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**INCENTIVES FOR MOBILITY
Using Market Mechanisms to Rebuild America's
Transportation Infrastructure**

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EXECUTIVE SUMMARY

America's transportation infrastructure is inadequate, but the solution is not simply to spend more public money. A market-oriented analysis reveals that the problem is institutional. The incentives which operate in the public sector under current policies all too often lead to (a) spending on the wrong needs, (b) not making efficient use of existing infrastructure, and (c) failing to maintain this infrastructure properly.

The market-oriented approach proposed here for our national transportation policy can resolve these structural failings. It stresses user funding, dedicated revenues, market pricing, and the use of private capital. These principles can be applied to airports, highways and freeways, mass transit, ports and waterways.

Federal and state policies toward transportation infrastructure should be revised in accordance with these principles. Doing so will make more efficient use of existing capacity and will target new resources to the highest-priority infrastructure needs.

*Note:
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1. AMERICA'S INFRASTRUCTURE PROBLEM

America in Ruins was the title of a book by TRW's Washington analyst Pat Choate several years ago.(1) It first raised the issue of decaying and inadequate infrastructure to national awareness. Many other studies have followed suit, generating estimates of the magnitude of the problem.

For example, in 1984 Congress's Joint Economic Committee estimated that infrastructure construction and maintenance needs over the next 15 years totaled over \$1 trillion.(2) Most of that total was for transportation--\$720 billion for highways and bridges and \$178 billion for mass transit. These sums were far less than would be available from current funding sources.

In 1984 Congress created the National Council on Public Works Improvement (NCPWI) to assess the problem. After three years of work, the Council published Fragile Foundations, a 1988 report which documented the declining share of Gross National Product being invested in public works since 1961 and recommended doubling the present level of capital spending on infrastructure.(3)

The magnitude of recent estimates of infrastructure-spending shortfalls may well be exaggerated. For example, the Federal Highway Administration told Congress in 1986 that it would cost \$51 billion to repair and replace the nation's 240,000 deficient bridges.(4) But a 1988 analysis of this report by the General Accounting Office (5) concluded that FHWA's estimate was questionable, because it included bridges that are not deficient, bridges which states have no intention of rehabilitating, and other bridges which can be "fixed" without major rehabilitation.

Similarly, a 1988 Congressional Budget Office study (6) takes issue with the NCPWI's uncritical acceptance of the Association of

General Contractors' estimate of \$118 billion per year in needed infrastructure investment. Interest groups, whether private or governmental, which stand to benefit from increased spending have an understandable incentive to exaggerate the need for such spending.

Nevertheless, it is undeniable that this country faces serious infrastructure problems:

- o Despite the soaring growth of air travel, only one major new airport (in Denver) is under development, while present traffic levels lead to serious delays at many congested hubs. The U.S. Department of Transportation puts the annual cost of airline delays at \$5 billion.
- o Urban freeways are choked with traffic during ever-lengthening rush-hour periods, with predictions of far worse gridlock by the year 2000. A study by the Texas Transportation Institute estimates the 1987 cost of traffic congestion in 39 urban areas at \$41 billion. (7)
- o The condition of major highways and bridges is deteriorating over time; these assets are wearing out faster than they are being replaced. "Deferred maintenance" is taking a major toll.
- o Despite major federal grants since 1972, thousands of communities still have inadequate wastewater treatment facilities. Moreover, many existing facilities are not generating enough revenues to provide for proper maintenance and replacement.

Infrastructure became a major issue during the election year 1988. Both conservative economist Gary Becker and liberal economist Alan Blinder devoted Business Week columns to the short-

changing of infrastructure needs. Becker, using public-choice analysis, explained why numerous other claims on public-sector resources tend to get more funding than infrastructure maintenance.(8) And Blinder pointed to a provocative study by economist David Aschauer of the Federal Reserve Bank of Chicago demonstrating a strong correlation between productivity gains and spending on airports, highways, water, sewer, and other core infrastructure.(9)

A lobbying coalition called Rebuild America was set up in Washington in 1987 to work in support of the recommendations of the NCPWI. Its founding members include the Associated General Contractors, American Public Works Association, and other large public works interest groups. Several Dukakis campaign advisers, including Robert Reich, spoke very favorably of Rebuild America, and The New Republic's Robert Kuttner called for massive new public works programs, as a way of dealing with both infrastructure needs and employment for workfare participants.

Sen. Daniel Moynihan introduced legislation in 1988 to set up a revolving loan fund, capitalized by federal infrastructure grants. In the House, then-Speaker Jim Wright proposed creation of a new infrastructure trust fund, similar to those now in existence for highways and airports. And the public works committees of both houses authorized the Office of Technology Assessment to conduct a study of new public works technologies and "major changes in the federal role to encourage more efficient and productive public works systems.

All of these activities represent what might be called the conventional wisdom in infrastructure. Their advocates assume that the problem is basically a lack of sufficient funding, rather

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than an institutional setting that is poorly equipped either to select cost-effective infrastructure projects or to properly manage and maintain them once they exist. They also assume that existing infrastructure is being used as efficiently and intensively as possible.

The premise of this paper is that the conventional wisdom is wrong. We can do a far better job of identifying and meeting this country's infrastructure needs by making use of market mechanisms (such as pricing and return-on-investment criteria).

2. A CASE OF GOVERNMENT FAILURE

In several fundamental ways, the conventional public-sector approach to infrastructure is deficient. To be sure, the public-sector approach does produce highways, airports, waterways, etc. But the incentives it provides for decision-making do not ensure that the most important needs are met, that the maximum benefits are derived from each project, or that projects are properly maintained over their lifetimes.

o Spending on Less-Important Needs

The Congressional Budget Office points out that, "Since the benefits of using facilities are not tied to the costs of providing them, federal programs lead to inflated perceptions of the demand for infrastructure."⁽¹⁰⁾ With federal capital grants providing 80 percent of the capital costs of new transit systems, for example, it is hardly surprising that many local officials choose to build capital-intensive rail transit systems which provide far less mobility per dollar than expanded bus or paratransit systems.

Moreover, because federal grant programs must allocate funding

to most or all congressional districts, numerous projects of relatively low priority end up getting funded--which makes fewer dollars available for more urgent projects. For example, although general aviation (small private planes) generates only 4 percent of the funds in the Airport & Airways Trust Fund, grants to the non-commercial airports used by this category of aviation account for 30 percent of all airport grants.

o Not Getting the Most out of Existing Infrastructure

The public sector historically has exhibited a strong bias against market pricing of infrastructure use. Below-market pricing leads to over-use (congestion), which leads to demands for building more capacity--some of which would not be needed, if more-rational pricing were employed to get the most use from the existing capacity.

Thus, we see major congestion problems at busy hub airports and on urban freeways--in both cases during peak-demand hours, while those same facilities are lightly used at many other times of day. The telephone system solves this problem with differential pricing, but publicly owned airports and freeways ignore this efficient mechanism. Federally supported inland waterways charge only token user fees, which currently cover only 9 percent of Corps of Engineers costs for inland navigation; this subsidization diverts traffic from rail systems (which must pay 100 percent of the cost of their infrastructure).

Economists are virtually unanimous in advocating the use of market pricing for infrastructure use. The Congressional Budget Office says that managers of infrastructure should "price [their facilities] in a way that will optimize their use." CBO maintains that present pricing policies on federally supported infra-

structure "fail to provide either infrastructure users or state and local managers with incentives to make efficient choices." And besides leading to over-use and congestion, "below-cost pricing leads users to request more infrastructure services than they are willing to pay for, while planners get an exaggerated perception of investment needs from these misleading signals about infrastructure demand."(11)

o Failing to Maintain Infrastructure Properly

There is a direct link between the lack of a dedicated revenue source for a bridge or highway and its ultimate state of maintenance. By funding much infrastructure operation and maintenance out of general revenues, the public sector has institutionalized irresponsibility in ongoing maintenance. The reason is not hard to understand. New York State Comptroller Edward V. Regan wrote the following to NCPWI in 1988:

When highways and bridges are regularly maintained there is no press coverage. When they are rebuilt it is an "event." There is a ribbon-cutting and plenty of press coverage. The incentives, therefore, are for public officials to purposefully starve the maintenance budget. . . . Until this motivation . . . is acted upon, we will be treated to recurrent infrastructure crises. In fact, proposals for infrastructure bonds, banks, etc. only abet this whole process. (12) [emphasis added]

It is not enough simply to impose some form of user fees on infrastructure. NCPWI's report points out that while nearly 75 percent of current capital spending on infrastructure comes from users, only about 50 percent of operations and maintenance spending comes from this source. The political process has demonstrab-

ly failed to dedicate the needed revenues to our infrastructure. The result is a chronic problem of deferred maintenance.

3. A MARKET-ORIENTED APPROACH

The problems discussed above are institutional; they are inherent in the way that infrastructure is funded and operated in the public sector. Massive increases in government spending are not the answer, even if they were likely--which they are not, due to the continuing fiscal problems at all levels of government. What we need is to rethink the institutions and incentives involved in infrastructure. Four basic principles form the basis of a market-oriented approach:

- o User funding: The general rule should be that infrastructure projects be paid for by those who use them and benefit from them. Making projects meet a market test of this sort will increase the likelihood that only those projects which are economically justified will get built.

- o Dedicated revenues: The organization which owns and operates the project must be able to keep and use the revenues to properly maintain and rebuild the project. We must institutionalize the responsibility for proper long-term maintenance of these facilities.

- o Market pricing: Mere user charges are not sufficient, since covering the average costs of a project does not ensure that users will be given the proper incentives to economize on its use. To resolve congestion problems, user fees must become market prices which provide incentives for concentrating only high-valued uses at peak-demand times and shifting other demands to off-peak hours.

- o Private capital: Economically viable transportation infra-

structure projects can and will be financed by private capital--if they are operated in accordance with the first three principles. Numerous examples from overseas demonstrate this point: the private tollways in Italy, France, and Spain; the privately funded subway in high-density Hong Kong; and most recently the \$13 billion privately funded and operated Channel Tunnel project. Thus, the lack of obvious funding sources for new infrastructure in the public sector need not mean that major new projects cannot be built.

These principles can be applied in several different configurations, including (a) management contracts with private firms to operate existing infrastructure, (b) the "build-operate-transfer" (B-O-T) system in which a private consortium gains a long-term franchise from government to finance, build, and operate a new project for a time period long enough to recover its investment (after which title reverts to the government), and (c) full privatization, in which the project is owned by investors and financed by a combination of debt and equity (as in the case of the proposed Illinois Toll Road Utility Act and recent development of "merchant" waste-to-energy plants).

America's infrastructure needs can be met by applying these market-oriented principles to airports, intercity highways, urban freeways, mass transit systems, ports, waterways, water supply, wastewater treatment plants, and solid-waste disposal facilities.

4. APPLYING MARKET PRINCIPLES

Airports

Airline deregulation has led to the growth of major hub airports, with a huge increase in air traffic. Delays at these air-

ports, already very significant, are projected to grow much worse over the coming decade, especially since only one major new airport project is under development (the replacement of Denver's airport with a larger facility). An industry coalition called the Partnership for Improved Air Travel is lobbying for higher levels of federal spending to increase airport and airway capacity.

A market-oriented assessment of the problem finds that airports do not charge market prices, which leads to demand greatly exceeding supply at peak hours but much excess capacity at other hours. In addition, airports do not have control over the principal variables which determine their ultimate capacity. The control tower and its staff and the high-tech landing aids are all owned and operated by the Federal Aviation Administration. The revenues which pay for new runways and taxiways come, in part, from a federal grants program which carries numerous controls and economic regulations. Among these regulations are substantial restrictions on airports' pricing freedom.

Airports are generally self-supporting enterprises, despite these constraints. Were airports free to operate like real businesses, they could be significantly profitable enterprises--which suggests that capital would be attracted into this business. In short, to the extent that we have a shortage of airport capacity in this country, we should be able to alleviate it by permitting airports to operate as private enterprises.

Airport privatization already exists in varying degrees. A small number of U.S. airports--both air-carrier and general-aviation--are operated under long-term lease or contract management by private firms. The Thatcher government privatized British Airports Authority in 1987; it is now a stockholder-owned for-

profit firm. New airports in Japan and China, and new terminals in Canada and Turkey, are being developed under the B-O-T system by private consortia. And a number of governments both abroad--New Zealand, Denmark, Belgium--and at home--Albany, Atlanta, Los Angeles, Peoria, and Philadelphia--have begun to consider selling their existing airports to private investors. In addition, investment banks and other firms in Europe and the United States are researching the potential of creating new hub airports (often referred to as Wayports) as business enterprises.

A number of current federal policies serve as deterrents to airport privatization, however. The Federal Aviation Administration has opposed Albany's efforts to privatize, despite the endorsement of private ownership and operation of transportation facilities in the Department of Transportation's National Transportation Policy, released in March 1990.

Interstate Highways

The present \$14 billion federal highway program expires September 30, 1991. There is much current discussion over what the federal role should be, now that the Interstate Highway system is virtually completed. The Highway Users Federation has held Transportation 2020 forums around the country, to generate support for a continued federal program, higher levels of spending, and the continued dedication of gasoline tax revenues to highway purposes. This approach reflects the business-as-usual conventional wisdom, ignoring such issues as the reason for massive deferred maintenance. It also conflicts sharply with growing pressures to impose further gasoline tax increases to help reduce the federal deficit.

The Congressional Budget Office and many transportation

economists have pointed out that the end of the Interstate program provides a good opportunity to rethink the federal role, possibly even withdrawing federal aid.(13) CBO and others have noted the potential of tolls as an alternative or supplement to gasoline taxes. Although tolls have historically been strongly discouraged by federal regulations, the 1987 highway bill authorized toll demonstration projects in nine states; and there has been intense competition among the states to qualify for these projects.

The strong success of the B-O-T model in Italy, France, and Spain, and its more recent spread to the Pacific Rim (Australia, China, Indonesia, Malaysia) suggests that the private sector could play a major role in both financing and operating toll highways in this country. During the last few years, private toll-road projects have been proposed in California, Colorado, Florida, Illinois, Missouri, Puerto Rico, and Texas. Laws creating private toll road programs have been enacted in California and Virginia (and are being considered in Arizona, Florida, Illinois, Minnesota, and Texas). America's first private toll road in modern times was approved in July 1990 in Virginia--the Dulles Toll Road Extension. And four private tollway projects, worth \$2.5 billion, were selected in California in September 1990.

The Bush administration's proposed surface transportation reauthorization bill reverses the federal government's historic opposition to toll roads. It provides for the use of federal aid to improve existing toll roads and build new ones and to reconstruct free bridges and tunnels as toll facilities. It also provides incentives for private financing, development, and operation (but not ownership) of toll facilities.

Urban Freeways

A September 1988 Time magazine cover story headlined "Gridlock!" typified growing media attention to the increasing congestion on our major urban expressways. Unfortunately, despite more than a decade of work by transportation economists, not one word was included in the article about peak-hour pricing as the remedy. Fortunately, this communications blackout is beginning to lift, outside the popular media.

Two key ideas need to be understood in this context. One is that new technology permits tolls to be charged electronically, so that cars need not stop at congestion-inducing toll booths. At least a dozen companies are producing Electronic Toll Collection (ETC) systems, using electronic technology to read a vehicle's account number as it drives past. Electronic toll collection is now fully operational on the Dallas North Tollway, the Crescent City Connection bridge in New Orleans, and the entire Oklahoma Turnpike system.

These ETC systems facilitate peak-hour pricing, because they make it very easy to change price levels. A recent paper from the Federal Reserve Bank of San Francisco advocates peak-hour tolling via ETC as the key to resolving gridlock on California freeways. [14] Its recommendations were endorsed by the Bay Area Economic Forum in its proposal for a market-oriented transportation policy for the San Francisco Bay area. [15] And this spring the Environmental Defense Fund released a major study advocating the use of congestion pricing to help resolve gridlock and reduce emissions on the Los Angeles freeway system. [16]

The other innovation is private financing, ownership, and operation--principally on the European B-O-T model. Historically, the B-O-T model has been used for intercity highways and for major

tunnels and bridges. But private firms have recently proposed several major urban tollway projects in Europe: a tunnel along the length of the Thames River beneath London, a second deck on the M-25 around London, and a system of tunnels beneath Paris. A 1988 Reason Foundation preliminary study suggested that private tollways be built as second decks above congested Los Angeles freeways.(17) The study inspired California's 1989 private tollway law, AB 680, under which several urban-area tollways are now being developed.

Many of the same barriers that inhibit private-sector provision of inter-city highways also apply to urban expressways. For example, since many gridlocked urban expressways are segments of the Interstate system, the federal ban on tolls prevents the introduction of congestion pricing on those expressways. Federal repayment requirements also inhibit the sale or lease of an existing expressway to private enterprise (e.g., for conversion to a privately operated and maintained tollway). The Bush administration surface transportation proposal would permit congestion pricing on Interstate segments within major cities with air pollution problems.

Mass Transit

"New federally assisted transit systems have not added to mass transit; instead, they have replaced flexible bus routes with costly fixed-route services to a few downtown areas, while the growth in jobs and population has been in the suburbs and in smaller cities."(18) This conclusion by the Congressional Budget Office illustrates how federal funding has often been spent on the wrong needs. Other unfortunate consequences of federal transit spending have been to foster the use of larger buses, when smaller

vehicles would provide more-frequent (hence, more user-friendly) service, and to promote premature replacement of buses. These and other incentive problems have led CBO and many transit economists to suggest the termination of federal subsidies for urban transit systems.

Transit clearly has a role to play in urban mobility, but an environment in which federal transit subsidies are reduced or eliminated would require considerable rethinking. What's needed is a new model for urban transit, based on encouraging a variety of competing transit providers. In order to attract drivers out of their cars, new types of transit are required, offering at least some of the amenities (little or no waiting time, comfort, privacy, safety, etc.) of the private automobile. Examples of some such systems exist in this country (e.g., the SuperShuttle and other door-to-door van services), and some major cities overseas (Buenos Aires, Hong Kong) offer examples of competitive (as opposed to monopoly) transit systems.

The reauthorization of the federal mass transit program in 1991 offers an opportunity to rethink the government's role, along market-oriented lines. The administration's proposal would eliminate operating subsidies for large cities (over 1 million) but would continue other capital and operating subsidies. On the positive side, it would continue to urge the competitive contracting of bus routes.

Ports and Waterways

The federal government maintains 21,000 miles of shallow-draft inland waterways and subsidizes 270 deep-draft ports and harbors. User charges in the form of a fuel tax pay for about 10 percent of federal waterway costs, and local governments have been required

to pay a small portion of harbor dredging costs since 1986. In addition, there is now a federal harbor maintenance tax which is intended to cover 40 percent of the Corps of Engineers' operations and maintenance expenditures at ports. Overall, users pay only 21 percent of the costs of these facilities, resulting in a net federal subsidy of about \$1 billion per year.[19]

This water transportation infrastructure is subject to the same problems as other publicly subsidized infrastructure. Many of the projects built by the system are economically unjustified; lack of market pricing causes over-use and congestion of certain facilities; and facilities are not always properly maintained.

Subsidization of water transportation infrastructure has been questioned by economists, environmentalists, and the Congressional Budget Office. The recent CBO report considered two options for future federal policy: increase user fees to cover all costs or withdraw all federal participation. CBO's calculations showed that in the majority of cases, modest and affordable user fees would recover all costs, except for certain ports and waterways with comparatively low demand. This assessment suggests that private ownership could be considered for most of these facilities.

Privatization could take the form of either a straight commercial buyout, with the port being run as a for-profit enterprise, or the creation of a user co-op. Several ports have been privatized in the past five years, including Associated British Ports, the Port of Gothenberg (Sweden), and the Port of Buffalo, New York (now owned by Gateway Metroport & Trade Center). A number of other countries are considering privatizing their major ports, including Argentina, Panama, Uruguay, Venezuela, Malaysia, and Singapore.[20]

5. CONCLUSION

Our national and state transportation policies must cope creatively with the mismatch between today's infrastructure needs and limited public-sector resources. The private sector is willing and able to play a major role in financing, building, rehabilitating, and operating transportation infrastructure. Wise government policy should encourage and facilitate this participation.

It must also provide incentives for wise use of existing infrastructure. Market pricing, user funding, and dedicated revenues will provide those incentives. But major changes in existing policy and regulations will be needed to take full advantage of these market principles.

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