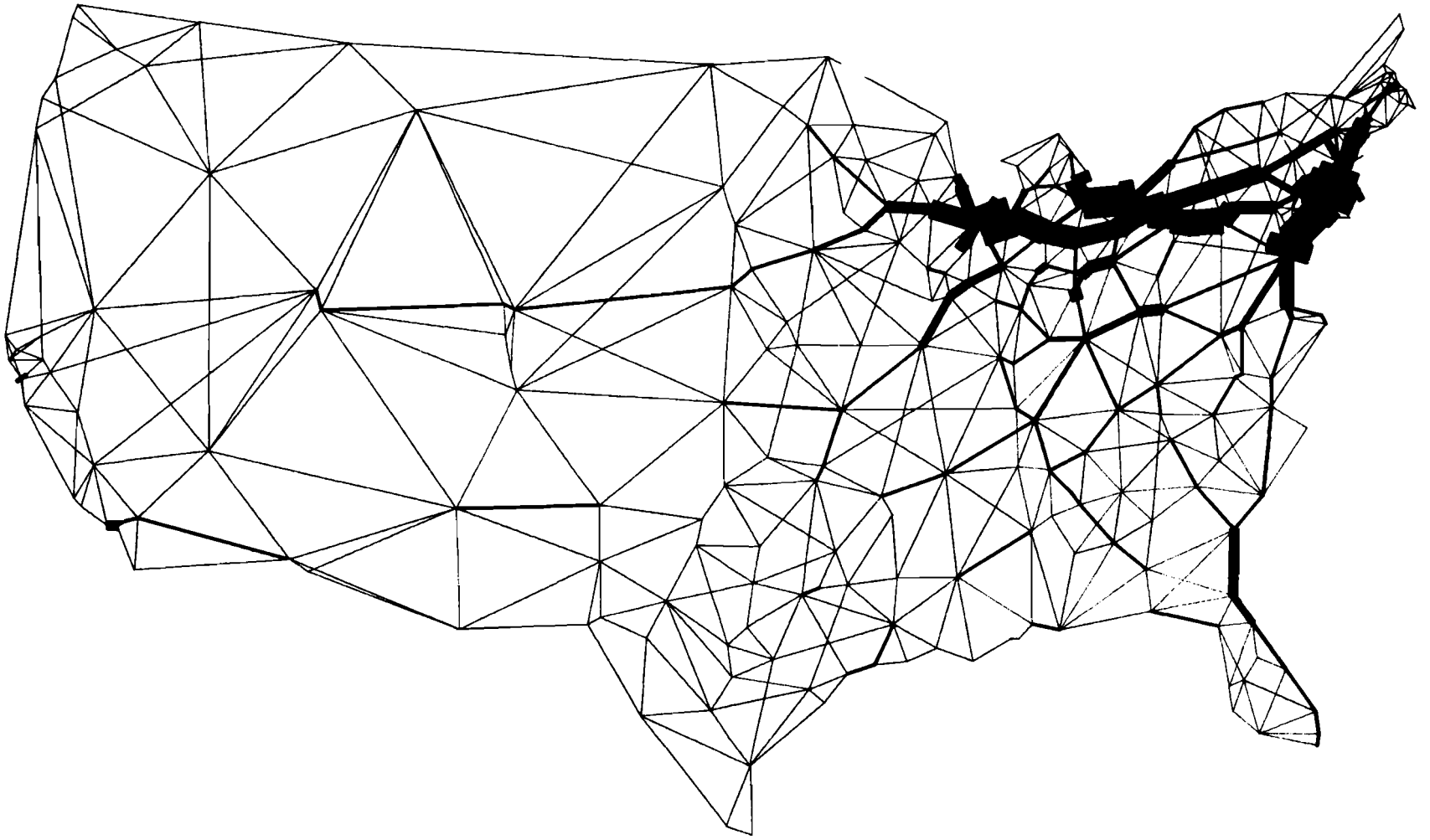
The market analysis involved an analysis of intercity travel demand from the point of view of: (1) total demand potential; (2) service to low income and carless populations; and (3) the special travel markets involving vacation and business travel. In this work, the 1980 projections of Standard Metropolitan Statistical Areas (SMSA's) were used along with the straight line distance between SMSA's to construct total transportation demand potential indices for each market type. The formulations used were based on the review of the literature and are typified by the following for total demand potential:

$$\text{Demand Potential} = \frac{\sqrt{\text{Population (O) x Population (D)}}}{(\text{Distance (O-D)})^{1.33}}$$

where Population (O) and (D) are the 1980 populations of the origin and destination SMSA's and Distance (O-D) is the straight line distance between the SMSA's. The use of the square root of the population product term was selected since it produces fewer trips per capita as city size increases, a characteristic of intercity travel. The power of 1.33 for distance has the effect of reproducing the average trip distance of current Amtrak travel. This equation was applied to all SMSA combinations and the cumulative demand displayed on a network obtained by interconnecting adjacent SMSA's. The results of this analysis are displayed in Figure A-1. It can be seen that the prime corridors of total demand potential are located in the northeast and between the northeast and Chicago.

Figure A-1

CORRIDOR DEMAND POTENTIAL



Similar analyses were conducted using low income and carless population as measures of the social need that might be served by Amtrak. When analyzed using SMSA level data, the proportion of the population falling into these groups was nearly uniform. This resulted in essentially the same markets being identified as when total population was utilized. Two formulations were developed to deal with recreation, vacation, and business-related travel. The first measured the interaction between population and hotels and motels (measured in terms of hotel and motel receipts). The second used census data on professional and managerial workers as a measure of business travel. With few exceptions, the same markets were again identified. As a result of this analysis it was concluded that the total population index was an adequate measure of potential travel desire and that the special stratifications did not require further analysis.

SYSTEMS ANALYSIS

It was felt that the alternative system concepts to be analyzed in depth should be an output of a screening process rather than predetermined. Thus, a system analysis procedure was designed to screen potential markets not now being served by Amtrak. A computerized process was used that included a number of simplifying assumptions. The process was geared toward producing estimates of total intercity travel potential for various candidate rail routes.

This approach led to the use of national networks in which total travel demand by all modes was assigned over the combination of rail lines which would provide service with minimum travel time. The section by section travel times used were based on 1977 operating schedules or the most recently available scheduled operating results. Transfers were allowed without time penalty between railroads at all points of intersection. If a heavy volume results for a particular movement, it provides an indication of a potential total travel demand along a particular route. Assuming that cost, institutional considerations, and alternative mode service considerations are also favorable some reasonable potential for intercity rail service may be surmised.

A considerable number of alternative networks were tested. Network One, shown in Figure A-2, is the most extensive network tested, consisting of 36,771 route-miles serving 220 SMSA's.[1]

The demand potential indices were produced for SMSA's served by the network. They were then loaded onto the network using the minimum travel time principle discussed above. The results are shown in Figure A-3. The corridors shown in the heavier lines are those with the greater demand potential with the width of the line being proportional to the demand index

---

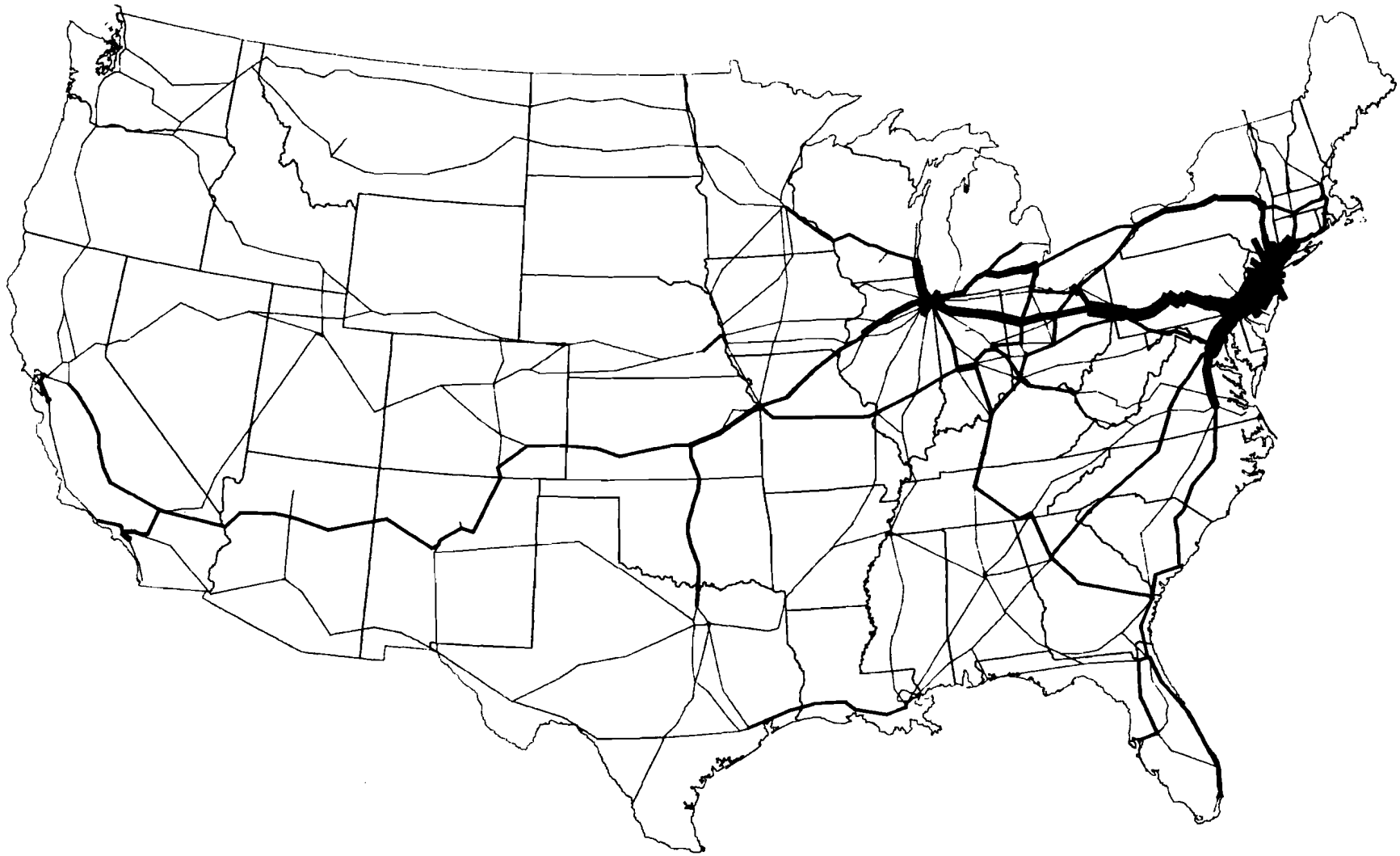
[1] An SMSA is considered to be served if its activity center is within 25 miles of rail passenger service.

Figure A-2

NETWORK ONE

Figure A-3

NETWORK ONE DEMAND POTENTIAL



(between 90 and 2,000 units). Those corridors indicated by a light line,were found to have a lower demand potential (less than 90 units). The figure does not include travel between the United States and Canada, nor travel to areas outside of SMSA's.

It should be clearly understood that the procedure described above was designed to be utilized only as a screening mechanism to identify routes for more detailed costing and demand analysis. Only through this more detailed analysis (considering proposed train consists and operating policies), could patronage, costs, and revenues be forecast with sufficient accuracy for the purposes of this study.

Appendix B

PATRONAGE AND REVENUE ESTIMATES

OVERVIEW

In order to evaluate alternative route systems it was necessary to develop patronage and revenue estimates for both existing and new markets. The Department of Transportation retained the firm of Peat, Marwick, Mitchell & Co. (PMM) to develop those estimates.

Base year 1977 patronage estimates for markets included within the recommended system and the alternative systems evaluated were developed using historical ridership information and a demand model developed during the course of the study. Where the routes under examination were identical to those operated by Amtrak during FY 1977, the FY 1977 ridership was analyzed and adjusted to compensate for changes resulting from improved schedules or reliability or for adjustments in routings. Historical patronage derived from commuter type services was eliminated from the estimates pending clarification of Amtrak's role in providing this type of service. Where the routes under examination involved new markets the demand model was used to estimate ridership to any new cities. Where identical city-pairs are served by a different intermediate routing (e.g., Chicago-Seattle), the amount of that patronage which could be diverted to the new routing was estimated considering schedules and running times. Revenues were calculated by multiplying passenger-miles by the FY 1977 yield (revenue per passenger-mile) for the specific route, if it had been part of the Amtrak system, and by a systemwide average yield for new routes.

Those transportation revenues were then adjusted for revenues from food, beverage, mail, and express to produce total revenues.

ANALYTICAL TECHNIQUES

DEVELOPMENT

Building on work performed by Amtrak's Marketing Research Department, and in consultation with the Department, PMM evaluated a series of equations to predict ridership where none existed before and to adjust historical ridership where changes in frequency or schedule were included in the scenarios.

Numerous direct-demand models were calibrated which used actual ridership (excluding commuter) in FY 1977 between 1,479 representative Amtrak city-pairs more than 50 miles apart. The variables examined are shown in Table B-1.

Table B-1

Data Collected for Each City-Pair

Variable	Description
Patronage	FY 1977 Amtrak annual patronage between city-pairs
Run Time	Scheduled rail travel time (minutes)
Yield	Average transportation revenues per passenger-mile (cents/passenger-mile)
Population 1 Population 2	Population of the two cities (in thousands)
Frequency	The average frequency of service per day during the year under consideration
Distance	Rail distance for each city-pair (miles)
Fare	Amtrak fare (dollars)
On Time	Average minutes late per mile traveled

In addition to the variables shown in Table B-1, a series of transformations were used to develop three other variables for each city-pair. The first was the product of the origin and destination city populations, an indicator of the potential travel between the two cities. The second new variable was a cost ratio, developed by dividing calculated automobile trip costs by Amtrak fares.

The autombile trip costs were estimated to be 17 cents/mile. Finally a train lateness variable was created by multiplying the number of minutes late per mile times the distance between the cities.

During the search for the best equation to explain differences in the historical ridership, the city-pairs were stratified into groups based on distance, whether the cities were SMSA's or not, travel time, and type of equipment.

As a result of these efforts, a final series of models was calibrated and a single patronage demand equation applicable to all city-pairs was selected.

Because the equation did not explain all the variations in ridership by the stated variables, the predicted ridership for a given city-pair market was often not close to the historical ridership. Therefore, an "attractiveness factor" was included in the equation to reflect that cities are attractive to travelers for reasons other than described in the equations. For cities already served by Amtrak, attractiveness factors were developed using a regression analysis on the differences between computed and historical ridership. For cities not served by Amtrak in FY 1977, attractiveness factors were calculated by assigning points to an SMSA for each of the following attributes which applied:

Negative Attractiveness Attributes

- Bad scheduled time
- Bad connections
- Bad service, slow speed, bad on-time record
- Bad station access
- Strong competitive non-Amtrak commuter service

Positive Attractiveness Attributes

- Good connections
- A college town
- A state capitol
- Major tourist attraction

The final form of the patronage demand equation modified to incorporate the "attractiveness factor" and subsequently applied in this study is shown below:

$$\text{Patronage}=\left[e^{(2.468+t_i+t_j)}\right]\left[(\text{pop}_i \times \text{pop}_j)^{-.6085}\right]\left[\text{time}^{-.7298}\right]\left[\text{freq}^{.7736}\right]\left[\left(\frac{\text{auto cost}}{\text{fare}}\right)^{1.0294}\right]$$

The equation variables are as follows:

- pop_i and pop_j are the 1976 populations of the city-pair.
- Time is the scheduled rail travel time in minutes.
- Frequency is the average daily number of roundtrips.
- Auto cost divided by fare is the ratio between the total cost of the trip by auto at 17 cents per mile divided by the Amtrak fare between the city pair.
- t_1 and t_2 are the "attractiveness factors" of the city-pair.

The coefficients from the above equation indicate that:

- a 10 percent increase in the population product results in a 6.1 percent increase in patronage,
- a 10 percent increase in travel time results in a 7.3 percent decrease in patronage,
- a 10 percent increase in frequency results in a 7.7 percent increase in patronage, and
- a 10 percent increase in the cost ratio results in a 10 percent change in patronage.

None of these individual coefficients, by themselves, can be accorded great significance. The frequency coefficient is consistent with previous similar work and thus can be used with greater confidence than, for example, the cost ratio coefficient which is not consistent with previous work.

The overall model results are more reliable than any of those individual coefficients.

The estimation of patronage for the alternative systems involved a combination of existing routes, new routes, and adjustments to existing routes. Existing ridership data were used wherever possible. The estimates for new routes and adjustments to existing routes involved use of existing patronage data and the model. The types of adjustments which were required fell into four categories:

- frequency changes
- schedule changes
- connectivity changes, and
- diversions.

Frequency changes were the adjustments made most often. Ridership was adjusted by using the frequency elasticity of 0.77 from the model.

Schedule changes caused problems, especially in the two smallest systems (short distance only and national), which have the least number of routes and a reorientation of service patterns from long distance markets to short distance markets. This meant that existing patronage could not be used to estimate the new short distance schedule. In this case, the model was used to estimate patronage.

Connectivity changes were also a problem in the first two systems. For example, there was no information available on the percentage of the New York to Chicago train ridership, which was actually bound for the Northwest (Seattle). As a result, there may be some over-estimation on the short distance routes in those systems. At the same time, there was no allowance for transfers. That is, if there was no direct service, it was assumed that the trip could not be made. In the aggregate, these errors will tend to cancel each other.

Diversion of ridership from city-pairs on existing routes being terminated common to city-pairs on routes being added or combined was estimated, considering the relationship in frequency, schedule, and running times.

For example, even though the frequency was reduced from two to one on the Chicago-Seattle routes in the recommended system, based on the fact that the trains ran on similar schedules, and with reasonably similar running times, it was estimated that 100 percent of the ridership between city-pairs common to both routes could be diverted to the one remaining route. In cases where the frequency did not change and the running time did not change significantly, it was estimated that 100 percent of the common city-pair ridership could be diverted. Where there was a significant difference in the running time, the overall model was used to estimate the ridership, rather than using the less reliable running time elasticity from the model.

OBSERVATIONS

The modeling exercise for this study relied on aggregate information taken from the existing FY 1977 national operations systems (non-NEC). There has been no attempt to investigate why individuals use rail transportation for intercity travel.

Also, the state-of-the-art in intercity rail passenger demand modeling is not far advanced and thus the prediction of patronage in new markets is subject to margins of error larger than predictions for existing markets. Since it was possible to draw heavily upon existing ridership, the total systemwide patronage estimates in all of the large scenarios are considered reliable. However, it must be realized that the further from the existing system the analysis goes, the more unreliable the estimates of patronage become. Further details about the demand forecasting techniques will be found in PMM's report to the Department of Transportation.

APPENDIX C

OPERATING COST ESTIMATING METHODOLOGY

In order to evaluate alternative non-Northeast Corridor systems and to present the Congress and the public with realistic information on the current and future consequences of adopting a particular system, reasonable estimates of the operating cost of each system were developed. The Department of Transportation retained the firm of Temple, Barker, and Sloane, Inc. (TBS), to develop these operating cost estimates.

A review of the existing Amtrak cost and data management systems and cost studies which had been performed by Amtrak staff and outside contractors indicated that the necessary information to test annual alternative physical and service configurations was not readily available. For example, Amtrak's activity unit data base did not readily report annual locomotive, car, or train miles by route, train, or consist type in sufficient detail to test system changes. Similarly, Amtrak's two cost systems could not be used to develop cost factors without significant staff work. The first of these systems, Route Profitability System (RPS), took large accumulations of costs by different functional categories and allocated them to routes and trains, rather than generating costs from actual activity units. Amtrak's second system, FinPac, reported an extremely detailed set of costs at responsibility location units (Res Locs), but these costs could not be readily linked with individual trains and routes.

Thus, Amtrak's train and route operations were simulated to produce appropriate annual activity units and the results calibrated with readily available Amtrak data to provide a base for the alternative system costing.

The 96 Amtrak cost accounts were reduced to 34 basic accounts for analysis. A set of appropriate cost factors was developed for each of the 34 accounts.

A cost simulator was developed to take activity at the train, consist, frequency and route levels, apply the appropriate cost factors to the activity units, and generate financial results for a base case and various alternative systems. To ensure reliability of the alternative system costs, the model was calibrated with actual 1977 results before the system alternatives were analyzed.

The calibration required simulation of actual 1977 activity units. It was necessary to duplicate Amtrak's actual operation during FY 1977 including changes in frequency and consists.

Two methodologies were used to develop the cost factors for the simulation. The first or engineered method started from readily available unit cost factors, multiplied the factors times activity units, and compared the results with reported Amtrak costs. A good example of this approach was the fuel and power

account. TBS applied fuel costs per thousand gross ton-miles to diesels, costs per train mile to turboliners, costs per unit mile for electric locomotives and rail diesel cars (RDCs), and costs per car mile to Metroliners and Silverliners to yield total fuel and power costs.

The second methodology started from actual 1977 Amtrak costs. Inasmuch as the simulation was to report only non-Corridor costs, a preliminary separation was made between NEC and non-Corridor costs, relying primarily on an Amtrak staff study. A second separation into fixed and variable components was made on the basis of Amtrak's avoidable cost formulas, discussions with Amtrak staff, and TBS's judgment. The variable portions were then linked to activity units.

Table C-1 shows the 34 cost factors, the 1977 Amtrak system totals, and the non-Corridor portion of the costs. Approximately 68 percent of Amtrak's 1977 expenses were attributed to non-Corridor operations. (It was necessary to make a 1 percent manual adjustment on the model results to accurately reflect a recent adjustment in the Amtrak FY 1977 Profit and Loss Statement.) It should be noted that the non-Corridor costs included all the expenses of long distance trains operating in both NEC and non-Corridor service if the trains had a restricted boarding policy. For those trains offering an unrestricted boarding policy, only the portion of costs incurred in non-Corridor service were charged to non-Corridor operations--the basic assumption being that the NEC would replace the train with substitute service to fill the time slot.

The results of the preliminary methodology for identifying and calculating activity measures and costs were reviewed with FRA and Amtrak staff. It was recommended that greater detail be built into the model and that Amtrak gather special cost and activity data for the study.

A major modification was the substitution of individually specified train consists for both peak and off-peak service in place of a limited number of standard consists. This change greatly enhanced the ability of the model to respond to detailed changes in assumptions. Further, in order to properly capture the movement of Amtrak cars throughout the system, it was necessary to define sub-train segments, each of which had its own peak and off-peak consists.

In the original train consist specifications, 150 trains were limited to 11 possible standard consists. The combined effect of the modifications was to increase the scope of the data base to approximately 250 train segments and 500 consists.

Similar efforts to refine the cost detail resulted in expanding the number of relevant activity units from 13 to 20. Several of the new activity unit/cost relationships involved programming relatively complicated algorithms. Table C-2 summarizes the 20 activity units.

At this stage, Amtrak undertook several special cost studies to supply activity units and costs not readily available in their system. The new information in several instances required reprogramming of the cost model. Table C-3 summarizes the final list of costs and factors used in the model.

Table C-1

FRA AMTRAK COST MODEL
FY 1977 REPORTED FINANCIAL PERFORMANCE[1]

(millions of dollars)

	System	Non-Northeast Corridor (Non-Corr.)
Train and Engine Crews	92.4[2]	71.2[2]
Fuel and Power	43.0	34.3
OB--Labor	54.1	50.6
--Supplies	21.0	15.5
Other	.8	.7
Route Stations	11.1	29.7[3]
Shared Stations	33.8	
Railroad Stations	12.5	5.9
Mainline Operations	8.4	1.4
Yard Operations	8.9	7.1
Transportation Overhead	5.6	2.7
Electric Loco Maintenance	7.4	2.1
Diesel Heavy Maintenance	6.1	6.0
Diesel Other Maintenance	34.8	29.6
Metroliner Maintenance	10.5	-
Turboliner Maintenance	12.1	12.1
Cars Heavy Maintenance	38.5	36.9
Cars Other Maintenance	97.4	71.3
MOE Overhead	17.1	10.4
Track MOW	18.1	5.3
Facilities MOW	12.1	1.3
MOW Overhead	9.9	3.9
Corporate Support	36.3	18.2
Line Support	19.1	16.4
Joint Facilities	18.8	11.0
Sales, Reservations, Marketing	45.3	24.2
Commissary, Crew Base	15.0	12.0
Payroll Taxes, H&W, Pensions	10.3[2]	9.6[2]
Administration and Ticketing	7.4	3.0
Other RR Miscellaneous	15.8	15.1
Taxes and Insurance	18.9	12.4
General and Administrative	22.9	6.9[4]
Interest	33.9	20.5
Depreciation	32.3	21.4
Total Expenses[5]	831.8[1]	568.6[4]

[1]Recently Amtrak reported several accounting adjustments which increased the total system deficit by $8.3 million. This data has not been included in any of TBS's analyses and is not included in this exhibit.

[2]T&E expenses as reported by Amtrak's route profitability system (RPS) do not include payroll taxes, health and welfare payments, or pension expenses. TBS, using an Amtrak study, has reflected these expenses in this exhibit and in its costing.

[3]RPS reports Station expenses under the headings Route Stations, Shared Stations, and Station Overhead. To reflect the costs of Amtrak Stations versus railroad stations, TBS made the format change shown.

[4]This number differs from that estimated by RPS due to a difference in methodological assumptions. The figure shown in this exhibit represents only an estimate of the incremental G&A that results from having Non-Corr. operations and was derived based on discussions with Amtrak management.

[5]Total expenses exclude Other Revenue, Other Expenses, and RPS adjustments.

Table C-2

FRA AMTRAK COST MODEL
ACTIVITY UNITS

1.	Train Miles (varies by railroad)
2.	Train Trips
3.	Car Miles (varies by car type)
4.	Car Trips (varies by car type)
5.	Loco Miles (varies by locomotive type)
6.	Unit Trips
7.	Train Weight
8.	Train Length
9.	Cars Required (varies by car type)
10.	Locomotives Required (varies by locomotive type)
11.	Trip Running Time/Train Hours
12.	Passenger Miles
13.	Size of Stations
14.	Number of Station Stops
15.	Unit Visits at Joint Facilities
16.	Presence of Facility (crewbase, commissary, maintenance base)
17.	Revenue
18.	Passengers-Reserved, Unreserved
19.	Number of Amtrak Trains
20.	Frequency

Table C-3

SUMMARY AMTRAK COST MODEL

	Account	Activity Units	Accumulated At	Reports Costs At
1.	Train & Engine	TM	RR	Train
2.	Fuel & Power			
	--Diesel	MGTM	System	"
	--Turbo	TM	"	"
	--Elec.	UM	"	"
	--Metro	CM	"	"
	--RDC	UM	"	"
	--Silverliner	CM	"	"
3.	OB Labor	Train Hr. Adjust Factors	Car Type/System	"
4.	OB Supplies	PSGR MI	Route New: Long/Short	" "
5.	Other Direct	TM	Non-Corr.	"
6.	Route Stations	Train Stop (Station Visit) + Fixed Cost	Station Specific	Route
7.	Share Stations		Station Specific (Size)	"
8.	RR Stations	TM + Fixed Cost	RR/Non-Corr.	"
9.	Mainline Operations	Amtrak Train Trip	Non-Corr.	Train
10.	Yard Operations	Unit Trip	"	"
11.	Transp. Ovhd.	1,2,5,9,10 Non-Corr. - % Markup	1,2,5,9,10 Non-Corr.	Non-Corr. "
12.	Elec. Loco. Maint.	Loco. Mile + Unit	System	Train
13.	Diesel Heavy	Units Overhauled	"	"
14.	Diesel Other Maint.	Loco. Mile Loco Units Fixed	" " Non-Corr.	" " Non-Corr.
15.	Metro Maintenance	Car Mi.	Corr.	Train
16.	Turbo Maint.	Train Mi.	System	"
17.	Cars Heavy Maint.	Unit Overhauled (car type) + Fixed Cost	" Non-Corr.	" Non-Corr.
18.	Cars Other Maint.	Per Mile Per Trip Per Car } by car type	System	Train
19.	MOE Overhead	Facility Present 50% Cars/Locos Assigned relative to 77 Base	Facility Specific Facility Specific	Non-Corr.

TM = Train Miles
CM = Car Miles
UM = Unit Miles
OB = On Board
MGTM = Thousand Gross Ton Miles
RR = Railroad

Table C-3 -- Continued

SUMMARY AMTRAK COST MODEL

	Account	Activity Units	Accumulated At	Reports Costs At
20.	Track MOW	TM Fixed Cost	RR Non-Corr.	Train Non-Corr
21.	Facility MOW	TM Fixed Cost	RR Non-Corr.	Train Non-Corr.
22.	MOW Overhead	Fixed Cost	Non-Corr.	Non-Corr
23	Corp. Support			
	--Revenue Accounting	% Rev.	Non-Corr.	Non-Corr.
	--Information Services	Res. Psgrs. Non-Res. Psgrs.	Non-Corr.	Non-Corr.
	--Other	CM	Non-Corr.	Non-Corr.
	--Fixed Comp. of Above	Fixed	Non-Corr.	Non-Corr.
24.	Line Support	# Amtrak Stations	Non-Corr.	Non-Corr
25.	Joint Facilities			
	--Var.	Unit Trip (Visits)	Facility Specific	Route
	--Fixed 90%	Specific Facilities Present	Facility	Non-Corr.
26.	Sales, Reservations & Marketing			
	--Sales & Mktg.	PSGRS	Non-Corr.	Non-Corr.
	--Reservations	Res. PSGRS Non-Res. PSGRS	" "	" "
	--Fixed of Above	Fixed	"	"
27.	Commissary/Crew Base	Presence & Size	Actual 1977	"
28.	Payroll, Taxes, Health Welfare, Pensions	TM	Non-Corr.	"
29.	Admin. & Ticket	RR TM	RR	"
30.	Other RR Misc.	RR TM	RR	"
31.	Taxes & Insurance			
	--Pers. Prop.	% Book Value Rolling Stock	System	"
	--Real Prop.	Fixed	Non-Corr.	"
	--Insurance	PSGR MI	System	"
32.	General & Admin.	(# Amtrak Trains)	Non-NEC	"
33.	Interest	Fixed	Non-Corr.	"
34.	Deprec.			
	--Pers. Prop.	Fleet Size (car type)	System (Car Type)	"
	--Real Prop.	Fixed	Non-Corr.	"

Res. = Reserved Non-Res. = Non-Reserved

A major test of the costing system was its ability to reproduce 1977 actual costs from activity units that were built up on a train, consist, route, station, and frequency basis. The calibration showed that the key activity units--train miles, car miles, and locomotive miles--fell within 4 percent of actual. Simulated non-Corridor costs were within 1 percent of actual.

Based on the activity unit/cost calibrations, TBS and FRA concluded that the model could be used to simulate alternative systems utilizing inputs at the train, consist, route, and frequency levels.

TBS and FRA recognized at the outset that 1977 actual results could not be used as the base case for comparison with alternative systems because full schedules had not been run and because the methodology for scenario testing required the specification of new equipment consists as of 1977. Regarding the latter issue, it was agreed that system projections would start from a 1977 base that incorporated all changes associated with the particular system. In other words, the simulation would not phase in consist, route, or train changes during the 1978-84 planning period, since phasing would have required substantial increases in data entry and data processing.

Therefore, a 1977 base case was coded and entered into the model representing 1977 Amtrak operations with new equipment already in place operating on the full 1977 schedule.

Since the model was calibrated successfully against the FY 1977 system, the results are considered reliable at the system level for the larger systems. It must be recognized that the route-related and train-related costs for a specific train may not reflect unique cost considerations for that train.

The most difficult determination required for this study, due to the lack of historical data, was the breakdown between fixed and variable costs. This, of course, has the greatest impact in the operating cost of the smallest systems. In these systems, the activity units undergo the greatest change from the existing system and the degree to which operating costs are estimated to be reduced is a direct function of the degree to which they are variable as opposed to fixed.

Appendix D

ADDITIONAL INFORMATION

This appendix describes the methodologies used to: (1) incorporate Northeast Corridor (NEC) data and projections into system total projections; (2) determine capital cost projections; and, (3) calculate labor protection payments. It also presents basic performance data for the alternative systems evaluated which are not included in this report.

NORTHEAST CORRIDOR PROJECT

The contribution of the NEC projections set forth in the Two-Year Report[1] to the systemwide totals projected in this report (in the base year) are shown in Table D-1. The Two-Year Report adopted FY 1982 as the first full year of improved NEC service, for the purpose of demand, revenue, and cost analyses. In developing a detailed program plan for FY 1979, however, it became evident that selected project elements would substantially benefit from further coordination with user agencies, including Amtrak, Conrail, and commuter operators. Accordingly, the completion date for portions of the NECIP construction will be delayed, although the introduction of some service meeting the trip-time goals will be possible.

This legislated report therefore assumes that FY 1984 will be the first full year of improved NEC services, but that NEC operations in 1981, 1982, and 1983 will begin to reflect the completion of significant portions of the construction program.

This report assumes the continuation of the present dual service in the NEC in which premium-fare passengers will benefit from separate trains at faster schedules. Chapter 5 and Table G-3 of the Two-Year Report provide exhaustive details on the dual service option assumed here. In brief, the operation would include hourly service between Boston and New York, half-hourly service between New York and Washington, and four additional peak hour trains each way between New York and Philadelphia. Premium trip-times achieved by half the trains, would be 3 hours, 40 minutes Boston to New York and 2 hours, 40 minutes New York to Washington. Other trains would run at longer schedules.

Due to the temporary impacts of the NECIP on service quality during the construction period, Amtrak NEC patronage is projected to remain at 1977 levels through 1980. 1984 patronage is assumed to be as predicted by the Two-Year Report for 1982; patronage in 1983, 1982, and 1981 is assumed to be as projected by Amtrak's 1977 Five-Year Corporate Plan for 1982, 1981, and 1980 respectively.

---

[1] Two-Year Report on the Northeast Corridor, U.S. Department of Transportation, February 1978.

TABLE D-1

ACTUAL FISCAL YEAR 1977
PERFORMANCE MEASURES
(in Millions)

	NEC	NON-NEC	TOTAL
Train-Miles	6.858	24.068	31.645
Passenger-Miles	1,183.531	3,138.487 *	4,322.018
Revenue	110.300	201.000	311.300
Operating Costs	266.400	574.700	841.100
Depreciation	10.900	21.400	32.300
Items requiring subsidy	145.200	352.3	497.500
Less items not requiring appropriation in FY 1977			14.900
FY 1977 Cash Subsidy			482.600

* Includes commuter passenger miles which are not included in alternative system comparisons.

Note: NEC data in this table include intra-NEC passenger-mile costs and revenues of national operations trains which operate with unrestricted boarding in the corridor. In addition, operating costs assume the NEC as the base Amtrak operation and the non-NEC as incremental.

In constant-dollar terms, revenues for 1984 incorporate the projections of the Two-Year Report; for 1980, actual 1977 NEC revenues are used. Intermediate years are arrived at by interpolation on a passenger-mile basis. To achieve current-year dollars, the constant-dollar estimates are multiplied by yield growth factors provided by the Amtrak Marketing Department.

In constant-dollar terms, operating costs are assumed to remain constant between 1977 and 1980. Costs for 1984 are based on the high costs projected by the Two-Year Report for 1982; the intervening years 1981-83 are arrived at by interpolation on the basis of passenger-miles.

Table D-2 projects the constant-dollar revenues and operating costs for the NEC modified from the Two-Year Report in accordance with the preceding discussion.

Table D-2

Projected Performance of NEC
(Millions of Constant $s)

Performance Measures	Base Year (1977)	Fiscal Year 1979	1980	1981	1982	1983	1984
Operating Cost[1]	266.4	266.4	266.4	273.4	283.2	294.9	297.9
Revenues	110.3	110.3	110.3	126.9	148.8	174.4	181.0
Operating Deficit	156.1	156.1	156.1	146.5	134.4	120.5	116.9

CAPITAL COSTS

The capital costs of the alternative systems are estimated for fiscal years 1979-1984. These costs were developed first for the base case using the needs identified in Amtrak's 5-year plan for fiscal years 1979-1982 as the base. The capital requirements for FY 1983 and 1984 were estimated by extending the routine capital requirements identified in the 5-year plan for prior years. These estimates do not include any funding for major unanticipated capital requirements. The costs for the alternative systems are then estimated based on additions and deletions from the base case. The capital program includes the annual levels of funding which Amtrak has requested for the NEC. Certain adjustments were made to the levels of capital funding which Amtrak has requested for the system outside the NEC. Amtrak's estimated funding requirement

[1] Amtrak staff studies contain significantly more pessimistic NEC cost projections.

for long distance low level passenger equipment was not included; rather an adequate amount of funding was provided for the conversion and rehabilitation of the required number of existing cars. Similarly the funding which Amtrak has requested for motive power and station facilities was adjusted to meet the requirements of the recommended system. Further, with the exception of grade crossing and right-of-way improvements required for the introduction of recommended new rail passenger routes, no funds were allocated for right-of-way capital improvements outside the NEC. For the purposes of this preliminary report and in order to compare all systems from a common base, all capital costs immediately required to enable operation of each system (i.e., track connections, new stations, etc.) are assumed to occur in FY 79 and the benefits are included in the base year. Capital costs for facilities and equipment which are necessary over a relatively short time frame in order to operate each system efficiently (i.e., new or overhauled equipment) are phased in for 1980-84 and no adjustments are made in operating cost or revenue projections for these latter improvements.

This preliminary study did not generally analyze the operating cost and capital cost tradeoffs or conduct other return on investment analyses for alternative capital projects.

EQUIPMENT

The amount of equipment required to operate over the recommended system will be influenced by several continuing analyses. The Northeast Corridor service and resulting equipment needs are currently being evaluated by DOT and Amtrak. Also, Amtrak is evaluating recommendations for improved equipment maintenance and utilization practices, developed under a joint FRA/Amtrak contract,which have the potential to reduce significantly the amount of equipment required to operate the system and the cost of maintaining that equipment. The capital funding for equipment proposed herein assumes Amtrak's current NEC operating plan and a conservative degree of improved equipment utilization.

Equipment options available to Amtrak include at least the following: purchase additional new Amfleet cars, purchase additional bi-level cars, purchase new low level cars, purchase new self powered cars, convert existing conventional cars to head-end power.

Costs in this report are estimated on the basis of refurbishing existing conventional cars and converting them to head-end power. The type of cars, their design and resulting capital costs will ultimately be determined after an extensive study of the market, after a clear Amtrak Board policy on market objectives is defined and after a complete analysis of the alternative types of services, including the costs and benefits of sleeper service and various types of dining and lounge service, is completed.

LABOR PROTECTION

Labor protection agreements known as "Appendix C-1" (pertaining to railroad employees) and "Appendix C-2" (pertaining to Amtrak employees) pose potential and substantial liabilities for both Amtrak and the operating railroads. These agreements provide for payments to be made to all employees who are placed in a worsened position with respect to compensation as a result of

discontinuance of intercity rail passenger service. Protective payments may continue for each affected employee for a period up to the length of his prior service, not to exceed six (6) years. Essentially the same coverage is applicable to management as is applicable to employees who are represented by labor organizations.

While employee protection is basically the same under the two agreements, determination of Amtrak or railroad liability for the protection payments is governed by original system staffing levels and by the duration of Amtrak employment. In addition to labor protection liability for its own employees, Amtrak incurs liability for railroad employees assigned to positions added to the railroad payroll subsequent to May 1, 1971 at Amtrak's request. Protection for railroad employees engaged in intercity passenger service prior to May 1, 1971 remains a railroad liability. An exception to the labor protection agreements is provided in the "Appendix C-2" coverage (Amtrak employees) in the event of temporary emergencies, discontinuance of a seasonal service in operation 120 days or less, or an experimental service discontinued within two (2) years of its inception.

Determination of the total potential liability is complicated by various provisions covering a variety of benefits such as moving expenses, future collective bargaining wage increases, and lump-sum separation allowance provisions. It is further complicated because the affected employee may simply displace another less senior employee, resulting in a series of chain reaction displacements subjecting displaced employees to the same protective benefits as the original affected employee.

In evaluating the consequences of adopting various systems, an understanding of the potential level of labor protection payments is important. Labor protection payments are for a finite amount. Thus, it is appropriate to project the extent of Amrak's liability for such payments in a manner similar to capital costs. For the purpose of this preliminary report very rough estimates have been made of the possible maximum labor protection payments which would result from implementation of each of the alternative systems.

Temple, Barker, and Sloane (TBS) estimated the labor protection liabilities that would be incurred by Amtrak under the alternative route systems studies. The estimates included high ranges and low ranges for each scenario. In each case the high estimate reflected a continued payment of compensation to protected employees for a number of years after the discontinuance of service. The number of years was determined by the length of time a given route was covered by a protective agreement. Liabilities incurred for system-level employees, where assignable to a given route or agreement, were estimated, assuming that employees would have an average of three years of coverage by November 1976. The low range represented the one-time payment of a sum equal to one year's compensation to protected employees. Both methodologies assumed that Amtrak liabilities would not be significantly reduced through relocation of employees.

Actual labor protection liabilities were estimated at the route and system levels for both Amtrak and railroad employees. On any route where a service discontinuance was proposed, TBS calculated the reduction in labor compensation relative to the existing Amtrak system or base case. TBS then calculated protection liabilities at the system-level, based on the difference between Amtrak and railroad labor compensation compared to the base case.

ALTERNATIVE SYSTEM PROJECTIONS

The NEC operations projections are combined with the operating and capital costs projections of the alternative systems (inflated by the factors presented in Table 5-5), and debt retirement and NEC purchase payment costs, to provide the total systemwide projected operating deficit. These projections are presented in detail, along with other Amtrak funding requirements, for each of the alternative systems not recommended in Table D-3 through D-8.

Route level performance measures for the four alternative systems not recommended are set forth in Tables D-9 through D-12. Similar data for the recommended system and base case are in Tables 5-1 and 5-2.

Table D-3

Estimated Total Funding Needs

For Scenario A (Short Distance Only)

(Millions of Current Dollars, Fiscal Years)

	1979[b]	1980	1981	1982	1983	1984	Total
National Services							
Operating Subsidy[a]							
NEC	179	199	208	223	249	265	1,323
Non-NEC	342	188	205	224	246	267	1,472
Total	521	387	413	447	495	532	2,795
Capital Cost							
NEC	32	146	106	220	105	115	724
Non-NEC	40	62	38	28	14	16	198
Total	72	208	144	248	119	131	922
Other Costs							
Debt Retirement[c]	25	25	50	50	50	50	250
NEC Purchase Payment	24	37	0	0	0	0	61
Grand Total	642	657	607	745	664	713	4,028

NOTE: This table does not reflect funding required for labor protection to implement this alternative system. A preliminary estimate indicates that labor protection payments required to implement this system will range from $110 million to $460 million. Neither does this table reflect any 403(b) funding (Federal/State supported services).

---

[a]Does not include depreciation.

[b]The FY 1979 funding needs reflect 8 months of operation under the existing system and 4 months of operation under the proposed system.

[c]Not a net Federal cash expenditure.

Table D-4

Estimated Total Funding Needs

For Scenario B (National System)

(Millions of Current Dollars, Fiscal Years)

	1979[b]	1980	1981	1982	1983	1984	Total
National Services							
Operating Subsidy[a]							
NEC	179	199	209	223	249	265	1,324
Non-NEC	228	248	271	301	335	368	1,751
Total	407	447	480	524	584	633	3,075
Capital Cost							
NEC	32	146	106	220	105	115	724
Non-NEC	50	66	46	33	23	25	243
Total	82	212	152	253	128	140	967
Other Costs							
Debt Retirement[c]	25	25	50	50	50	50	250
NEC Purchase Payment	24	37	0	0	0	0	61
Grand Total	538	721	682	827	762	823	4,353

NOTE: This table does not reflect funding required for labor protection to implement this alternative system. A preliminary estimate indicates that labor protection payments required to implement this system will range from $110 million to $460 million. Neither does this table reflect any 403(b) funding (Federal/State supported services).

---

[a]Does not include depreciation.

[b]The FY 1979 funding needs reflect 8 months of operation under the existing system and 4 months of operation under the proposed system.

[c]Not a net Federal cash expenditure.

Table D-5

Estimated Total Funding Needs

For Scenario D (Modified Current System)

(Millions of Current Dollars, Fiscal Years)

	1979[b]	1980	1981	1982	1983	1984	Total
National Services							
Operating Subsidy[a]							
NEC	179	199	208	222	249	265	1,322
Non-NEC	414	435	480	538	602	668	3,137
Total	595	634	688	760	852	931	4,459
Capital Cost							
NEC	32	146	106	220	105	115	724
Non-NEC	73	150	149	72	38	41	523
Total	105	296	255	292	143	156	1,247
Other Costs							
Debt Retirement[c]	25	25	50	50	50	50	250
NEC Purchase Payment	24	37	0	0	0	0	61
Grand Total	749	992	993	1,102	1,044	1,137	6,017

NOTE: This table does not reflect funding required for labor protection to implement this alternative system. A preliminary estimate indicates that labor protection payments required to implement this system will range from $110 million to $460 million. Neither does this table reflect any 403(b) funding (Federal/State supported services).

---

[a]Does not include depreciation.

[b]The FY 1979 funding needs reflect 8 months of operation under the existing system and 4 months of operation under the proposed system.

[c]Not a net Federal cash expenditure.

Table D-6

Estimated Total Funding Needs

Scenario E (National/Interregional/Intraregional System)

(Millions of Current Dollars, Fiscal Years)

	1979[b]	1980	1981	1982	1983	1984	Total
National Services							
Operating Subsidy[a]							
NEC	179	199	208	222	249	265	1,322
Non-NEC	434	494	546	613	686	760	3,533
Total	613	693	754	835	935	1,025	4,855
Capital Cost							
NEC	32	146	106	220	105	115	724
Non-NEC	187	245	192	97	48	52	821
Total	219	391	298	317	153	167	1,545
Other Costs							
Debt Retirement[c]	25	25	50	50	50	50	250
NEC Purchase Payment	24	37	0	0	0	0	61
Grand Total	881	1,146	1,102	1,202	1,138	1,242	6,711

NOTE: This table does not reflect funding required for labor protection to implement this alternative system. A preliminary estimate indicates that labor protection payments required to implement this system will range from $110 million to $460 million. Neither does this table reflect any 403(b) funding (Federal/State supported services).

---

[a]Does not include depreciation.

[b]The FY 1979 funding needs reflect 8 months of operation under the existing system and 4 months of operation under the proposed system.

[c]Not a net Federal cash expenditure.

Table D-7

Estimated Total Funding Needs

For Base Case (Existing System)

(Millions of Current Dollars, Fiscal Years)

	1979[b]	1980	1981	1982	1983	1984	Total
National Services							
Operating Subsidy[a]							
NEC	179	198	208	223	249	265	1,322
Non-NEC	426	467	514	575	643	710	3,335
Total	605	665	722	798	892	975	4,657
Capital Cost							
NEC	32	146	106	220	105	115	724
Non-NEC	69	158	153	88	39	42	549
Total	101	304	259	308	144	157	1,273
Other Costs							
Debt Retirement[c]	25	25	50	50	50	50	250
NEC Purchase Payment	24	37	0	0	0	0	61
Grand Total	755	1,031	1,031	1,156	1,086	1,182	6,241

NOTE: This table does not reflect funding required for labor protection to implement this alternative system. A preliminary estimate indicates that labor protection payments required to implement this system will range from $110 million to $460 milllion. Neither does this table reflect any 403(b) funding (Federal/State supported services).

---

[a]Does not include depreciation.

[b]The FY 1979 funding needs reflect 8 months of operation under the existing system and 4 months of operation under the proposed system.

[c]Not a net Federal cash expenditure.

TABLE D-8

ROUTE-LEVEL PERFORMANCE MEASURES FOR SCENARIO A, SHORT DISTANCE ONLY
(Simulated Operations in FY 1977)

Route	Performance				Service	
	Passenger-Miles (Millions)	Train Miles (Millions)	PM/TM	Revenue ($ Millions)	Frequency **	Class *
Chicago-Carbondale	20.75	0.226	92	1.29	1	C
San Diego-Los Angeles	56.15	0.374	150	3.68	4	C
Oakland-Los Angeles	45.05	0.341	132	2.60	1	C
Chicago-Milwaukee -Minneapolis	35.05	0.493	71	2.27	1-4	C
Chicago-St. Louis	35.52	0.412	86	2.76	2	C
Chicago-Kansas City	23.23	0.329	71	1.42	1	C
Chicago-Cleveland	15.99	0.250	64	1.09	1	C
Chicago-Detroit	43.22	0.407	106	2.92	2	C
New York-Buffalo	93.55	1.054	89	6.06	2-5	C
System Total	368.51	3.886	95	24.09		

* C = coach only
** - Frequency is expressed in daily roundtrips
NOTE: This table does not include NEC routes

TABLE D-9

ROUTE LEVEL PERFORMANCE MEASURES FOR SCENARIO B, NATIONAL SYSTEM
(Simulated Operations in FY 1977)

Route	Performance				Service	
	Passenger-Miles (Millions)	Train-Miles (Millions)	PM/TM	Revenue ($ Millions)	Frequency***	Class**
Short Distance:						
San Diego-Los Angeles	56.15	0.374	150	3.68	4	C
Chicago-Milwaukee-Minneapolis	35.05	0.493	71	2.27	1-4	C
Chicago-St. Louis	35.52	0.412	86	2.76	2	C
Chicago-Detroit	43.22	0.407	106	2.92	2	C
Chicago-Cleveland	15.99	0.250	64	1.09	1	C
New York-Buffalo	93.55	1.054	89	6.06	2-5	C
Subtotal	279.48	2.990	93	18.78		
Long Distance:						
Chicago-New Orleans	104.60	0.674	155	5.59	1	S
Seattle-Los Angeles	224.92	0.995	226	12.98	1	S
Chicago-Denver/Los Angeles	353.25	1.756	201	20.20	1	S
New York-Chicago	93.57	0.660	142	6.43	1	S
New York-Florida *	285.02	1.074	265	17.86	1	S
Subtotal	1,056.87	5.159	205	63.06		
System Total	1,340.84	8.149	165	81.84		

* Excludes intra-NEC passenger-miles and revenue but includes NEC train-miles

** Explanation of codes: C = coach only; S = coach and sleeping car

*** Frequency is expressed in daily roundtrips by route. Frequency on short distance routes does not include any long distance frequencies between those end-points.

NOTE: This table does not include NEC routes.

TABLE D-10

ROUTE-LEVEL PERFORMANCE MEASURES FOR SCENARIO D, MODIFIED CURRENT SYSTEM
(Simulated Operations in FY 1977)

Route	Performance				Service	
	Passenger-Miles (Million)	Train-Miles (Million)	PM/TM	Revenue ($ Million)	Frequency ***	Class**
Short Distance:						
Chicago-Carbondale	18.60	0.226	82	1.16	1	C
San Diego-Los Angeles	77.25	0.561	138	5.02	6	C
Seattle-Portland	14.67	0.135	109	0.74	1	C
Chicago-Milwaukee	21.08	0.248	85	1.40	4	C
Minneapolis-Duluth	11.08	0.108	103	0.56	1	C
Chicago-St. Louis	49.33	0.617	80	3.83	3	C
Chicago-Detroit	5.16	0.611	95	3.93	3	C
Chicago-Quincy	14.84	0.192	77	0.94	1	C
New York-Buffalo	102.09	1.157	88	6.62	2-6	C
Seattle-Vancouver	10.12	0.113	90	0.62	1	C
Total	377.22	3.968	95	24.82		
Long Distance:						
Chicago-New Orleans	98.25	0.674	146	5.27	1	S
Los Angeles-New Orleans	216.38	1.476	147	11.29	1	S
Los Angeles-Seattle	264.27	1.397	189	15.25	1-2	S
Chicago-Los Angeles	324.58	1.622	200	18.57	1	S
Chicago-Houston	104.64	0.999	105	5.96	1	S
Chicago-San Francisco/Seattle	353.75	2.556	138	21.03	1	S
Chicago-Seattle/Portland	273.70	1.790	153	15.96	1	S
Washington/New York-* Montreal	48,62*	0.489	99*	3.62	1	S
New York-Florida*	700.35*	3.610	194	45.71	3-4	S
New York-New Orleans	136.80	1.006	136	7.91	1	S
Washington-Cincinnati-Chicago	65.84	0.654	101	3.33	1	S
New York-Chicago/Kansas City	184.07	1.307	141	12.78	1	S
New York/Boston-Chicago/Detroit	140.80	0.901	156	8.72	1	S
Total	2,912.05	18.481	158	175.41		
System Total	3,289.27	22.449	147	199.24		

* Excludes intra-NEC passenger-miles and revenue but includes NEC train-miles.

** Explanation of codes: C = coach only; S = coach and sleeping car

*** Frequency is expressed in daily roundtrips by route. Frequency on short distance routes does not include any long distance frequencies between those end-points.

NOTE: This table does not include NEC routes.

TABLE D-11

ROUTE LEVEL PERFORMANCE MEASURES FOR
SCENARIO E NATIONAL/INTERREGIONAL/INTERREGIONAL SYSTEM

Route	Performance				Service	
	Passenger-Miles (Million)	Train-Miles (Million)	PM/TM	Revenue ($ Million)	Frequency ***	Class **
Short Distance:						
Los Angeles-San Diego	77.25	0.561	138	5.02	6	C
Portland-Seattle	14.67	0.135	109	0.74	1	C
Chicago-Milwaukee	21.08	0.248	85	1.40	4	C
Minneapolis-Duluth	11.08	0.108	103	0.56	1	C
Chicago-Detroit/Flint	71.61	0.795	90	4.80	1-4	C
New York-Albany-Buffalo (Incl. Montreal, Toronto)	137.92	1.514	91	8.99	1-7	C
Chicago-St. Louis	49.33	0.617	80	3.83	3	C
Chicago-Quincy	14.84	0.192	77	0.94	1	C
Seattle-Vancouver	10.12	0.113	90	0.62	1	C
Boston-Newport News*	16.49	0.472	35	1.16	1	C
Chicago-Champaign-Memphis	32.01	0.480	67	1.94	1-2	C
Total	456.40	5.235	87	30.00		
Long Distance:						
Los Angeles-Sacramento-Seattle	264.27	1.397	189	15.25	1-2	S
Chicago-Seattle/Portland	330.23	2.766	119	19.32	1-2	S
Chicago-Dallas-Houston	113.01	1.026	111	6.71	1	S
Chicago-Denver-Oakland/Los Angeles	511.14	2.091	245	28.70	1	S
Chicago-Seattle/Oakland/Los Angeles	571.80	3.349	171	34.47	1	S
Chicago-New Orleans	98.25	0.674	146	5.27	1	S
Los Angeles-New Orleans	216.38	1.476	147	11.29	1	S
Chicago-Atlanta-Florida	128.17	1.409	91	7.70	1	S
New York/Washington-Pittsburgh-Detroit/Chicago	173.48	1.092	159	11.78	1	S
New York/Pitt-Ind-K.C.	195.13	1.633	119	13.55	1	S
Wash-Cinn-Ind-Chicago					1	S
New York-Florida*	700.35	3.610	194	45.71	3-4	S
New York-New Orleans	136.80	1.006	136	7.91	1	S
Boston/New York-Detroit/Chicago	140.80	0.901	156	8.72	1	S
Washington-Montreal*	48.62	0.489	99.4	3.62	1	S
Total	3628.43	22.919	158	220.00		
Grand Total	4084.83	28.154	175	250.00		

*Excludes intra-NEC passenger-miles and revenue but includes NEC train-miles.

**Explanation of codes: C = coach only; S = coach and sleeping car

***Frequency is expressed in daily roundtrips by route. Frequency on short distance routes does not include any long distance frequencies between those end-points.

NOTE: This table does not include NEC routes.

A Reexamination of the Amtrak Route Structure
Preliminary Report to Congress and the Public
May 1978

Errata

Page 6-2 - Add to note: "A preliminary estimate indicates that labor protection payments required to implement this system will range from $70 million to $300 million."

Page D-7 - Fourth line of note: labor protection payments range from $155 million to $640 million.

Page D-9 - Fourth line of note: labor protection payments range from $45 million to $145 million.

Page D-10 - Fourth line of note: labor protection payments range from $25 million to $90 million.