

but have relatively little significance for national transportation. Transferring such programs to the states would release about \$1.7 billion in Highway Trust Fund revenues that are currently spent on these programs. If these revenues were spent on the Interstate program, they would greatly reduce the additional motor fuels tax burden associated with the various program alternatives outlined above. For example, the Minimum System would require an increase in motor fuels taxes of 1.3 cents per gallon instead of 3.5 cents. Under the Intermediate System, the increase would be 1.9 cents per gallon instead of 4.1 cents (see Summary Table).

Indeed, if all federal aid to highways were concentrated exclusively on the Interstate and primary systems, the Minimum System could be completed without increasing highway user taxes at all and the Intermediate System would require an increase of only 0.4 cents per gallon. Such a course would shift to the states full responsibility for the secondary and urban systems, as well as a wide range of safety and other specialized programs. While the extent of national interest in these safety, resource development, and recreation programs can be argued, they clearly contribute less than the Interstate and primary systems toward the facilitation of interstate commerce and intercity travel. To the degree that this highway transportation objective is of the greatest national interest, the other programs are a secondary priority.

Transferring some current federal highway programs to the states would not reduce the need for increased highway user taxes, however, if the associated revenues for these programs were transferred as well. Although such a combined program-revenue shift would substantially alleviate any state financial dislocation, some states might face organizational stresses as federal categories and standards were eliminated, and various state factions pressed for specific uses of the newly gained latitude.

Whether by shifting program priorities away from new construction, by increasing highway user taxes to pay for the program, or by transferring funds from other highway programs into the Interstate program, the Congress faces difficult choices between eliminating various activities or increasing taxes to pay for them. While any resolution of the problems confronting the Interstate program might reflect a combination of all these steps, all three could substantially alleviate current financial pressures within the Interstate highway program.

CHAPTER I. INTRODUCTION

In its 25 years of existence, the Interstate Highway System has assumed enormous importance within the nation's transportation system. Interstate routes carry 19 percent of the nation's auto travel and an estimated 32 percent of the nation's truck traffic. The Interstate System has reshaped where Americans live, work, shop, and vacation. It has been a major factor in the growth of suburbia, with its attendant shift in populations and the services they require.

The Interstate System was conceived in the Federal-Aid Highway Act of 1944, which authorized a network of 40,000 miles to link the country with high-quality roads. Not until passage of the 1956 highway act, however, did full construction begin, when the program received a consistent source of funding through establishment of the Highway Trust Fund. ^{1/} Between fiscal years 1956 and 1981, the federal government, which pays 90 percent of construction costs, has spent \$176 billion on the Interstate System (in 1979 dollars).

CURRENT PROBLEMS

Although most Americans take the Interstate Highway System for granted, its future is threatened by several emerging problems:

- o The high, and constantly increasing, cost of completing the system;
- o Projected declines in its financing base--revenues from the motor fuels and other highway user taxes; and
- o The inadequacy of the program to keep pace with current and future repair needs.

Solving these problems will require several actions to be taken either separately or, more probably, in combination: trim and restructure the

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1. It should be noted that the Highway Trust Fund allocates money for about 90 percent of federally assisted highway programs, of which the Interstate System is only one.

current program to fit available future resources, increase highway user taxes, and discontinue other highway programs to free additional funds for Interstate projects.

In short, the present program is trying to do too much with too little, and is not succeeding on any front. With existing authorization levels, the system will not be completed before the mid-1990s at the earliest, repairs will fall further behind, and revenues from current user fees will continue to be inadequate to finance an effective resolution of these needs. The three factors that contribute to the present inadequate financing are described briefly below.

Escalating Completion Costs

To date, 95 percent of the routes in the Interstate System has been completed. In spite of continued progress in reducing the number of remaining miles, however, the \$38.8 billion (in 1979 dollars) needed to complete the planned system remains high (see Table 1).

Two factors have caused the increased costs to complete the Interstate System. First, in addition to constructing new routes, completing the system has grown to include substantial expenditures for upgrading sections already open to traffic.^{2/} Most of these upgrading costs are for additional lanes and interchanges, new safety measures, rest areas, noise barriers, and other features that have been added since the program began in 1956. Second, material and labor costs have risen by an average of 15 percent annually between 1977 and 1980. As a result, the cost per mile to complete the system (including upgrading) has risen from \$4 million in 1959 to \$20 million in 1979 (both estimates are in 1979 dollars) (see Table 1). Even if construction costs increased by only half that rate for the next ten years, current authorization levels for new construction could finance less than three-quarters of the remaining work.

Declining Trust Fund Revenues

The 1956 highway act both authorized the Interstate Highway System and created the Highway Trust Fund to finance it. Although federal taxes on motor fuels had been used to fund federal road programs since the 1930s,

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2. Throughout this report, estimates of cost to complete include costs to upgrade sections open to traffic.

TABLE 1. COST TO COMPLETE THE INTERSTATE SYSTEM a/,
SELECTED CALENDAR YEARS 1959-1979 (In 1979 dollars) b/

Calendar Year	Miles Not Opened	Cost to Complete (In billions of dollars)	Cost Per Mile to Complete Sections Not Yet Opened (In millions of dollars)
1959	33,858	124.0	4
1966	19,024	89.6	5
1970	10,957	80.9	7
1975	5,108	59.9	12
1977	3,593	60.5	17
1979	2,723	53.8 <u>c/</u>	20

SOURCE: CBO estimates from data provided by the Federal Highway Administration.

- a. Includes cost to upgrade completed sections.
- b. Deflated using the U. S. Department of Transportation's Composite Index of Federal-Aid Highway Construction.
- c. The Federal-Aid Highway Act of 1981 reduced this amount to an estimated \$38.8 billion (after allowing for possible route withdrawals) through cuts in certain Interstate construction projects.

it was not until 1956 that the linkage between programs and financing was formally established by the creation of the trust fund. The key revenue source--the tax on motor fuels--began at 3 cents per gallon and has increased only once, to 4 cents per gallon in 1959. In spite of this relatively static revenue source, revenues entering the Highway Trust Fund grew rapidly in the first 20 years of the program because vehicular travel also grew rapidly.

Recently, however, this revenue source has been increasingly constrained. Surges in fuel prices not only have slowed the rate of growth in vehicular travel, but also have encouraged consumers to purchase more fuel-efficient cars. Thus, there is less consumption of motor fuels to tax. Receipts from excise taxes on trucks and truck parts also have been reduced by lower sales caused by general economic conditions. As a result, receipts for the Highway Trust Fund fell from \$8 billion in fiscal year 1979 to \$7.3 billion in 1981 (see Table 2). In addition, the Interstate program has received a smaller share of overall highway revenues in the last eight years. Between fiscal years 1957 and 1973, the Interstate highway program generally received around 65 percent of all authorizations from the Highway Trust Fund. Starting in 1974, that share fell to under 50 percent, as more was allotted to other highway programs. When adjusted for inflation, Highway Trust Fund revenues have been falling sharply, as have authorizations for the Interstate program (see Table 2). Similarly, trust fund receipts in future years will remain relatively static, even as inflation forces increases in the cost of highway projects.

Mounting Repair Needs

At the same time that revenues are shrinking and costs growing, open portions of the system increasingly need repairs. Federal and state spending for repair of Interstate highways covers only about one-third of the work needed to keep them smooth and safe. Many of the earliest Interstate routes are nearing the end of their expected useful lives of 15 to 20 years (called "design life"), and many others will do so in the next several years. Since virtually no major repairs were made during the first 15 years, the percentage of Interstate miles in poor condition has grown rapidly in the last ten years. CBO estimates that about \$16 billion (in 1979 dollars) will be needed for repairs between 1980 and 1990 (see Table 3). Under current authorizations, less than half this amount will be available.

PLAN OF THE PAPER

Chapter II discusses the key provisions of the current Interstate program and highlights how the provisions themselves have contributed to the problem of growing completion and repair costs. Chapter III describes the current program and sets out two alternative plans for restructuring the Interstate program to contain new construction costs, thereby freeing funds for needed repairs. Chapter IV examines options for financing the Interstate System.

All three program alternatives set forth in Chapter III would require sizable increases in user fees. Chapter V outlines some possible mechanisms for restraining such increases by decreasing federal funding of non-

TABLE 2. HIGHWAY TRUST FUND RECEIPTS AND INTERSTATE AUTHORIZATIONS, SELECTED FISCAL YEARS 1960-1981

Fiscal Year	Highway Trust Fund Receipts (In millions of current dollars) <u>a/</u>	Highway Trust Fund Receipts (In millions of 1979 dollars) <u>b/</u>	Authorizations for the Interstate Program (In millions of 1979 dollars) <u>b/</u>
1960	2,536	9,761	9,622
1965	3,670	12,550	9,233
1970	5,469	13,446	9,834
1975	6,774	9,989	4,498
1976	6,000	9,161	4,657
1977	7,302	10,413	4,635
1978	7,567	9,037	3,881
1979	8,046	8,046	3,425
1980	7,647	6,690	2,996
1981	7,303	6,633	3,338

SOURCE: CBO estimates from data provided by the Federal Highway Administration.

- a. Includes tax receipts plus interest earned on trust fund balance.
- b. Deflated using the U. S. Department of Transportation's Composite Index of Federal-Aid Highway Construction.

Interstate highway activities of relatively local importance and using the savings to finance the repair and remaining construction of the Interstate System.

TABLE 3. INTERSTATE SYSTEM REPAIR NEEDS, SELECTED CALENDAR YEARS 1960-1980

Year	Percentage of Route Miles Having Reached Design Life <u>a/</u>	Percentage of Route Miles in Poor Condition <u>b/</u>	10-Year Cost of Repair (In billions of 1979 dollars)
1960	0	0 <u>c/</u>	0 <u>c/</u>
1965	0	0 <u>c/</u>	0 <u>c/</u>
1970	0	0 <u>c/</u>	0 <u>c/</u>
1975	28	4 <u>d/</u>	12 <u>e/</u>
1980	41	9 <u>d/</u>	16 <u>e/</u>

- a. Based on design life of 15 years for roads designed between 1956 and 1963, and 20 years thereafter.
- b. The term "poor" covers pavements that have deteriorated to such an extent that, in the opinion of the Federal Highway Administration, they are in need of resurfacing.
- c. Although no data are available it is probable that little Interstate mileage reached a state of poor condition in these years.
- d. CBO estimates based on 1978 data presented in U. S. Department of Transportation, The Status of the Nation's Highways' Conditions and Performance (1981).
- e. CBO estimates based on Final Report, Interstate Resurfacing, Restoration, and Rehabilitation Needs Study (Updated 1980).

Appendix A provides a detailed outline of Interstate program costs. Appendix B presents a historical overview of federal highway aid. Appendix C summarizes the characteristics of gaps in the Interstate system.

CHAPTER II. KEY FEATURES OF THE PROGRAM AND 1981 CHANGES

Since many of the causes of the Interstate program's current problems come from the very provisions that made it so effective in earlier years, it is instructive to review these features in light of today's financing concerns and economic outlook. In particular, four features of the program have contributed importantly to the existing situation:

- o The extraordinary federal financial commitment to the Interstate System compared to other highway programs;
- o The exceptional degree of centralized planning, as reflected in the appropriations of funds based on cost to complete the system;
- o The almost exclusive orientation of the program toward new construction, without adequate provision for repairs of existing routes; and
- o The dual emphasis on national and local transportation requirements of existing routes.

These key features are examined in this chapter, as well as the changes enacted in the 1981 highway act.

FEDERAL FINANCIAL COMMITMENT

The Congress has financed roads since the early 19th century, based on its constitutional powers to establish post roads and regulate commerce among the states. Throughout most of this century, federal aid for roads has been distributed to the states according to a formula based upon factors like area, population, and road mileage; and the states have retained substantial authority to decide which projects to fund. Over the years, the number of federal road programs has grown considerably. Since the beginning of the modern highway program in 1916, however, the bulk of federal highway aid was directed toward a system of interconnected arterial routes, now called the primary system, that links the nation's major cities.

The program was significantly expanded in 1944, when the federal government established separate, proportioned allocations for three cate-

gories of roads--the primary system (whose funding could be used for the Interstate System), a secondary system (mostly farm-to-market roads in rural areas), and urban extensions of the primary system. Since then, the highway program has continued to expand, including the creation of general improvement programs for bridge replacement, hazard elimination, and rail-highway crossings. Numerous, highly specialized programs have also been instituted for safety, emergency relief, the Great River Road, control of outdoor advertising, and other purposes. In fiscal year 1982, the federal government authorized about \$8.5 billion from the Highway Trust Fund for various road programs, less than half of which went to the Interstate program (see Table 4).

The Interstate System was first conceived as part of the Federal-Aid Highway Act of 1944. It was envisioned as a separate, new interconnected network of high-quality roads, over and above those being built in various other categories. During the decade after the Interstate System was first approved, however, little progress was made in its construction. Although the 1944 highway act designated a network of 40,000 Interstate route miles eligible for federal funds, it did not set aside separate money for this purpose. The states were given no special incentives to build Interstate routes. Rather, they continued to receive the same 50 percent in federal matching funds for primary routes, which could also be devoted to the Interstate System. In addition, since the total funds available to each state for primary routes was fixed, a state that built Interstate routes diminished the amount of financing that remained for its primary routes.

As a result of this financing method, less than 1 percent of the Interstate System was completed by 1954--10 years after the system was first authorized. Consequently, many believed that, without special incentives, few state legislatures would ever appropriate enough money to build the Interstate System. The Federal-Aid Highway Act of 1956, which is generally regarded as marking the beginning of the Interstate highway program, established three such special incentives: first, it authorized a large, separate sum for Interstate highways; second, it provided federal funds to the states on a 90/10 matching basis; and third, it created the Highway Trust Fund to ensure a continuous, reliable source of program funds. These three provisions are discussed below.

TABLE 4. AUTHORIZED FEDERAL SPENDING FROM THE HIGHWAY TRUST FUND IN FISCAL YEAR 1982 a/

Program	Authorization (In billions of dollars)	Percent of Total
Major Road Systems		
Interstate	4.025	47.13
Primary	1.500	17.56
Secondary	0.400	4.68
Urban	0.800	9.37
General Improvement Programs		
Bridge replacement and reconstruction	0.900	10.54
Pavement marking and high-hazard obstacle removal	0.265	3.10
Railroad/highway crossings	0.190	2.22
Categorical Programs		
NHTSA operations and research <u>b/</u>	0.031	0.36
NHTSA safety grants <u>b/</u>	0.100	1.17
FHWA safety research and development <u>c/</u>	0.013	0.15
FHWA safety grants <u>c/</u>	0.010	0.12
Accident data collection	0.005	0.06
Demonstration projects		
Railroad/highway crossings	0.067	0.78
Emergency relief	0.100	1.17
Economic growth center development highways	0.050	0.59
Forest and public lands highways	0.049	0.57
Great River Road	0.025	0.29
Bicycle program	<u>0.010</u>	<u>0.12</u>
Total, All Programs	8.540	100.0

- a. In addition to the figures shown, authorized expenditures on roads from general revenues total approximately \$800 million in 1982. Of this, more than \$500 million was appropriated in 1982. Most of these nontrust fund revenues are spent on forest development roads and trails, Appalachian Development highways, Indian reservation roads and bridges, and public lands development roads and trails.
- b. NHTSA = National Highway Traffic Safety Administration.
- c. FHWA = Federal Highway Administration.

Interstate Authorization

The 1956 highway act authorized huge federal sums for the Interstate program--beginning with more than \$1 billion in fiscal year 1957 and growing to \$4 billion in fiscal year 1970. This dramatic shift in highway funding can be appreciated by comparing it to authorizations for the other major highway programs--the primary, secondary, and urban extensions--which, even though their authorizations were also increased in the 1956 act, together received less than \$900 million in total authorizations annually between fiscal years 1957 and 1959. Thus, in one definitive step, the Interstate System became the dominant federal highway program, accounting for about two-thirds of all federal spending on roads in the 1960s and early 1970s.

Through the Interstate's history, authorizations for the system have treated it as a one-shot, capital construction program. As a result, the periods of authorizations have extended many years into the future, and were intended to cover all construction until the system was completed. The large authorizations for the program were not considered to be a permanent feature of federal highway policy, but rather a once-only construction program.

90/10 Matching Funds

To encourage states to participate actively in the Interstate program, the 1956 act provided that the federal government would pay 90 percent of the costs of constructing the Interstate System. (The federal share was set even higher in states where the federal government owns a large proportion of the land.) ^{1/} Compared to the primary, secondary, urban extensions, and other highway programs, which generally received federal funding on a 50/50 matching basis, the Interstate program represented a high degree of financing responsibility by the federal government. Since the size of the system was agreed upon at the outset, the generous federal contribution was not seen as encouraging program expansion, but simply as a device for

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1. The 1956 act allowed the federal share to exceed 90 percent (but never more than 95 percent) to the extent that "unreserved public lands and nontaxable Indian lands exceed 5 percent of the state's total land area." Under this provision, 10 western states pay less than 10 percent of Interstate construction costs.

getting the job done quickly. Later events, however, proved this control to be less stringent than the framers of the 1956 act had envisioned.

The 90 percent federal contribution provides a substantial incentive for states to expand their participation independent of their actual transportation needs. This occurs because construction activities themselves generate jobs, which, in turn, generate additional retail and other economic activity, and ultimately result in increased state tax revenues by virtue of the enhanced employment, both direct and indirect. As a result, apart from the value of the roads itself, the Interstate program provides significant economic returns through its stimulation of local construction activity and indirect increases in related economic activity. Thus, states have an economic incentive to undertake construction projects of this sort simply because the highly subsidized financing yields economic benefits to the state during the construction phase. For example, during a period when its construction industry had substantial slack capacity, the state of Massachusetts estimated that, for each 10 cents it spent building Interstate roads, it received 15 cents in increased state tax revenue.^{2/} Under such circumstances, there can be little doubt that 90/10 financing provides a significant incentive to the states to undertake Interstate projects without regard to their transportation merits.

This incentive has probably been responsible for a substantial share of the program's rapidly escalating costs in recent years. Since the Interstate program finances the upgrading of existing roads as well as construction of new routes, states have a financial motive to do as much upgrading as possible, and controls on upgrading have not been as tight as the controls on new construction. This situation may cloud the evaluation of whether or not proposed upgrading projects are justified from an overall, cost-effectiveness standpoint. The large amount of upgrading work that has occurred in the Interstate program in recent years may be caused partly by the high federal share of costs.

Highway Trust Fund

The 1956 act created the Highway Trust Fund to ensure a stable source of funds to build the Interstate System and other highway projects. Receipts from various federal highway excise taxes, most importantly the

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2. Telephone conversation with Fred Salvucci, Secretary of Transportation and Construction for the Commonwealth of Massachusetts from 1975 to 1978.

4 cents per gallon tax on motor fuels, are deposited in the Highway Trust Fund. These funds are earmarked for highway projects, including the Interstate system, the primary system, secondary rural roads, urban roads, and more than 30 other separately authorized programs and projects. This earmarking ensures a source of long-term funding for multiyear construction projects such as the Interstate Highway System. Once authorized, funds for highway projects are virtually assured for the entire construction period.

The financing mechanism for the Highway Trust Fund also allowed the program to grow during the 1960s and most of the 1970s. Growth in vehicular travel between 1956 and the early 1970s increased the revenues available through the trust fund. Total federal expenditures for all highway programs grew from \$2.9 billion in fiscal year 1959 to \$5.3 billion in fiscal year 1973, an increase of about 83 percent, almost enough to keep pace with inflation during that period. But in the last decade, skyrocketing fuel prices have stemmed the growth in driving and consumers have been buying more fuel-efficient vehicles, thus lowering revenues from the gasoline tax. Simultaneously, rapid increases in highway construction costs have reduced the purchasing power of trust fund receipts. This trend is likely to continue throughout the 1980s as the growth in trust fund revenues remains well below the expected rate of inflation.

Matching the decline in trust fund revenues is the amount allocated to the Interstate System. The amount authorized for Interstate System completion fell from about 65 percent in the sixties and early seventies to 40 percent of total trust fund authorizations in recent years.

CENTRALIZED PLANNING AND APPORTIONMENT BASED UPON COST TO COMPLETE

Compared to other highway programs in which the states have broad discretion to choose which projects to build, the 1956 act designated a system of 41,000 route miles that were planned as parts of the Interstate Highway System. All of these miles were eligible for the 90 percent federal financing afforded by the program and all were included in the states' estimated cost to complete when funds were apportioned. This original route system has remained largely intact, although several intervening highway acts have extended it. In particular, it was extended by 1,500 miles in 1968 and 444 miles in the 1970s; the current maximum is 42,944 miles. The mileage of the system has always been somewhat imprecise because the exact length depends on the alignment along which routes are built. The system plan shows the general alignment of routes, but the states always are responsible for proposing the exact alignment and design of each route. The

Federal Highway Administration (FHWA), however, has final approval of the location and design of Interstate routes.

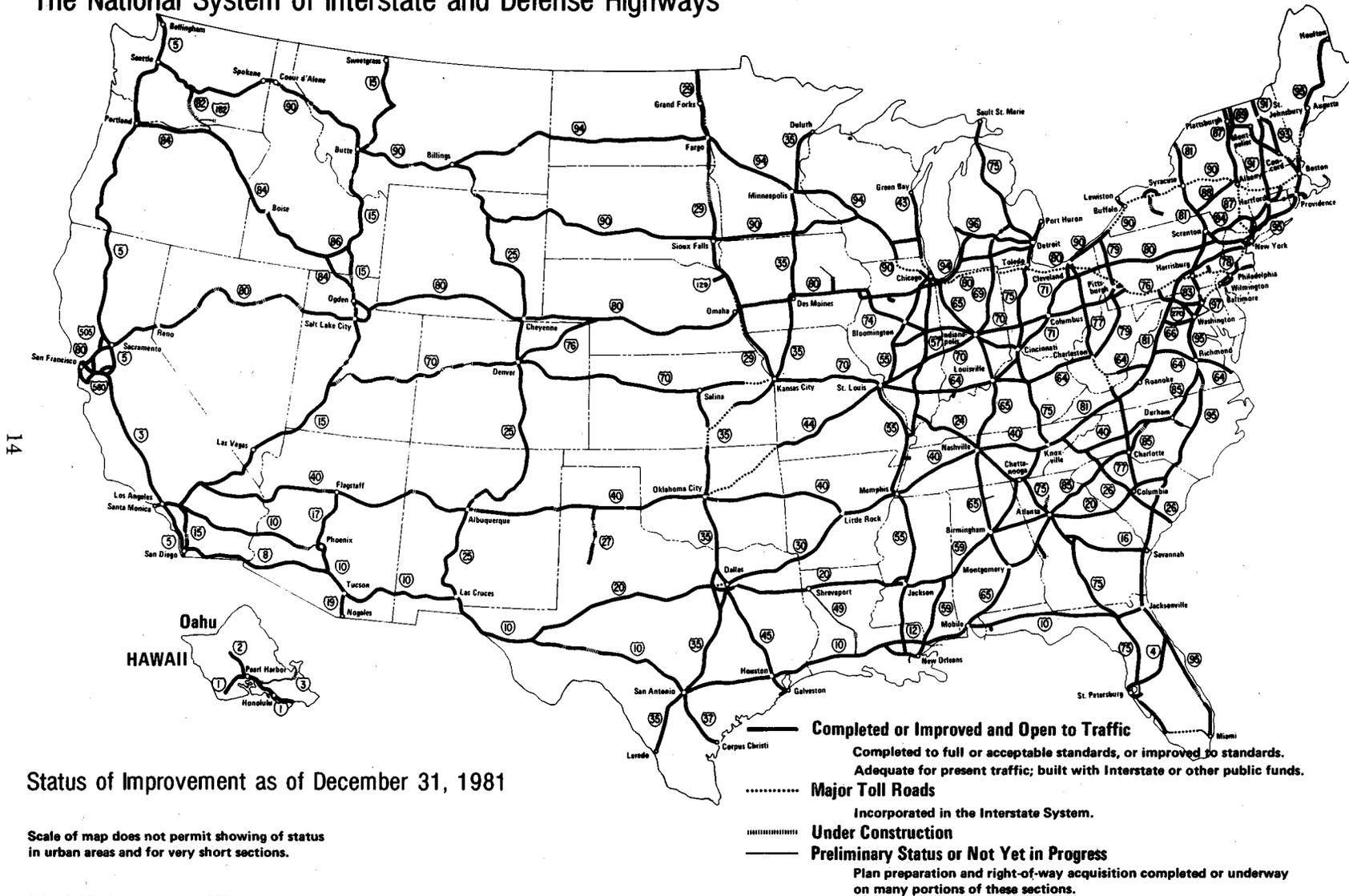
The alignment of all 42,944 miles has now been approved by FHWA (see Figure 1), and as of mid-1981, 40,634 miles--almost 95 percent of the system--were open and another 735 miles were under construction. The remaining 1,575 miles are not yet under construction. To begin construction of these unbuilt sections, states must meet two conditions. First, the FHWA must approve the environmental impact statement for the road (called design concept approval). Second, the FHWA must approve the detailed engineering, geometrics, and pavement design (called final design approval). Of the remaining 1,575 miles, 1,193 miles have design concept approval, and the remaining 382 miles are still in the earliest phases of planning and design.

Since the Interstate program started, funds to complete the system have been apportioned to states according to each state's share of the remaining completion costs. This approach has several advantages. First, it distributes funds in an even way which, barring changes in design or cost, permits each state to complete the same proportion of its Interstate work at the same time.^{3/} Thus, if all went according to plan, by the time one state had completed 80 percent of its work, every other state would have completed the identical percentage. Second, the apportionment plan does not penalize states with mountainous terrain, densely populated areas, or other conditions that make road building especially costly. Rather, it has the effect of increasing the apportionment to such states each year, thereby giving them the additional resources needed to complete their routes.

The approach of financing the system based upon the cost to complete has a perverse consequence, however. Any state that can increase its completion costs can thereby increase its share of program funds, all else being equal. This feature tends to encourage expansion of the system, which is apparent in two ways. First, the 1968 and 1978 highway acts together

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3. To give states an added incentive to complete the Interstate System, an exception to the apportionment formula provides that all states must receive a minimum amount of one-half percent of total authorizations. While helping small states, this minimum also provides an incentive to states to complete their Interstate construction quickly. Nine states currently receive the one-half percent minimum apportionment; three of these (Delaware, Nebraska, and North Dakota) have completed their Interstate routes.

Figure 1.
The National System of Interstate and Defense Highways



Status of Improvement as of December 31, 1981

Scale of map does not permit showing of status in urban areas and for very short sections.

SOURCE: Department of Transportation, Federal Highway Administration.

added nearly 2,000 route miles to the original 41,000 miles eligible for federal funding. Second, additional upgrading of existing or planned routes adds substantially to the total cost of completing the system.

While financing based on completion costs poses an incentive to expand the system, it would be unrealistic to assume that all expansions of the Interstate system are attributable to federal financing provisions. In the case of upgrading, for example, some of the costs come from incorporating various turnpikes and other existing highways into the Interstate System plan, rather than building entirely new routes. In these cases, the federal government paid to upgrade the existing roads to Interstate standards, thereby making them compatible with the remainder of the system. Many of the states had paid for the original routes with their own funds or by funds pledged against future tolls, which were largely paid by local users. In such cases, upgrading represents a net reduction in costs to the federal government, compared to the cost of constructing entirely new routes.

Similarly, some states built their Interstate routes in stages, opening a highway of minimum width as soon as possible and intending to widen it at a later date. Following this course could speed up the construction of the basic national networks, while deferring the widening of heavily travelled local sections.

Furthermore, many of the changes in design standards that have occurred since the program began in 1956 reflect improvements in construction techniques, advances in safety-related features, greater concern about the environmental consequences of roads, or increased emphasis on using roads to facilitate bus and carpool traffic. Thus, many of the added upgrading projects have responded to real changes in needs and technologies.

Nevertheless, there is little consensus about how to differentiate between genuinely needed upgrading projects and those that have been stimulated by the financial advantages conferred through apportionment based on cost to complete and the 90/10 federal matching funds. Prior to the passage of the Federal-Aid Highway Act of 1981, upgrading had grown to consume 47 percent of the cost of completing the Interstate System. Regardless of the reasons for this growth, many of these projects appear to be less important to the national interest than does completion of unbuilt parts of the system that are needed to connect important points of the national network.

Just as upgrading projects have arisen in response to changes in development patterns and social values during the last decade, it is likely that the system will have to adjust in similar ways in future years. At this

stage, with 95 percent of the planned routes built, it might be more appropriate to finance adjustments to these future needs on the basis of some set formula that does not encourage the creation of new projects. Now that the basic network is nearly complete, the highly centralized cost-to-complete approach is not well-suited to the complex local tradeoffs that determine the priorities for upgrading projects. If, instead, each state was apportioned some set amount for Interstate upgrading, this would remove the current incentive implicit in the cost-to-complete formula whereby additional "needs" generate more federal funds. As a result, each state would have some allocation of federal funds for upgrading, and could apply these in accordance with its own priorities, without attempting to increase its share of funding.

EMPHASIS ON CONSTRUCTION AND NEGLECT OF REPAIRS

In addition to having outgrown some of its financing provisions, the Interstate System is also confronted by repair needs that were not addressed in the early legislation governing this program. Historically, federal aid for roads has generally concentrated on new construction, and the states have been responsible for road repair. When federal policy toward repair of the primary system was evolving in the early 1920s, legislation required that federal construction funds be withheld if a state had failed to keep federally assisted routes in proper repair.

When the Interstate program began in 1956, repairs on the primary, secondary, and urban systems were not financed by the federal government. For the most part, repair of the Interstate System was also presumed to be a state responsibility, and early Interstate legislation followed the historical tradition of providing no federal funding for repairs.

Federal concentration on new road construction throughout most of this century is probably attributable to two factors. First, roads, like many other major improvements, impose very high capital costs, and federal financing helps to avoid dislocations in state and local economies. Repair costs are generally smaller, less volatile, and occur in smaller quantities. Therefore, they do not have the same financially disruptive effects on local budgets as construction. Second, local responsibility for road repair has a long, common-law history, dating from the time abutting property owners were responsible for clearing roads of fallen trees and the like. Although traditionally it is a national responsibility to ensure a right of way for passage, for hundreds of years it was the responsibility of local governments to keep that right of way clear and serviceable.

To some degree, the delineation of state and local roles in road repair is blurred by the distinction between maintenance and repair. Maintenance, such as snow removal, cutting roadside grass, cleaning highways, or patching potholes, has always been assumed to be a state responsibility. Indeed, state spending for these activities has increased relative to most other forms of state highway spending in recent years. Repairs, as used here, refers to resurfacing, restoration, and rehabilitation--or the so-called "3R" activities. These repairs typically involve major construction and may cost as much as new construction. Thus, while federal and state governments continue to assume that states will maintain roads, in the sense defined here, the resolution of appropriate roles regarding repairs has never been completely articulated at either level.

In recent years, the federal government has increased its financial assistance for road repair, for two principal reasons. First, roads formerly served mainly local traffic, even those occasionally used for long-distance travel. High-speed highways and vehicles, however, have permitted more long-distance hauling and driving. As a result, the mix of traffic using some roads has become increasingly nonlocal, and state priorities for road repair are increasingly diverging from federal priorities. This is particularly true on the Interstate System, which carries high percentages of out-of-state traffic on some routes. Second, road repair was once a relatively inexpensive activity. But, with the emergence of more intercity vehicular travel and the use of increasingly heavy vehicles, the cost of rebuilding worn out pavements can be nearly as much as building new roads.

Starting in 1974, the Congress began to redefine new construction and repair.^{4/} No federal funds for repair of the Interstate System were authorized until 1976, when that year's highway act apportioned \$175 million a year for repairs. The Surface Transportation Assistance Act of 1978 increased this funding to \$275 million for fiscal year 1981 and the Federal-Aid Highway Act of 1981 increased it to \$800 million for fiscal years 1982 and 1983. While this authorization has grown very rapidly since 1976, it still falls far short of paying for all repairs that are needed on Interstate roads. The Department of Transportation (DOT) estimates these will cost an average of \$1.6 billion to \$2.1 billion (in 1979 dollars) annually between calendar years 1980 and 1990.

4. U. S. Code, Congressional and Administrative News, House Committee on Public Works, H. Report 93-1567, 93:2 (1974), p. 8013.

Federal authorizations for repairs have been funded by a formula based on lane miles (specifically, the number of lane miles that have been in use for more than five years on the Interstate System) and on vehicle miles of travel on these roads. This formula helps to avoid some of the cost-increasing incentives of the financing approach based on cost to complete that is now applied to new construction.

At this juncture, the Congress may wish to review whether and how the federal government should help to finance the repair of Interstate routes. While federal assistance in this area is fairly new, three highway bills in the last six years have explicitly increased federal participation. There appears to be little rationale for treating new construction differently from major repairs. Whatever the federal purposes in building the Interstate System--be it facilitation of interstate commerce, enhancement of internal communication, or promotion of national defense--these same federal interests require that the system be kept in repair. At the same time, the federal program for Interstate repair is relatively new and untried. Many features of this program, including financing provisions and project eligibility requirements, may eventually need to be adjusted to make the program more effective.

DUAL EMPHASIS ON NATIONAL AND LOCAL ROADS

Another key feature of the Interstate program is its compound scope. It finances not only major intercity arteries that carry goods and people from state to state, but also major arteries within urban areas--roads serving commuting and other local needs. Since roads serving primarily local needs account for roughly 75 percent of the completion costs of the unbuilt portions of the Interstate System, their treatment is central to the long-run financial stability of the program.

Since the Interstate program began in 1956, it has financed both national and local roads, although this policy has been much debated both as it was being written into law and during the years the law has been applied. In particular, many of the planned local portions of the system proved to be highly controversial because of their environmental, developmental, social, or architectural consequences. In addition, many people thought that the highly favorable financial terms for Interstate highways contributed to the deterioration of public transportation services and contravened local and federal policies promoting such services. In response to these concerns, the Interstate program was modified in the 1973 highway act to allow states to delete routes that were not integral to the national, interconnected system. States that withdrew such segments could spend the same amount of federal funds on public transportation projects (or other Interstate roads) instead. Highway interests were strongly opposed to the use of Highway Trust Fund