# HIGH PERFORMANCE PUBLIC WORKS

A New Federal
Infrastructure Investment Strategy
for America



U.S. Army Corps of Engineers Water Resources Support Center Institute for Water Resources



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# HIGH PERFORMANCE PUBLIC WORKS

A New Federal Infrastructure Investment Strategy for America

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### **EXECUTIVE SUMMARY**

The National Council on Public Works Improvement (NCPWI) reported to the President and the Congress in 1988 that "America's infrastructure is barely adequate to fulfill current requirements, and insufficient to meet the demands of future economic growth and development." Still today, the federal government has no coordinated public works strategy to implement the improvements that NCPWI recommended.

The 1990 charge to the U.S. Army Corps of Engineers to develop a Federal Infrastructure Strategy provided an opportunity to follow up on the NCPWI work in consultation with many other federal agencies, as well as with representatives of state and local governments and the private sector. These broad consultations are the key to strategy development because most public works infrastructure is state, local, or private. Nevertheless, the federal government exercises pervasive influence over America's public works through its financial assistance and regulatory programs. Thus, an infrastructure strategy for the federal government is a very important element in the success of a larger infrastructure strategy for the whole nation.

This report examines six key public works improvement topics:

- I. Improving the quality of infrastructure investments:
- II. Applying benefit-cost analysis to investment options;
- III. Improving the maintenance of infrastructure;
- IV. Making federal regulation of infrastructure more effective, efficient, and equitable;
- V. Improving environmental decisionmaking for public works; and
- VI. Improving the financing of infrastructure.

For each topic, an interagency, intergovernmental consensus statement is presented. From these statements, a four-point strategy is developed to assure the President, the Congress, and the people of the United States that continued federal investment in infrastructure will go for:

- The highest quality investments that can yield maximum benefits compared to their costs;
- Cost-effective maintenance of existing facilities and equipment that will help avoid premature and costly repairs, rehabilitation, and replacement;
- Soundly and equitably regulated projects that can meet environmental and other performance requirements efficiently in the setting where they are located; and
- Affordable facilities that can be supported financially now and in the future by those who are responsible for them.

To implement this strategy, an action agenda is presented for the federal government. It has three primary elements: (1) leadership by the President and the Congress, (2) the issuance of detailed guidance to help improve the practices of all the federal infrastructure and infrastructure-related agencies and the clients that they influence through their financial aid and regulatory activities, and (3) governmentwide mechanisms to support the recommended improvements. All of the recommended actions are addressed to specific parties.

#### The President is asked to:

- Issue an executive order requiring (1) improved investment analysis techniques, (2) greater use of pricing and demand management techniques, (3) improved maintenance management strategies, (4) better regulatory analysis, (5) the integration of an environmental quality ethic into all public works agencies, (6) integrated environmental review processes, and (7) realistic financial plans that can support program goals.
- Establish a public works investment section in the executive budget funded wholly or largely by stable trust funds that can be tapped only for soundly justified projects.
- Propose an infrastructure legislative program that includes (1) "The Infrastructure Investment Act," designed to improve the quality of investment analysis that is applied to all projects pro-

posed for funding; (2) "The Environmental Integration Act," designed to encourage analysis and management of environmental problems in an interrelated way that can make best use of limited resources to get the greatest health and ecosystem improvements; and (3) "The Mandate Relief Act," designed to keep tabs on the cumulative effects of mandate costs on responsible parties and to keep these costs within the bounds of reasonable affordability.

 Convene a White House Conference on Infrastructure Investment to motivate action on this agenda.

#### The Congress is asked to:

- Take action on the President's infrastructure legislative program;
- Reorganize its committees to make it easier to integrate infrastructure and environmental programs;
- Integrate sound investment criteria into infrastructure and environmental programs when they are reauthorized; and
- Revise the congressional budget and appropriations processes to correspond with the President's public works investment budget.

The detailed guidance called for would be supplied

largely through the Office of Management and Budget (OMB) circulars affecting the budget, legislative clearance, and regulatory review processes. Follow-up work by all federal infrastructure agencies would be required. Environmental integration would be the responsibility of the Council on Environmental Quality or its successor in the Executive Office of the President. A new infrastructure policy coordinating mechanism is also recommended to keep all of the parties involved and to avoid the issuance of arbitrary and unworkable guidance.

Governmentwide support for these activities should be provided by a number of agencies, including but not limited to OMB, the Federal Accounting Standards Advisory Board, the Bureau of Economic Analysis, the Federal Geographic Data Committee, the Office of Science and Technology Policy, the Office of Personnel Management, the Administrative Conference of the United States, the Advisory Commission on Intergovernmental Relations, and the General Accounting Office.

In addition, there is an urgent need for something more. A new institution, tentatively called the Infrastructure Research Board, should be created cooperatively by federal agencies, state and local governments acting through their national associations, and the private sector. Its purpose would be to sponsor interagency, intergovernmental, and public-private exchanges of information and views. This new organization should be modeled on the successful Transportation Research Board.

## PREFACE AND ACKNOWLEDGMENTS

This report is the result of a series of consultations that took place between April and July 1993. Six broadly representative task forces each met three times—in April, May, and June—to consider and develop consensus statements on six major public works topics. The main points from those statements were synthesized into a four-point strategy and a more detailed action agenda. The draft strategy and agenda, along with the six task force statements, were considered further at The National Conference on High Performance Infrastructure, attended by about 160 experts, on July 29-30, 1993, in Washington, D.C. Numerous revisions were made in the draft report as a result of the conference.

This report and the consultation process leading to it were made possible by financial assistance and technical support from the U. S. Army Corps of Engineers. The project is part of a larger effort by the Corps responding to a specific appropriation made for the purpose of developing a Federal Infrastructure Strategy. The project manager for the Corps was Robert Pietrowsky of the Institute for Water Resources. He was assisted by Cameron Gordon. We also benefited from the participation of many other persons in IWR, other parts of the Corps, and several persons in the office of the Assistant Secretary of the Army for Civil Works.

The ACIR effort was directed by Bruce D. McDowell, director of Government Policy Research. He was assisted by Charles Griffiths, Jeffery Fitzpatrick, and Suzanne Spence.

Each task force was assisted by a technical expert and a professional meeting facilitator. The task force topics, experts, and facilitators were:

- Investment Analysis
   Richard Mudge, Apogee Research, Inc.
   Angela Callahan
- II. Benefit-Cost Analysis John Boland, Johns Hopkins University John Link
- III. Maintenance
  Harry Hatry, The Urban Institute
  Lester Schoene

- IV. Federal Regulation
  Timothy Conlan, George Mason University
  Dick Cocozza
- V. Environmental Decisionmaking
  Thomas Magness, Midwest Research Institute
  Pam Salsbery
- VI. Financing
  John Petersen, Government Finance Group, Inc.
  Frank Blechman

Other topics—such as research and development, technology transfer, geographic information systems, education, and training—were not selected for formal consideration by ACIR because they were being addressed by other activities in the Corps' larger effort on the Federal Infrastructure Strategy Program. Nevertheless, they have not gone completely unmentioned in this report.

Participants in the task forces and the conference—to which all task force members were invited, along with many others—are too numerous to list individually. Figure 1 (page 4), lists the organizations represented on the task forces and/or at the conference.

# Formal presentations at the conference were made by (in order of presentation):

Hon. Edward G. Rendell, Mayor, Philadelphia

Hon. Alice M. Rivlin, Deputy Director U.S. Office of Management and Budget

U.S. Senator Bob Graham

U.S. Representative Bob Carr

Hon. Thomas M. Downs, Commissioner New Jersey Department of Transportation

Hon. Mortimer Downey, Deputy Secretary U.S. Department of Transportation

Hon. G. Edward Dickey, Acting Assistant Secretary of the Army for Civil Works

Hon. David Gardiner, Assistant Administrator U.S. Environmental Protection Agency

Robert Goodin, Director of Public Works

Rockville, Maryland (American Public Works Association)

Michael J. Pompili, Assistant Health Commissioner Columbus, Ohio

Thomas J. Harrelson

former Secretary of Transportation North Carolina

(National Academy of Public Administration)

Hon. John Horsely, Founding Chairman
The Rebuild America Coalition

Barbara Dyer, Director

The Alliance for Redesigning Government

#### Presentations to the task force meetings were made by:

#### Task Force I—Investment Analysis

Harry Hatry, Director State/Local Government Research Program The Urban Institute

Joesph Wholey, Director Washington Public Affairs Center University of Southern California

Bruce Cannon, Chief

Legislation & Strategic Planning Division Policy Development Office Federal Highway Administration

Paul Posner, Director
Budget Issues
U.S. General Accounting Office

Richard Mudge, President Apogee Research, Inc.

Chris Wye

National Academy of Public Administration

Ron Kirby, Director

Transportation Planning
Metropolitan Washington Council of Governments

Cameron Gordon, Economics Study Manager Institute of Water Resources U.S. Army Corps of Engineers

Art Koines, Deputy Director
Office of Strategic Planning
and Environmental Data

U.S. Environmental Protection Agency

David Berg

Policy Analysis Branch
Pollution Prevention Division
U.S. Environmental Protection Agency

#### Task Force II—Benefit-Cost Analysis

David Moser, Senior Economist Institute for Water Resources U.S. Army Corps of Engineers

Brett Snyder, Chief

Economic Analysis and Research Branch U.S. Environmental Protection Agency

Susan Binder, Chief

Industry and Economic Analysis Branch Federal Highway Administration

Don Emerson, Chief

Planning Analysis and Support Division Federal Transit Administration

Charles Terrell, Natural Environmental Specialist U.S. Soil Conservation Service

#### Task Force III - Maintenance

Jay Fountain, Assistant Director of Research Government Accounting Standards Board

Ron Young, Executive Director Federal Accounting Standards Advisory Board

Sheldon Edner

Office of Environment and Planning Federal Highway Administration

Martin Borsykowsky, Chief Engineer
Office of Management and Budget
City of New York

Joseph Bittner

Central Programs Branch U.S. Army Corps of Engineers

William Steele, Economist U.S. Bureau of Reclamation

Harold Steinberg, Deputy Controller U.S. Office of Management and Budget

Dick Earl, Chief
Facilities and Real Property Division
U.S. Department of Energy

Mike Rugless
Parsons Brinkerhoff, Inc.

#### Task Force IV—Federal Regulation

Michael J. Pompili, Assistant Health Commissioner Columbus, Ohio

Paul Lapsley, Chief Regulatory Management Division U.S. Environmental Protection Agency

Philip Harter
Private Mediator

Timothy Conlan, George Mason University

Penny Medford, Chief
Planning Analysis Division
Federal Aviation Administration

Paul Guthrie, Chief State/Local Operations

U.S. Environmental Protection Agency

Joseph F. Canny, Deputy Assistant Secretary for Policy and International Affairs U.S.Department of Transportation Barry Korb, Chief Regulatory Innovation Branch U.S. Environmental Protection Agency

Tom Kozlowski, Chief
Operations and Standards Division
Motor Carriers, Federal Highway Administration

#### Task Force V-Environmental Decisionmaking

Eugene Cleckley, Chief Environmental Operations Division Federal Highway Administration

Dinah Bear, General Counsel
U.S. Council on Environmental Quality

Anne Cole, Small Communities Coordinator U.S. Environmental Protection Agency

Norm Miller, Director of Legislation and Intergovernmental Affairs New Jersey Department of Environmental Protection and Energy

David Berg
Policy Analysis Branch
Pollution Prevention Division
U.S. Environmental Protection Agency

Lynne Pickard, Chief Community and Environmental Needs Divison Federal Avaition Administration

Bill Westbrook, Mayor Jackson, Wyoming

Robert Mulready, City Administrator Lewiston, Maine

Carl Bausch, Deputy Director
Environmental Analysis and Documentation
Animal and Plant Health Inspection Service
U.S. Department of Agriculture

#### Task Force VI-Financing

J. Douglas Koelemey, Executive Director Commission to Promote Investment in America's Infrastructure

Scott Reznick, President
Commonwealth Development Associates

George Ames, Chief
Resources and Analysis Branch
U.S. Environmental Protection Agency

Pete Butkus, Manager
Public Works Trust Fund
Department of Community Development
State of Washington

Richard Geltman Linton, Mields, Reisler & Cottone, Ltd.

Barbara Weiss
Federal Liaison Center
Government Finance Officers Association

Jim Link, Chief Highway Revenue Analysis Branch Federal Highway Administration

Mark Pointon
Navigation Division
Institute for Water Resources
U.S. Army Corps of Engineers

Philip M. Dearborn, Director
Government Finance Research
U.S. Advisory Commission
on Intergovernmental Relations

Robert W. Rafuse, Jr., Senior Economist Policy Analysis Division U.S. Department of Treasury

The Commission expresses its thanks to the Army Corps of Engineers for making this project possible, and to all who participated in the process. The ACIR staff has made every effort to capture the richness and diversity of views expressed by the participants accurately, and to express the points of consensus reached as clearly as possible. The staff takes full responsibility for any errors that may have been made and any acknowledgements that may have been missed. Comments on and corrections to this report are invited.

John Kincaid Executive Director

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### THE INFRASTRUCTURE CHALLENGE

The National Council on Public Works Improvement reported to the President and the Congress in 1988 that "America's infrastructure is barely adequate to fulfill current requirements, and insufficient to meet the demands of future economic growth and development. And unless we dramatically enhance the capacity and performance of the nation's public works, our own generation will forfeit its place in the American tradition of commitment to the future."

Most of the nation's public works are built, owned, operated, and maintained by state and local governments and utility companies, often in cooperation with the private sector, but the federal government exercises great influence over the entire infrastructure system in three ways:

- Directly building, owning, operating and maintaining certain key facilities, such as dams, hydropower facilities, flood control projects, waterways, and federal buildings;
- 2. Financially assisting state and local governments to build, own, operate, and maintain facilities such as roads and highways, transit systems, air-

- ports, water and sewer systems, waste management facilities, and community facilities; and
- Regulating most public works as to their environmental impacts, the accessibility and services provided to Americans with disabilities, and the wages and working conditions of public works employees and contractors. Federal regulations frequently add substantial uncompensated costs and delays.

There is too little consistency among federal infrastructure policies and priorities. Federal inflexibility often interferes with good state and local decisionmaking, wastes scarce money, and causes poor performance. Infrastructure and public works too often become synonymous with "pork barrel" spending and waste.

A new federal infrastructure strategy is needed to turn this perception (and sometimes reality) around and to help the nation realize how essential public works are to growth and development, economic vitality and jobs, enhanced productivity and international competitiveness, and a healthy environment.

### DEVELOPING A FEDERAL INFRASTRUCTURE STRATEGY

#### The Process

In 1990, an appropriation was made to the U.S. Army Corps of Engineers to develop a federal infrastructure strategy. This strategy was to be developed in consultation with other federal agencies, state and local governments, and the private sector. At the Corps' request, the Advisory Commission on Intergovernmental Relations (ACIR) assisted with the required consultation process.

In its 1992 interim report on this process, Toward a Federal Infrastructure Strategy: Issues and Options, ACIR recommended "that the nation's state and local governments, and the several federal infrastructure agencies, work more closely together, and in cooperation with the private sector, to take advantage of opportunities to make the nation's infrastructure more efficient, better coordinated, and more highly productive." The Commission recommended 11 opportunities that should be considered.

In the final phase of its infrastructure work for the Corps, ACIR established six task forces to develop the most important of the cross-program opportunities:

- Improving the quality of infrastructure investments;
- II. Improving the use of benefit-cost analysis;
- III. Improving the maintenance of infrastructure;
- IV. Managing federal regulation of infrastructure;
- V. Streamlining the environmental permitting process; and
- VI. Finding adequate funding for infrastructure.

The many federal, state, local, and private interests participating in the task forces and the development of this report are listed in Figure 1 (page 4).

The topics of research and development, geographic data coordination, technology transfer, and the education of public officials and the general public about public works issues were dealt with only obliquely in this process because they were being developed more fully by the Corps through other elements of the Federal Infrastructure Strategy Program, including efforts of the Corps' Civil

Engineering Research Laboratories and the American Society of Civil Engineers' Civil Engineering Research Foundation.

#### **Purposes of the Task Forces**

For the purposes of these six task forces, ACIR defined infrastructure to include any type of physical capital facilities for which the participating federal agencies are responsible, whether that responsibility is direct (ownership, operation, or maintenance), through federal aid, or through regulation. This places the focus of the task forces on the common principles and guidelines that all agencies could follow regardless of their specific program goals.

The purpose of each task force was to develop an initial statement of principles and guidelines for governmentwide use. It is expected that, over time, these initial statements will evolve into interagency memorandums of understanding, OMB circulars, executive orders, or some other instrument establishing common practices among federal departments and agencies. The purposes of these agreements are to (1) spread the best practices across the government as rapidly as possible and (2) make it easier for the state and local governments, and others, to work with the federal government as a consistent partner rather than with a conglomeration of diverse agencies with confusingly different approaches to infrastructure.

#### The Role of the Conference

The National Conference on High Performance Infrastructure was held July 29-30, 1993, to review the six task force statements along with the four-point strategy and the action agenda. The conference confirmed the strategy and action agenda, refined many points, added some new points, and shifted some emphases. For example, this section, describing development of the strategy, was expanded to include contributions of the conference and the need for follow-up work involving state and local governments. The list of participants in Figure 1 also was expanded.

Perhaps the most significant addition to the report from the conference came from the emphasis by several

# Figure 1 Participants in Preparing this Report

#### Congress

Congressional Budget Office Congressional Research Service General Accounting Office House Committee on the Budget Joint Committee on Taxation Office of U.S. Senator Byron L. Dorgan

#### **Executive Branch**

Council on Environmental Quality Department of Agriculture

Animal and Plant Health Inspection Service

Economic Research Service Soil Conservation Service Department of Defense

Office of the Secretary Department of the Army

Civil Works

Corps of Engineers

Department of Energy

Department of Health and Human Services

Department of Interior
Office of the Secretary
Bureau of Reclamation
Fish and Wildlife Service
U.S. Geological Survey

Department of Transportation
Office of the Secretary

Federal Aviation Administration Federal Highway Administration Federal Railroad Administration Federal Transit Administration

Department of Treasury

Environmental Protection Agency Executive Office of the President National Economic Council

Federal Accounting Standards Advisory Board

General Services Administration Office of Management and Budget

#### **State and Local Government**

City of Columbus, Ohio City of Jackson, Wyoming City of Lewiston, Maine

City of New York, Office of Management and Budget

Denver Regional Transportation District Maryland Department of Fiscal Services

Metropolitan Washington Council of Governments

Metropolitan Water Reclamation District

of Greater Chicago

New Jersey Department of Environmental Protection and Energy

New Jersey Department of Transportation Northwest Indiana Regional Planning Commission Washington State, Department of Community Development, Public Works Trust Fund

#### **Other Government Agencies**

Administrative Conference of the United States Federal Reserve Bank of Cleveland Competitiveness Policy Council The World Bank

#### **Professional Associations and Research Groups**

American Consulting Engineers Council American Planning Association American Public Works Association American Society for Public Administration American Society of Civil Engineers

American University

American Waterways Operators Building Futures Council

Building Research Board, National Academy of Sciences

Civil Engineering Research Foundation

Council of Infrastructure Financing Authorities

ENO Transportation Foundation George Mason University

Governmental Accounting Standards Board Government Finance Officers Association

Johns Hopkins University Midwest Research Institute

National Academy of Public Administration

National Association of Counties

National Association of Regional Councils

National League of Cities

National Trust for Historic Preservation

The Urban Institute

Transportation Research Board University of Southern California Washington Public Affairs Center

#### **Private Companies and Consultants**

Agenda Communications, Inc.

Apogee Research Bechtel Corporation

Commonwealth Development Associates, Pennsylvania

Government Finance Group, Inc.

Hickling Corporation KPMG Peat Marwick

Linton, Mields, Reisler and Cottone, Ltd.

Philip Harter, Mediator Parsons/Brinckerhoff Rapoza Associates Steinberg & Associates speakers on pricing infrastructure not just for cost recovery but also to help manage the demand for services. This point was incorporated into the action agenda.

At the suggestion of one conference session, the task force recommendation to institutionalize the environmental quality ethic throughout the federal agencies and state and local governments was added to the action agenda. A new recommendation that the Congress revise its budget and appropriations processes to respond more effectively to the President's "investment budget" also was added.

Additions to the "governmentwide guidance" section of the action agenda included a broadening of the investment analysis process and incorporation of greater flexibility into procurement policies.

The section of the action agenda on "Government-wide Support for Infrastructure Agencies" was augmented with a data improvement role for the Bureau of Economic Analysis, additional cooperating agencies in the science and technology effort, and greater definition of the proposed Infrastructure Research Board. There were numerous reminders about the importance of the R&D component of infrastructure programs.

The use of performance goals, performance indica-

tors, and capital budgeting were strong themes that ran throughout the conference. The top priority, however, by a wide margin, was the need for leadership by the President and the Congress in establishing firm principles and procedures to guide sound investment strategies. In particular, the President was urged to issue executive orders quickly to start the process and to establish a strong infrastructure policy coordinating mechanism. The Congress was urged to reform its budget, authorization, and appropriations processes to base them on sound investment criteria. The federal agencies were urged to take advantage of the Government Performance and Results Act of 1993 to reformulate their infrastructure programs around performance goals and regular tracking of results.

#### **Implementation**

A great deal of work will be required by all the partners in the federal system and by the private sector to achieve the objectives spelled out in this report. To ensure success, all follow-up work on the strategy, action agenda, and task force statements in this report should be pursued in consultation with all the affected federal, state, local, and private parties.

### THE FOUR-POINT STRATEGY

The work of the six task forces, taken together, yielded recommendations that can be summarized in the following four-point strategy.

To justify continued federal investment in infrastructure, the people, the President, and the Congress need assurance that future spending will be for:

- The highest quality investments that can yield maximum benefits compared to their costs;
- Cost-effective maintenance of existing facilities and equipment that will help avoid premature and costly repairs, rehabilitation, and replacement;
- Soundly and equitably regulated projects that can meet environmental and other performance requirements effectively and efficiently in the setting where they are located; and
- Affordable facilities that are efficiently priced and can be supported financially now and in the future by those who are responsible.

These four points are elaborated on briefly below.

#### **High-Quality Investments**

The key to improving the quality of proposed infrastructure investments is to require that they be subjected to **investment analysis**. Task Forces I and II worked on this topic.

Task Force I recommended several ways to analyze the quality of proposed infrastructure investments, so that decisionmakers will have reliable means of choosing the most beneficial ones. The recommendations include performance measures, benefit-cost analysis, cost-effectiveness analysis, impact analysis, analysis of alternative means of program delivery, and means of judging cross-program priorities. Federal departments and agencies should be expected to use a combination of these means to justify the inclusion of their infrastructure projects in the federal government's "investment budget." Raising the quality of investments in terms of "return on investment" should be emphasized.

Task Force II recommended (1) that more federal agencies use benefit-cost analysis, (2) improved methodology of benefit-cost analysis, and (3) promotion of consistency among agencies in using this technique so that it might become a means of prioritizing investments across diverse programs. Although this type of investment analysis is one of the longest used and best developed in the federal government, it is still controversial, and its consistent use is largely limited to water resources agencies. The requirement for all agencies to use benefit-cost analysis to justify their new regulations to OMB has spread familiarity with the concept over the past decade, providing a basis for extending its use still further. Task Force II recommended principles and guidelines to support this extension.

#### **Cost-Effective Maintenance**

Studies in recent years have shown that cost-effective maintenance of infrastructure is being neglected in many cases. Two remedies for this problem are recommended by Task Force III. One is required planning for maintenance, which received a big boost in the *Intermodal Surface Transportation Efficiency Act of 1991*. The other is an accounting approach being developed by the Governmental Accounting Standards Board. This approach would treat public infrastructure as financial assets, and would count deferred maintenance of these assets as financial liabilities. These liabilities would be required to be reported as part of the annual financial reports of governments. This procedure would result in public disclosure of deferred maintenance, allowing citizens to hold public officials accountable for it.

# Effective, Efficient, and Equitable Regulations

Task Forces IV and V worked on different elements of this topic. Task Force IV considered the cumulative effects of all the applicable federal regulations. Task Force V considered the more limited issues involved with environmental permits and approvals.

Practical Federal Regulations. The federal government extensively regulates the provision of public works by state and local governments and the private sector. This regulation is imposed through a variety of federal mandates and conditions of federal financial aid. The amount of such regulation is increasing. Although much of this federal regulation is justified, the effect often is to raise costs and slow the implementation of projects unnecessarily. Cumulative effects of the growing number of requirements are very severe in many cases. These unintended consequences frequently result from lack of federal awareness of the problem, lack of federal recognition of and responsibility for the problems faced by the implementing governments, and lack of flexibility in the federal regulations that might allow state and local governments to find feasible ways to comply. Task Force IV recommended several ways to strengthen the analysis of regulatory impacts, provide greater flexibility in the compliance process, and provide greater federal aid where necessary to achieve national goals quickly and equitably.

Less Costly Environmental Permits. The process of getting environmental permits for infrastructure projects remains fragmented, expensive, and time consuming. Task Force V recommended several ways of integrating and streamlining this process. The key is to uncover all the permit requirements as early as possible, share environmental data freely among all affected parties, and design infrastructure projects from the beginning to meet all the applicable requirements. This approach is designed to avoid surprises at later stages, when redesign would be required, and could save significant time and money and achieve greater environmental protection.

#### **Affordable Facilities**

Practical Financial Plans. Too often, grand visions of infrastructure are framed, programs are developed, general principles are mandated, and it is assumed that the necessary financing will come from somewhere—often from someone else's budget. This widespread problem was recognized in the *Intermodal Surface Transportation Efficiency Act of 1991*, which constrains the size of state and metropolitan transportation programs to what can reasonably be expected to be funded. The federal government, however, is under no such constraint; it plans larger programs than it can fund and mandates that others carry out larger programs than they can fund.

In recent years, this has generated a great deal of striving to find non-traditional sources of governmental revenues, including cost sharing with the private sector. Many of the non-traditional revenue sources are not well known, not easy to use, and not able to produce reliably predictable revenues.

Task Force VI recommended the preparation of financial feasibility and affordability analyses of every infrastructure program being mandated, proposed, or reevaluated by the federal government. This should include an "ability to pay" analysis of any public and private partners brought into the program with financial responsibilities. Both traditional and non-traditional funding sources and mechanisms should be identified and evaluated. Affordability of the proposed program should be demonstrated.

In addition, conference participants reinforced the need for agency financial planning to incorporate demand management techniques and pricing strategies aimed at the efficient use of limited resources

## AN ACTION AGENDA

A complex, multiagency infrastructure strategy will not be easy to implement. It will require presidential and congressional leadership; governmentwide guidance, oversight, and support systems for federal infrastructure agencies; and the commitment and cooperation of many federal agencies.

This action agenda outlines an initial set of consolidated recommendations, based on the advice of the six task forces, for who should do what to get started on implementing the strategy. Additional recommendations can be found in the six task force reports following this agenda.

#### Presidential and Congressional Leadership

Occasionally, federal agencies cooperate with each other, without being told to do so, when their vital interests demand it or when a serendipitous personal relationship encourages it. Usually, however, such cooperation is inhibited by the extra time and expense involved and the uncertainty that it is authorized and would be appreciated and rewarded. Conflicting missions frequently are mentioned as barriers to joint activities. Undoubtedly, real difficulties are encountered when federal agencies attempt joint activities.

The strongest remedy to these difficulties is a clear signal from the President, the Congress, or both, that cooperation and coordination are appropriate and required. That signal is needed if a governmentwide federal infrastructure strategy is to become reality.

#### The President's Role

Much can be done within existing legislation to establish governmentwide infrastructure policies and practices. The President should take advantage of these opportunities to:

Issue an Executive Order (1) establishing governmentwide principles to guide the infrastructure investment, federal aid, and infrastructure-related regulatory activities of federal agencies, and (2) designating parties responsible for issuing additional guidance and overseeing the implementation of

these principles and guidelines. The principles should require federal agencies to:

Prepare investment analyses and strategies, based on life-cycle costing, to justify their infrastructure budget requests, legislative proposals, and rulemaking activities. The purpose of these analyses should be to ensure that the investments made and mandated are those with the greatest rates of return as measured by a variety of techniques.

Seek opportunities to set economic and equitable prices for the use of infrastructure to help measure and respond to the public's infrastructure preferences, to help bring the supply of and demand for infrastructure into balance, to broaden the nonfederal audience for investment analysis, and to achieve the maximum feasible infrastructure cost recovery.

Use maintenance management analyses and strategies to ensure cost-effective maintenance of federal, federally aided, and federally regulated infrastructure.

Analyze existing and proposed regulations affecting infrastructure to ensure that they are necessary and that the least burdensome and most flexible forms of regulation that can get the job done are being used.

Institutionalize the environmental quality ethic throughout the leadership and professional staffs of every federal agency so that environmental quality factors will be routinely and actively pursued throughout every agency's analytical and decisionmaking processes and passed on to the state and local governments that they assist, regulate, or work with as co-regulators.

Integrate their environmental review and approval processes to introduce environmental reviews into the infrastructure planning process as early as possible, provide for concurrent

reviews and decisions to meet multiple requirements, and minimize duplication and delay.

Prepare financial plans for each direct federal investment, federal-aid program, and infrastructure mandate showing how construction, operation, and maintenance funding will be or can be funded effectively, efficiently, equitably, and affordably by the responsible parties.

- President's Budget. The goal should be that this section of the budget eventually be funded by a series of broad, flexible infrastructure trust funds each funding a category of interrelated public works activities and supported by appropriate dedicated sources of revenue designed to encourage multiyear stability in planning long-term investments and maintaining facilities cost effectively. Only those investments justified by sound investment analysis should be eligible to be included in the public works investment budget.
- Develop an infrastructure legislative program incorporating at least the following three proposals:

The Infrastructure Investment Act, which would (1) give statutory recognition to the basic principles of investment analysis, maintenance analysis, regulatory analysis, and financial analysis; (2) revise the congressional budget, authorization, and appropriations processes to recognize and effectively respond to the President's "investment budget"; (3) consolidate interrelated infrastructure programs into a series of flexible funding mechanisms (such as block grants and revolving loan funds) that allow alternative crossmodal, construction, operation, demand management, and maintenance options to be considered to best meet state and local conditions, (4) provide tax incentives for greater infrastructure investment and reduce tax disincentives, (5) encourage the development of innovative funding mechanisms in the bond markets, (6) provide incentives for the introduction of new technologies that have the potential for improving the cost effectiveness of infrastructure programs, (7) establish a national cooperative infrastructure research program, and (8) revise procurement practices to remove barriers to high performance investments.

The Environmental Integration Act, which would (1) make it clear that all environmental requirements are to be administered within the framework of the National Environmental Policy Act, (2) correct prohibitions in environmental laws that prevent the use of benefit-cost and

other types of investment analysis; and (3) provide for scientifically justified and risk-based multimedia analysis, regulation, and prioritization in the implementation of environmental requirements.

The Mandate Relief Act, which would require (1) regular inventory and cost estimation of all existing and proposed federal mandates, (2) analysis of the incidence of costs and the ability to pay of those parties on whom the costs fall or would fall, and (3) equitable federal sharing of the mandated costs or an affordable prioritization and scheduling of compliance by the non-federal parties.

• Convene a White House Conference on Infrastructure Investment to highlight the importance of the issue, motivate the diverse federal infrastructure agencies to work together more closely, bring in the non-federal partners, and begin working out some of the details of the federal infrastructure strategy. This conference should be reconvened periodically.

#### The Role of the Congress

Regardless of how innovative the executive branch is in its efforts to improve the management and administration of infrastructure programs, some needed improvements will remain off-limits until present law is changed and new laws are enacted. Therefore, Congress also must act. The Congress should consider the following high-priority proposals:

- Hold hearings and act on the President's infrastructure legislative program.
- Reorganize its committees on infrastructure and the
  environment to allow easier consideration of issues
  like the creation of block grants, cross-program flexibility, and environmental integration. For example,
  the number of transportation committees, the number of water committees, and the number of environmental protection committees should be reduced.
- Take the opportunity, when reauthorizing infrastructure and environmental programs, to introduce the principles of sound investment justification, life-cycle costing, cost-effective maintenance, financial affordability analysis, mandate reform, and environmental integration.
- Revise the congressional budget and appropriations processes to recognize and effectively respond to the President's "investment budget."

# Governmentwide Guidance on Infrastructure Investment and Regulation

In accordance with the President's Executive Order on Infrastructure, the following agencies should issue additional guidance, in consultation with affected federal agencies, state and local governments, and other affected parties, and should exercise implementation oversight.

- The Office of Management and Budget (OMB) should revise its circulars on budget submissions (A-11), legislative clearance (A-19), and benefit-cost analysis (A-94), and its procurement policies, to support the President's principles on investment analysis, maintenance analysis, and financial analysis. The legislative clearance process should be strengthened to emphasize the need to examine alternative program designs and the potential impacts of federal mandates more carefully from the viewpoint of the state and local partners. The principles of Executive Order 12612 (Federalism) should be incorporated into this clearance process. The benefit-cost circular should be broadened to incorporate alternative and supplementary types of investment analysis most appropriate to various types of programs and program objectives, including those that might not be fully monetizable. Procurement policy needs to be flexible enough to allow decisions based on life-cycle cost analysis.
- OMB's Office of Information and Regulatory Affairs (OIRA) should revise its regulatory review guidance to emphasize (1) the need for mandate relief, performance-based regulation, market-incentive regulation, the use of technologically advanced means of complying with regulations, and regulatory flexibility; (2) greater use of negotiated rulemaking in suitable cases, and (3) limiting the use of interim guidance in place of formal regulations (including provisions to sunset interim guidance after a reasonable time).

OIRA should be charged with responsibility for maintaining a cumulative inventory of federal mandates, ensuring that their costs are estimated, and requiring a cost and affordability analysis of proposed rulemakings (including an analysis of the incidence of costs, the ability-to-pay of those responsible for paying, and an evaluation of alternative rules that might be less burdensome).

Periodically, OIRA should require federal agencies to conduct a zero-based review of their regulations affecting infrastructure to ensure that, as a group, they remain up to date, effective, practical, understandable, coordinated, and affordable.

- The Council on Environmental Quality (CEQ), or some other appropriate unit in the Executive Office of the President, should be responsible for the environmental integration effort. This responsibility should not be located in a line department or agency because of its interagency nature.
- Federal infrastructure agencies should consult freely and constructively with the guidance agencies listed above to help ensure that the guidance developed is as well informed and practical as possible. Interagency workgroups should be convened as needed. Appropriate thresh-

olds, short-cut methods, tiered approaches, rules of thumb, automation, management-by-exception, and other techniques should be carefully provided to avoid imposing overwhelming analytic burdens.

The federal agencies also should develop program-specific guidance to ensure that the more general governmentwide guidance is tailored to the individual needs of each program, whether it is administered directly by the agency, through federal aid, or through a regulatory program. This guidance should be sensitive to experience gained in the field operations of agencies.

The agencies should be alert constantly for opportunities to cooperate with other agencies to further their joint interests. The negotiation of memorandums of understanding (MOUs) among agencies should be encouraged. Regional offices should implement these agreements consistently.

• An infrastructure policy coordinating mechanism is needed to provide continuing interagency input to the development, updating, and refinement of governmentwide guidance. The choice of mechanisms might include a Cabinet sub-council, an OMB task force, or a formal Infrastructure Council modeled after the Water Resources Council. It will need continuing support from the President if it is to be effective.

# **Governmentwide Support** for Infrastructure Agencies

The changes called for by these infrastructure principles and guidelines are substantial. They will significantly revise the way many federal agencies do business. Therefore, there will be a need for governmentwide assistance. Several existing federal institutions should contribute to this effort, but an additional institution also is needed. The following support activities should be provided in consultation and cooperation with relevant state, local, and Indian tribal governments, and the private sector.

- OMB should allocate to infrastructure agencies some of the pilot projects under the Government Performance and Results Act of 1993.
- The Federal Accounting Standards Advisory Board (FASAB) should consider Service Efforts and Accomplishments (SEA) reporting standards and help develop unfunded maintenance estimating and reporting standards in conjunction with the Governmental Accounting Standards Board (which sets standards for state and local governments) and also in conjunction with any federal agencies that pursue this goal under an OMB performance pilot project.
- The Bureau of Economic Analysis (BEA) should revise the National Income Accounts to be more helpful in tracking the economic benefits and costs of infrastructure investments.

- The Federal Geographic Data Committee (FGDC), which operates under OMB Circular A-16, should place priority on completing a full range of environmental databases to support the needs of the accelerated environmental integration process.
- The Office of Science and Technology Policy (OSTP) should focus the governmentwide research efforts needed to provide a stronger scientific basis for environmental regulation, for the management of regional ecosystems and watersheds, and for better understanding of relationships between land use and infrastructure development. The President's Council on Sustainable Development, the Federal Laboratory Consortium, the Federal Coordinating Council for Science, Engineering and Technology, Congress' Office of Technology Assessment, and others also should have roles in this effort.
- The Office of Personnel Management (OPM) should assist with the governmentwide effort to provide training and personnel exchanges to federal, state, and local infrastructure personnel. Existing training facilities such as the Federal Executive Institute and facilities in the individual agencies should be used. The involvement of state and local officials is provided for by the *Intergovernmental Personnel Act*. Training might be especially needed on such topics as investment analysis, maintenance analysis, environmental integration, regulatory analysis, and strategic management of environmental review personnel.
- The Administrative Conference of the United States should provide advice, referral services, and train-

- ing in administrative dispute resolution and negotiated rulemaking.
- ACIR should develop and promote improved methods of regulatory analysis, federal mandate cost estimating, and intergovernmental impact analysis.
- GAO, in cooperation with agencies' internal audit programs, should audit and evaluate the quality of federal agency and federal-aid recipient investment analyses, maintenance analyses, environmental integration processes, mandate cost estimates, and regulatory analyses to assure the Congress, the President, and the public that the government's investments in infrastructure are of high quality and getting higher.
- An Infrastructure Research Board (IRB) should be established, using the Transportation Research Board as a model. It could be located within the National Research Council or the National Academy of Public Administration, both of which are congressionally chartered advisors to the federal government. The purpose of IRB would be to sponsor interagency and intergovernmental committee work, training, education conferences, national cooperative research, policy development, publications, and clearinghouse functions. It would be supported by regular contributions from federal infrastructure agencies and other cooperating organizations. Its governing board should equitably represent cooperating federal, state, local, and private parties, including practicing infrastructure program managers.

### THE TASK FORCE REPORTS

- I. IMPROVING THE QUALITY OF INFRASTRUCTURE INVESTMENTS
- II. APPLYING BENEFIT-COST ANALYSIS TO INVESTMENT OPTIONS
- III. IMPROVING THE MAINTENANCE OF INFRASTRUCTURE
- IV. MAKING FEDERAL REGULATION OF INFRASTRUCTURE MORE EFFECTIVE, EFFICIENT, AND EQUITABLE
- V. IMPROVING ENVIRONMENTAL DECISIONMAKING FOR PUBLIC WORKS
- VI. IMPROVING THE FINANCING OF INFRASTRUCTURE

#### Statement of Principles and Guidelines, Federal Infrastructure Task Force I

### IMPROVING THE QUALITY OF INFRASTRUCTURE INVESTMENTS

#### I. OBJECTIVE

The objective of this statement of principles and guidelines is to improve the quality of infrastructure investments in the United States by ensuring that all projects funded are likely to yield maximum benefits compared to their costs. This can be accomplished by requiring sound investment analysis of proposed investments as the basis for selecting and funding the construction, maintenance, and operation options likely to yield the greatest net rates of return as measured by social, environmental, and economic benefits and costs.

#### II. FINDINGS

Importance of Infrastructure. A sound public infrastructure forms a key part of the nation's capital stock and thus plays a vital role in encouraging a more productive and competitive national economy. In addition, public works are vital to meeting immediate as well as long-term public demands for safety, health, and a clean and ecologically healthy environment.

**Definition of Infrastructure.** This statement applies to public works infrastructure broadly defined, including transportation, water, waste management, and environmental protection facilities, as well as public buildings.

Need for Investment Analysis and Prioritization. Too many public works investments have been of questionable value. Charges of waste and favoritism often are leveled at public works spending proposals. Too often, projects with little or no demonstrable merit have been approved, while other projects with demonstrated merit have gone unfunded. With the current scarcity of federal, state, and local funds for infrastructure, these wasteful practices cannot be tolerated. They are not only inefficient but also are part of the reason for the loss of confidence in government by many citizens.

Current Initiatives for Improving the Quality of Infrastructure Investments. The President, the Congress, and others appear to be moving rapidly toward the use of performance measures, investment budgeting, and other devices designed to improve the quality of public investment. Examples include the following:

- The White House work group on infrastructure investment policy;
- Vice President Al Gore's National Performance Review:
- Recent GAO reports on investment budgeting, performance budgeting, and federal agency collection and use of performance data;
- Inclusion of a public infrastructure investment policy in *A Competitive Strategy for America*, the second report to the President and Congress by the Competitiveness Policy Council;
- Enactment of the Chief Financial Officers Act of 1990:
- Enactment of the Government Performance and Results Act of 1993;
- Publication of preliminary views on Service Efforts and Accomplishments (SEA) reporting by the Governmental Accounting Standards Board (GASB); and
- Establishment of an FASAB work group to assist in developing infrastructure accounting and reporting standards (July 1993).

#### III. BASIC PRINCIPLE

Given the profound economic and social importance of infrastructure, it is essential that the federal government identify, assess, and undertake infrastructure investments that will pay the greatest possible dividends for the nation now and in the future. Citizens and taxpayers need to be assured that these public investments are not wasted and that they will help the nation respond to current and future economic and social demands.

Achieving this objective requires a governmentwide commitment to better data, improved measures of per-

formance, and investment analysis that goes well beyond current practice. This improved analysis then needs to be communicated effectively to government officials and the general public.

To merit public expenditure, an investment proposal should show a good likelihood of (a) returning future benefits (public and private) that substantially exceed its estimated costs, (b) supporting related public and private investments, and (c) reinforcing other national strategic goals. These standards should apply to direct federal investments as well as to investments by state, local, or private bodies that federal agencies encourage, assist, or regulate.

This principle, and the guidelines that follow, should be applied by federal infrastructure agencies and their assisted and regulated partners to develop, plan, and implement improved infrastructure investment strategies. They also should be followed by all federal entities in the executive and legislative branches when they evaluate public works programs, projects, and systems. The expected result is that infrastructure investments will become increasingly effective, economical, and equitable in meeting program goals, and more readily supported and understood by the public and their political representatives.

# IV. GUIDELINES FOR EVALUATING INFRASTRUCTURE INVESTMENTS

Strengthening the analysis of infrastructure investments requires: setting program goals, improving the measurement and analysis of program performance, supporting a strategic framework for overall economic and environmental improvement, and improving the communication of results.

1. Define Performance Goals. Defining performance goals is an essential first step in evaluating any program and set of related investment options (public or private). An important part of this effort is to identify the customers of the program, consult with them, and assess their needs. Customers (or stakeholders) should be defined broadly, including direct users (trucking firms for highways, for example) as well as indirect clients (manufacturers and service firms that need on-time shipments). The goals of customers should not be assumed, but rather should be assessed as directly as possible, perhaps using market research and public involvement.

In most cases, negotiating and setting goals will help define a meaningful set of performance measures. While the specific goals for each program will vary according to the category of infrastructure and the government responsible for making decisions, they are likely to include direct economic benefits, general economic productivity, public health and safety, social well-being,

quality of life, environmental protection, and national security.

Typically, this goal-setting should be undertaken as part of an agencywide strategic planning process that reexamines agency missions, legislative requirements, and underlying trends. The recently completed strategic planning exercises at the Department of Transportation and the Department of Energy are examples worth examining for lessons learned in crossing program boundaries, reconceptualizing issues, and reformulating goals in light of changing realities.

- 2. Measure and Analyze Performance. Achieving these goals requires, in turn, better measurement and analysis. In addition to the analytic techniques highlighted below, these efforts should include descriptions of current physical conditions, level of demand, and service quality. Care should be taken to formulate performance indicators that go beyond simple averages and to work toward program-specific indicators. Demand forecasts, along with high-capital and low-capital options for meeting and managing this demand, should be developed. The appropriate government to undertake this work will vary across programs.
- 3. Establish an Investment Strategy. This improved measurement and analysis should be conducted within an overall framework that incorporates a strategic perspective. Infrastructure programs are only one of the ways available to each agency in carrying out its overall mission. As such, the capital investment program should be coordinated with other agency activities and with the activities of agencies that have complementary roles and goals. Frequent and full communication within the agency and with other agencies to develop a shared understanding of these roles is important.

Furthermore, public infrastructure investments differ from most private investments in the longevity of their impacts (for example, such facilities as roads, airports, and dams are rarely torn down), and in their potential to have profound effects on the nature and quality of our lifestyles and the productivity of the private economy. This means that their evaluation should consider the qualitative aspects of the benefits and costs of infrastructure, assess and compare the risks of different programs, and consider their long-term public policy implications.

4. Consider Alternative Program Designs. Program objectives can be achieved though several different means, including direct administration, financial aid to others, regulation, or a combination. Each method has different pros and cons, different levels and patterns of benefits and costs, and

different implications for the roles of governments. These differences should be explored before new programs are proposed or old ones revised. Choices to consider might include block grants versus categorical grants, grants versus mandates, loans versus grants, regulation versus financial assistance, market-based incentives, pricing policies, and tax changes (tax expenditures) versus regulations or grants. Criteria for helping to make these choices are summarized in the 1988 Fragile Foundations report by the National Council on Public Works Improvement.

In assessing these choices, it is useful to consider the near-term and long-term incentives that each may place on the builder and operator of the infrastructure facility. Any assessment of program alternatives will be more useful if it can be linked to changes in efficiency, effectiveness, expected performance measures, and future budgets of affected parties.

5. Examine Needs for Cross-Program Flexibility. The relative priorities among different programs typically are left to political judgment. Sole reliance on these judgments, however, does not necessarily serve well to optimize national economic productivity and efficiency in meeting agreed-on societal objectives.

For example, arbitrary national funding levels divided between highways and transit or between new construction and rehabilitation can skew local investment decisions by requiring suboptimal investments or programs that may not consider how to minimize life-cycle costs. Redefining program goals in terms of "zones of competition" (such as mobility rather than the specific means of achieving that mobility), can help overcome the inherent bias of some programs—if the program's performance measures reflect the broader concept.

Achieving this outcome requires (a) enough flexibility among related programs to allow consideration of alternative solutions using resources from multiple programs, (b) time and ability to apply economic and program performance analysis, and (c) a role in the decision process for the people and governments affected most directly.

Establishing investment priorities as legislative mandates may set inappropriate spending priorities that do not take into account current data, more comprehensive performance goals, or analytic results. For example, agencies may be directed to implement statutory mandates against the advice of sound investment analysis or performance assessments. In some cases, Congress even prohibits the economic analysis of some mandates, thus ensuring some wasteful investments.

All budgets have limits, forcing hard choices. The role of consistent investment analysis processes is to encourage the funding of the most worthy programs and projects. While the political process will (and should) allow for overriding pure analysis, the identification of direct and indirect subsidies and inefficiencies should be made explicit.

Congress and the executive have taken some positive steps to provide the flexibility needed to seek out and make the best investments. For example, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) encourages greater flexibility and realism in setting project priorities by requiring state departments of transportation and metropolitan planning organizations—the agencies now responsible for making many of the investment decisions—to prepare financially constrained transportation improvement plans. In contrast to past "wish lists," these new project lists are limited in magnitude to the funds that can be demonstrated to be available over the six-year program period. This constraint requires much more fiscal discipline than has usually been exercised in the past, but it has also attracted greater public and private interest since the projects in the plan are now more likely to be implemented. Also, a broader array of projects can be considered, including highways, bridges, transit, bicycle and pedestrian facilities, intermodal facilities, and other forms of surface transportation that might be more effective in achieving program goals under particular circumstances.

6. Analyze Long-Term Financial Implications. Just as infrastructure investments provide services over long periods of time, so too they generate long-term financial impacts that can also affect the quality of services provided many years in the future. For example, limited explicit attention to the rehabilitation and maintenance costs of the Interstate Highway System in 1956 meant that it deteriorated faster and further than expected during the 1970s. Life-cycle costing of alternative designs and practices for operating and maintaining facilities would help to reduce long-term costs and eliminate biases toward construction.

Some federal programs now require grant recipients to show the expected source of funds to operate and maintain the system as well as remaining costs to complete. Such analysis should be required for directly administered federal programs, federal-aid programs, and federal regulatory programs, showing who will be responsible for meeting future costs and how they could do so. Financial analysis of this type should be performed for alternative program designs before

choices are made, and as a reality check on programs being implemented. Simplified and inexpensive means of performing this type of analysis should be developed and made widely available.

- 7. Develop Confidence in Investment Analysis. Confidence in the system of investment analysis requires implementing the decision-support tools in an even-handed and technically correct manner, with widespread understanding of the methods that are being applied. Such understanding should spread beyond the staff who perform the calculations. This means that the analytic results should be communicated effectively and fully to decisionmakers and the general public. Openness and full disclosure in this process are important, since the quality and extent of available data vary widely across infrastructure programs, as does the ease of implementing the techniques. Papering over these difficulties creates a false sense of the quality of analysis, exposes the process to attack, and hides the need for better data and better techniques.
- 8. Communicate Effectively. The need for improved public awareness of the value of infrastructure means that investment analyses should be developed with inputs from and communicated effectively and fully to the public and to their elected representatives. Clarity and simplicity are important, as well as an active effort to explain what the analysis shows and does not show.

#### V. MENU OF DECISION-SUPPORT TOOLS

No single analytic method provides comprehensive answers. As many of the following types of analysis as practical should be used to help policymakers evaluate potential public works investments and develop sound investment strategies, plans, and budgets. Over time, the quality, extent, and consistency in applying these tools should be improved. The federal, state, and local governments all should use equivalent methods—tailored to their own needs—to establish consistency in the analytical evaluations of directly administered federal infrastructure programs and related federal-aid and regulatory programs. These tools will need to be used differently in evaluating programs and projects, and in making cross-program comparisons. Some further development of these methods may be necessary to meet all of these needs.

Performance Measures. Relevant and internally consistent measures of performance provide the key raw material for internal evaluations of the expected effectiveness of infrastructure investments while also helping to make the results more understandable to decisionmakers and the public.

Different programs have different goals or provide a different emphasis to similar groups of goals. (For example, urban mobility is important for both transit and highways, but each may emphasize different aspects of mobility.) Some programs provide services; others emphasize risk reduction (better health or safety), while others aim to stimulate productive private investments. Most will serve a combination of goals. Program performance should be defined not by inputs, but in terms of program outputs and by the social, economic, and environmental outcomes that will result (such as a specific threshold or improved performance compared to the past).

Efforts to evaluate investments need improved measures of performance. The SEA reporting concepts being considered by GASB and FASAB should be pursued to help meet the need for better measures of conditions and performance. Such measures should be reported regularly, both to track specific programs (thus helping to hold their sponsors accountable) and to establish longitudinal data bases to aid in projecting future outcomes under new or changed programs.

One of the few existing performance efforts in the federal government is DOT's biennial report to Congress, The Status and Condition of the Nation's Highways, Bridges, and Transit. The 1993 volume is the latest to report on the characteristics, condition, and performance of these systems. Future federal and non-federal investment requirements for all highways and bridges are estimated based on the costs to meet different performance levels in pavement condition and traffic service.

The report has not been static; regular efforts have been made to expand the scope and type of analyses, and to improve underlying data and analysis. Transit and highways are now combined, and changes are under way that should provide a more comprehensive assessment of alternative investments. A new Highway Economic Reporting System (HERS) using a benefit-cost framework is being developed to complement the long-standing Highway Performance Monitoring System (HPMS), which uses an engineering-based analytic process. Improvements also are needed to incorporate operational options for improving "level-of-service" performance, focusing on outcomes, and tracking program performance and outcome trends over time.

Although each infrastructure program has its own unique needs, other departments and agencies should consider adopting analytic and reporting systems similar to those developing in DOT.

Benefit-Cost Analysis. This form of analysis incorporates a range of traditional evaluation techniques developed by economists, including rate of return analysis, net present value of benefits, and various timing measures. As practiced by water resource agencies, benefit-cost analyses typically estimate how much better off the nation's economy would be if the project were to be built. Other

applications frequently have less expansive horizons, focusing on more narrowly defined geographic regions and on more direct project benefits and costs.

A minimum threshold for this type of analysis is usually whether or not benefits exceed costs (after discounting future streams), but the methods can be used to rank projects according to the highest returns, thereby helping to select a program of projects that provides the greatest overall return within a limited budget. If applied consistently across programs, the techniques of benefit-cost analysis can provide information (however imperfect) that can help set cross-program priorities. This advantage should be cultivated. As mentioned below, the costs of externalities should be included in the benefit-cost analysis whenever possible.

Timing measures such as pay-back period (how long before the benefits exceed costs) and first-year benefits (does the rate of return exceed a hurdle rate in the first year of operation) are important outputs from this analysis.

Benefit-cost techniques, however, also present some shortcomings for infrastructure investments. First, results depend on the rate of discount used to convert future streams of benefits and costs to current dollars. As a practical matter, early-year impacts receive a much greater weight—a possible problem in projects that may have useful lives of several decades. Second, these techniques are best suited to well-defined projects and may be awkward if used for regional or national systems. Third, as with many analytic tools, they are best suited for investments not likely to stimulate a significant shift from business as usual. Thus, strategic implications and non-linear impacts are often missed (witness, for example, the effect of the Interstate Highway System on stimulating new national-scale markets and the consequent changes in distribution networks and economic concentration) and their ability to remold market shares (witness the rapid growth in large trucks).

Cost-Effectiveness Analysis. Once performance measures have been developed, they can be used to assess individual investments and programs in terms of their ability to improve performance and their cost-effectiveness in doing so. They can be particularly valuable when used as part of a strategic planning effort that assesses the relative merits of alternative program structures, including qualitative factors that can complement a comprehensive benefit-cost analysis.

Analysis of Externalities and Unintended Consequences. In addition to their planned economic and environmental benefits, infrastructure investments often have unexpected positive and negative impacts on the environment, health and safety, the financial condition of governments and private parties, and established patterns of daily behavior. Some of these impacts become apparent only over long time periods, such as the role of Interstate

Highways and other road improvements in encouraging suburbanization. The net effect is often difficult to calculate, but the potential scenarios should be searched out as much as possible.

Adverse effects may have to be mitigated by law or political necessity (the FAA, for example, makes federal funds available for a series of mitigation measures for neighborhoods in noise impact zones near airports). The costs of these impacts should be identified and quantified in monetary terms where possible (many environmental impacts do not have a formal market place and thus may require using proxies to determine their monetary values). Alternative program or project designs that would maximize net benefits or reduce adverse effects should be considered.

Analysis of Risks. Inadequate, insensitively designed, and poorly maintained infrastructure puts environments at risk, raises health and safety risks, and creates potential financial liabilities. Prioritization of infrastructure investments should take these factors into account. Formal risk analysis procedures should be used for major investments that have high-risk features.

Long-Term Analysis. Traditional analytic methods grew out of the need to assess individual projects or specific investments. As such, they may be misleading when considering the long-term or strategic impacts of infrastructure investments. The importance of these long-term impacts can outweigh the net economic value shown by benefit-cost analysis. In considering these projects, it is important not to ignore qualitative factors such as:

- System effects (How much does the value of the air traffic control system or the Interstate Highway System exceed the sum of their individual parts?);
- Non-linearities (Will the investment encourage shifts in how infrastructure systems are used by the private sector?) For example, investment in high-speed rail may change long-distance travel patterns; double-stack trains may generate significant shifts in what and how much freight is moved over long distances. The importance of a global economy, with its emphasis on new patterns of producing goods and services, has implications that are difficult to specify; and
- Quality of life, including long-term environmental implications and possible effects on where people live and work. These issues are particularly difficult to assess, since they require speculation about changes in individual values and behaviors. Nevertheless, they can have profound effects.

Long-term impacts are difficult to assess with precision. It may be useful to consider the consequences (economic, health, and safety risks) of alternative scenarios, including not building the facility, or designing facilities

with flexibility to adapt to changes in technology, life styles, and business practices. Flexibility and the treatment of risk are important factors in making strategic planning a realistic part of decisionmaking.

Uncertainty. The analysis of any long-lived project needs to consider the issue of uncertainty. All forecasts will be wrong in their details. In some cases, this uncertainty can be assessed quantitatively using various types of sensitivity analyses. For example, OMB's Circular A-94 on benefit-cost analysis highlights the value of probability-based techniques to help assess the multiple forces that influence investments.

#### VI. IMPLEMENTATION STEPS

The principles and guidelines presented above offer an opportunity to generate a profound change in how federal (and state and local) agencies nominate, evaluate, implement, and assess infrastructure investments. This should, in turn, result in more effective spending of scarce resources, a better understanding by decisionmakers and the public of infrastructure, improved infrastructure programs, and enhanced social, economic, and environmental outcomes.

While full implementation of these changes will require some time, the following near-term actions can generate significant benefits and initiate more fundamental changes.

Issue Principles and Guidelines to Require Investment Analysis. The President should require all federal infrastructure agencies to justify their budget requests and their legislative and regulatory initiatives with investment analysis, including life-cycle costing.

Leadership in encouraging and developing analytical guidelines and supporting data systems should be assigned to OMB, GAO, CBO, FASAB, and the chief financial officers in each executive branch department and agency. The goal should be to establish widely accepted analytic procedures that:

- Are applicable and accepted across the executive and legislative branches;
- Account for all costs of alternatives, including development, construction, operation, and maintenance;
- Can be validated by independent reviewers;
- Will permit regular audit of results;
- Can be readily understood by the public and the decisionmakers who must make use of them; and
- Are designed to foster interaction and constructive communication among analysts and decisionmakers and across different agencies, levels, and branches of government.

The analytic staffs of federal agencies should consider the data and methodologies appropriate to each analytic problem, rather than limiting themselves to the data available. These data should be produced and verified objectively. A process for automated data collection, analysis, and reporting should be in place before agencywide implementation begins.

The National Income Accounts should be revised to be more helpful in tracking the economic benefits and costs of infrastructure.

Encourage Continued Interagency Cooperation. Interagency cooperation should continue and expand to include efforts to build an active dialogue on how best to implement the principles and guidelines described here, efforts to identify successful applications and areas for improvement, communication of successes and problems, and efforts to tie in with other performance-related studies or mandates (such as the White House National Performance Review and activities designed to respond to the Government Performance and Results Act of 1993).

A National Infrastructure Council should be established to pursue these tasks. It could take the form of the old interagency Water Resources Council or a Cabinet sub-council.

Develop Examples. Application of these principles and guidelines will not be clear or easy. The methods need further development and demonstration within the complexities of public programs. This effort should begin as soon as practical, and it should be undertaken carefully, with the lessons learned shared widely among the relevant individuals in federal agencies.

Establish an Interagency Working Group. The work of Task Force I benefited greatly from active participation by senior program analysts and policymakers from many key federal agencies involved in infrastructure. The process of sharing examples and techniques and discussing ways to apply performance analysis is stimulating and self-reinforcing. This working group mechanism should continue under the auspices of the White House or OMB.

Pursue Pilot Projects. The Government Performance and Results Act of 1993 calls for agencies to volunteer to develop and implement appropriate performance measurements. Infrastructure agencies have an advantage in that it is relatively easy to quantify many benefits and costs of their programs. Also, most infrastructure agencies already have some form of performance assessment under way. Coordinated pilot study reports by several infrastructure agencies would provide an early test of the new opportunities provided by this legislation. Federal infrastructure agencies should participate actively with OMB in the administration of the act.

Provide Infrastructure Training. While a stand-alone infrastructure institute has much to recommend it, the

need to begin disseminating these ideas is too important to wait for agreement on organization, funding, and direction for such an enterprise. Until these important details can be worked out, needed infrastructure investment training should be provided by existing training programs, such as the National Highway Institute, the Federal Executive Institute, and other agency and program-specific efforts.

Convene a National Conference on Infrastructure Performance. An annual conference offers one way to speed up communication across agencies and governments, among different levels of managers, and between managers and decisionmakers. To add prestige and to encourage attendance by senior managers, this should be sponsored by the White House, perhaps as a follow-up to the National Performance Review efforts. The conference should be scheduled for more than one day, and should include sessions devoted to techniques and case studies, interaction with private-sector consumers of infrastructure services, and feedback from public decisionmakers.

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#### Statement of Principles and Guidelines, Federal Infrastructure Task Force II

#### APPLYING BENEFIT-COST ANALYSIS TO INVESTMENT OPTIONS

#### I. OBJECTIVES

This statement proposes a strategy for using economic analysis to improve the quality of decisionmaking associated with federal infrastructure investment. This can be done by (1) expanding the use of benefit-cost analysis by agencies that deal with federal, federally assisted, or federally regulated infrastructure; (2) improving the accuracy and credibility of benefit-cost analyses prepared by these agencies; and (3) promoting greater consistency in the use of this analytical method, thus enhancing its role in comparisons of diverse programs, projects, and regulations.

#### II. FINDINGS

The federal government faces the urgent tasks of maintaining and improving the nation's infrastructure, during periods of fiscal stringency as well as other periods. More attention needs to be focused on improving the productivity of infrastructure investments, the methods for investment analysis, and the quality of data available to support this analysis.

A Powerful and Timely Tool. Of the various tests of merit that may be applied to infrastructure investments, benefit-cost analysis is useful and broadly applicable. It can be used to (1) develop and support initial decision strategies; (2) compare and prioritize investment options; (3) upgrade investment portfolios and reduce investment risks; and (4) evaluate post-investment decisions to help determine whether to continue, change the amount of, or redirect investment.

Definition of Benefit-Cost Analysis. Benefit-cost analysis compares the expected beneficial consequences of a proposed action to its expected adverse effects. In comparing alternative proposals, benefit-cost analysis employs a decision rule derived from concepts of economic efficiency, for example, to maximize net benefits or benefit-cost ratios. In practice, most benefit-cost analysis attempts to consider non-monetized as well as monetized consequences, although decision rules may deal with monetized values only.

This definition of benefit-cost analysis is broad and encompasses less comprehensive forms of analysis, such as cost-effectiveness analysis and performance analysis. The following text refers specifically to standard benefit-cost analysis, although individual topics may be applicable to cost-effectiveness analysis or to other variant forms.

Historical Development. The development of benefit-cost analysis within the federal government began with the Flood Control Act of 1936. By the 1950s, the necessary techniques had progressed to the point where several water resources agencies were using benefit-cost analysis, interagency guidelines for its use were developed, the President endorsed general principles for applying the technique, and Congress endorsed the procedure. An interagency Water Resources Council was established in 1966, chaired by the Secretary of the Interior, and operated until 1983 as the primary instrument for improving benefit-cost methods and promoting their use among all federal water resources agencies. Benefit-cost analysis continues to be used for water resource projects throughout the government.

Since 1981, Executive Order 12291 has required benefit-cost analysis of all major federal regulations as part of the mandated regulatory impact analysis. OMB Circular A-94 establishes guidelines and discount rates to be used in benefit-cost analysis of federal programs.

Although benefit-cost concepts are well developed and widely understood and applied, practical difficulties have arisen in many cases for which the expertise, time, and funds required to perform adequate analyses have not been available. Thus, many applications of benefit-cost analysis have used short-cut methods.

Spreading the Use of Benefit-Cost Analysis. Since the 1960s, some federal agencies outside the water resources programs have chosen to apply benefit-cost analysis. In addition to the Office of Management and Budget's (OMB) regulatory impact analysis program, other current examples include the U.S. Forest Service, the Soil Conservation Service, the Federal Aviation Administration, the Federal Railroad Administration (in its railroad assis-

tance program), and the Federal Transit Administration. In addition, Congressman Bob Carr, chairman of the Transportation Appropriations Committee, recently released a set of investment criteria for highway, transit, and airport investments emphasizing the need to consider benefits and costs as part of the justification for appropriations requests coming before that committee. Thus, many federal agencies now are using some form of benefit-cost analysis for one or more of these purposes.

However, methods are not consistent from one agency to another. Application of benefit-cost analysis is governmentwide only in the case of regulatory impact analysis (following general guidance issued by OMB). The only functional program to make routine and consistent use of benefit-cost analysis across multiple agencies is water resource development.

Diverse Applications of Benefit-Cost Analysis. In accordance with the three federal roles in infrastructure—direct federal projects, federal-aid projects and programs, and federal regulation—benefit-cost analysis can be applied in at least three ways. Traditionally, this type of analysis was applied only to federal projects to be federally constructed, operated, and maintained. As cost-sharing came to these programs, benefit-cost analyses began to be prepared for projects with diverse sources of funding and responsibilities for ownership, operation, and/or maintenance. In 1981, Executive Order 12291 extended the use of this analytical technique to a wide variety of regulatory programs.

Now, as the federal government considers dividing its budget into "investment" and "current expense" sections, many federal aid programs for infrastructure are likely to be moved into the investment budget, where they will need to be justified on the basis of their likely future returns. For this reason and others, traditional project-by-project analysis may no longer be adequate. Programmatic analysis will be needed to help pick the most economically meritorious programs and the most efficient forms of those programs. Benefit-cost analysis is developing as one technique that may be used for this evaluation.

Also, in order to reduce some of the uncertainty about the quality of investments made by state and local governments receiving federal aid under these infrastructure programs, federal aid recipients should perform a benefit-cost type of analysis for the investment options that they consider. Consistency of benefit-cost analyses prepared by state and local governments with federal procedures would give further assurance that these funds would be well spent by state and local governments.

Need to Improve Benefit-Cost Analysis. Benefit-cost analysis is an imperfect tool. When the practice—as embodied in the procedures of the various federal agencies—is contrasted to underlying principles, many deficiencies can be noted. In some cases, it may be possible to use

present knowledge to improve practice. In other cases, further research and development efforts, and better data, may be needed. Nevertheless, the current state of the art of benefit-cost analysis provides an effective technique for investment analysis, provided it is applied in accordance with principles and guidelines discussed below.

#### III. PRINCIPLES

Universal Application. All significant federal and federally assisted and regulated infrastructure proposals should be subjected to benefit-cost analysis.

Accounting Stance. Federal programs should be evaluated from the point of view of national impacts, including both direct and external benefits and costs, in both the private and public sectors.

Multiple-Objectives. The "best" project or program is the one that delivers the most desirable combination of net improvements with respect to economic efficiency, redistribution of income, environmental quality, intergenerational equity, and other objectives.

Decision Criteria. From an economic efficiency standpoint, which is one of several important considerations, the purpose of investment analysis is to maximize the net benefit obtained from a portfolio of investments (e.g., from a program budget).

Baseline Assumption. Benefit-cost analysis requires the establishment of a plausible baseline assumption; beneficial and adverse effects are then measured against that baseline on a with-without basis.

Optimality vs. Feasibility. Various analytical methods may be used to search for optimal projects; benefit-cost analysis is then used to determine economic feasibility and funding priorities.

Risk and Uncertainty. Benefit-cost analyses should present the expected values of beneficial and adverse effects as well as statements regarding the nature and magnitude of risk or other uncertainty associated with those estimates.

Non-Monetized Effects. Benefit-cost analysis should consider all of the beneficial and adverse effects of a proposed action, regardless of whether or not those effects can be expressed in monetary units.

Discount Rate. To facilitate comparisons, benefit-cost analysis requires that future streams of benefits and costs be converted to equivalent present values by discounting.

# IV. GUIDELINES FOR APPLYING BENEFIT-COST ANALYSIS

The principles listed above may not always be easy to apply. The following guidance is provided to assist in the application of this method.

Universal Application. When properly applied, benefit-cost analysis helps in the identification of the most worthy projects, and in setting priorities for implementation. This is possible within a particular program only when all projects or elements of that program are subjected to consistent analysis. But, in practice, benefit-cost analysis is applied selectively-routinely in some programs and agencies (e.g., water resource development), never in others, and occasionally elsewhere. OMB's required benefit-cost analysis guidelines for major proposed federal regulations (those likely to have an effect on the economy of \$100 million or more per year) are more broadly applicable but not specific to any particular project or program. Even though project selection may ultimately reflect non-economic as well as economic criteria, insights gained through benefit-cost analysis should be given an important role in the decision process.

All significant federal infrastructure projects, programs, and regulations should, therefore, be subjected to benefit-cost analysis, using a consistent set of standards and approaches. These standards should provide for analyses of varying complexity and level of detail, as appropriate to each situation. In some cases, the standards may provide for cost-minimization studies, cost-effectiveness analysis, or performance analysis as alternatives to a complete benefit-cost study.

Lacking universal application, benefit-cost analysis can be applied to specific programs, as it is to water resource development projects. In this case, benefit-cost analysis, at the appropriate level of complexity, should be applied to all significant infrastructure investments within each selected program. This guideline assumes that steps are taken to provide the necessary analytical capability within each affected agency if it does not exist.

Accounting Stance. In identifying and measuring benefits and costs, the analyst must choose an accounting stance: Are benefits and costs to be measured from a local, regional, or national perspective? Are only direct, program-related benefits and costs to be measured, or should external effects be considered as well? If external effects are to be considered, should they be limited to the United States, or should transboundary effects be computed? In fact, none of these effects can be omitted completely from the analysis, although some may be treated less rigorously than others.

For example, there may be a national interest in the distributional and other consequences of a program for a particular locality or region (or state or neighboring country), and it may be helpful to separate program-related effects from external effects. In some cases, such as revenue sharing and block grant programs, distributional effects may be of primary interest, with economic efficiency considerations as a secondary issue. In this case, effects should be calculated at state and regional levels, as appropriate, as well as at the national level. For projects within

federal-aid programs that are decided on by a state or local government, benefit-cost analysis should be performed by the federal-aid recipient for the geographic area affected. Care should be taken in the use of state and regional multipliers to avoid double-counting benefits and costs that may simply be shifted across borders.

Multiple Objectives. Federal infrastructure projects affect the welfare of the nation in a number of ways. When economic benefits exceed costs, they increase the aggregate value of goods and services produced (promote economic efficiency). In the course of doing this, benefits and costs may be redistributed from some groups in society to others, or from one generation to another. Environmental quality may be affected, as might several other measures of social well-being. In principle, these are all joint objectives. The most desirable investment is the one that delivers the best combination of improvements with respect to all objectives. But it is difficult to determine what is "best" when some effects are difficult to monetize and the tradeoffs among the different objectives are not well understood. Better methods are needed for presenting and comparing combinations of impacts.

In practice, benefit-cost analysis is most useful for determining the economic efficiency of alternatives when all effects are monetized. In the case of water resource projects, environmental quality changes, regional impacts, and effects on social well-being are assessed, but they are not given official status as objectives. Benefit-cost procedures used for other programs speak only of economic (monetized) benefits and costs. It should be noted that the ability to monetize project effects has improved in recent years. Some environmental effects can be characterized as non-market economic goods and can be valued by methods that utilize market data for related goods (hedonic price analysis, travel cost analysis, and alternative cost analysis) or survey data (contingent valuation studies).

Pending the development of an improved capability for ranking investments according to multiple objectives, benefit-cost analysis should retain economic efficiency (e.g., maximize the benefit-cost ratio) as the primary decision rule. At the same time, standards should require the tabulation of other categories of consequences, such as income redistribution, intergenerational equity, environmental quality, regional impacts, and other social well-being effects.

Economic Decision Criteria. Where the size of the investment budget can be assumed to be fixed, total net economic benefit would be maximized by choosing a portfolio of projects with the highest benefit-cost ratios. In practice, however, the benefit-cost procedures of some agencies advocate formulating projects initially (by scaling and selecting among mutually exclusive alternatives) in the absence of budget constraints, based on a net-benefit decision rule (the present value of benefits minus costs, also known as net present worth). Next, a budget-constrained

investment program is developed by ranking projects according to their benefit-cost ratios (a measure of economic efficiency). Projects also may be ranked by internal rate of return.

These approaches may require modification where projects are large relative to the available budget. In this case, a strict application of any single criterion might result in unspent funds. Further complications arise in the case of federally assisted or federally regulated infrastructure investment, where most project costs are borne by other levels of government or by the private sector.

It should be noted that the use of a benefit-cost ratio decision criterion, instead of net benefit, requires attention to the way in which benefits and costs are categorized. Current practice often groups together all positive effects under the heading of "benefits" or "beneficial effects"; all negative effects are similarly grouped and termed "costs" or "adverse effects." In fact, there is a distinction between "benefit" and "beneficial effect," as there is between "cost" and "adverse effect." Economic benefits consist of all output-related effects, including those which are adverse (e.g., congestion costs due to recreation use of a reservoir). Economic costs include all input-related effects, including those which are beneficial (e.g., increased profits to local businesses as a result of highway construction activity). Failure to observe these distinctions biases benefit-cost ratios, but will not affect the net benefit measure or the calculated internal rate of return. The method used in each specific application, and the reasons for choosing it, should be explained, so that those using the analysis will not be misled.

Baseline Assumption. The baseline assumption for direct federal projects and federal regulations should incorporate all future actions and conditions considered most likely to occur in the absence of federal investment. This includes the possibility of investment by state or local governments or by the private sector. The baseline assumption is rarely a status quo assumption.

Similarly, the baseline assumption for benefit-cost analysis of federal-aid expenditures decided on by state or local governments should include all future actions most likely to occur in the absence of the federal-aid recipient's proposed action, including the possibility of investments by other governments and by the private sector.

Optimality vs. Feasibility. Economic feasibility is usually defined as requiring benefits to exceed costs; it is demonstrated through benefit-cost analysis. The same analysis also permits the ranking of a specified set of investments according to economic returns, or other objectives. Selection of the "best" investment from among those considered, however, does not reveal whether some still better investment might exist. The best possible investment, according to the decision criterion used, is the optimal investment. Benefit-cost analysis can be used to

search for optimal projects, but it is a crude tool for this purpose. Better methods are available, including linear programming and other mathematical optimization approaches. Further development of these methods and expanded application is needed to improve analysts' ability to identify alternatives and test for optimality.

Risk and Uncertainty. All estimates of benefits and costs of proposed investments are forecasts, and therefore inherently uncertain. Sometimes, it is possible to estimate the probability of occurrence for various outcomes to help put boundaries around the uncertainty. The methods for doing this include estimates of probabilities of various outcomes, confidence intervals, and certainty equivalents. In other cases, where nothing is known of the probability of alternative outcomes, the results are simply said to be uncertain. There has been relatively little development of methods for coping with this type of uncertainty.

Where infrastructure proposals are related to health and safety risks, risks to the environment, and risks of external financial liabilities, it may be particularly important to apply formal risk analysis methods to develop a fuller understanding of these potential cost factors. Risk analysis is not always used in conjunction with benefit-cost analysis, however. This may reflect, in part, the difficulty of performing risk analysis and communicating the results to decisionmakers and to the public.

Better methods are needed for estimating, expressing, and communicating the estimated uncertainties and risk factors incorporated into benefit-cost inputs, assumptions, and results so that decisionmakers may understand the range and likelihood of possible outcomes. One result of better characterization of risk and uncertainty should be greater attention to risk reduction through data improvement.

Non-Monetized Effects. Quantitative comparisons, determinations of economic feasibility, and rankings are facilitated by effects that can be measured in a common unit, such as money. Yet, in practice, many effects cannot be, or have not been, expressed in monetary units. As a result, conclusions are often based on monetized effects alone. Such conclusions are limited at best, seriously biased at worst. Much progress has been made in developing monetary measures for certain non-market goods, and more progress is needed. More importantly, methods must be found for evaluating investments having significant non-monetized consequences.

Benefit-cost analysis should consider all consequences of an investment, whether monetized or not. Every reasonable attempt should be made to monetize any effects which can be characterized as economic benefits or costs. Various market-based and non-market-based methods are available, such as hedonic price analysis, travel cost methods, and contingent valuation surveys. These methods may be useful for some, but not all, project ef-

fects. Where monetization is not feasible, the effect should be fully described, and quantified to the degree possible.

Discount Rate. Investments should be analyzed using "real" (inflation-free) estimates of benefits and costs and a "real" discount rate. Depending on its conceptual basis, the discount rate may range from several percent to as much as 10 percent. It is relatively stable over time, however, and does not vary with price inflation. Discount rates are mandated for some federal benefit-cost analysis, by legislation for water resource projects and by OMB Circular A-94 (1992) for regulatory and certain other programs.

#### V. IMPLEMENTATION STEPS

Issue Principles and Guidelines. In order to achieve the full benefits of benefit-cost analysis, the President should issue governmentwide principles requiring the use of benefit-cost analysis by all federal infrastructure departments and agencies in justifying their budget requests and their legislative and regulatory initiatives. The President also should assign responsibility within the Executive Office of the President for oversight of this requirement and for issuing and maintaining additional guidance to assist federal agencies in meeting this requirement. OMB's Circular A-94 already provides guidelines that could form the basis for governmentwide implementation of benefit-cost analysis.

The principles and guidelines should be adapted for use in directly administered federal infrastructure programs, federal-aid infrastructure programs, and federal programs that regulate infrastructure. The oversight responsibilities in the Executive Office of the President should be exercised in consultation and cooperation with the federal infrastructure agencies.

Despite its shortcomings and uncertainties, benefit-cost analysis is a powerful—and frequently the best available—tool for evaluating and ranking proposed infrastructure investments. When benefit-cost analysis is conducted in accordance with the guidelines listed above, it can make a substantial contribution to the productivity and effectiveness of government investment.

However, benefit-cost analysis cannot achieve its potential under current institutional arrangements. Benefit-cost analysis is, in most respects, a bureaucratic orphan. It is applied comprehensively only to water resource projects under optional guidance not currently being updated or maintained. The governmentwide application of benefit-cost analysis imposed by Executive Order for regulations with potential impacts in excess of \$100 million per year is supported only by general OMB standards and guidelines, which are not backed up by program-specific procedures in many cases. (An exception is EPA's Guidelines for Performing Regulatory Impact Analysis.) Within each agency, the agency head, policy analysis office, or

Chief Financial Officer should be responsible for providing detailed procedures appropriate to the agency's mission, to ensure consistent implementation.

Institutionalize Support for Benefit-Cost Analysis. Among the responsibilities of the central support agency or agencies are the following:

- Develop and issue detailed standards, guidance, and procedures for the conduct of benefit-cost analysis within the various federal agencies, consistent with the various federal roles and types of programs and projects.
- Continuously maintain and improve standards, guidance, and procedures.
- Assist agencies in developing organizational capability for performing benefit-cost analyses.
- Conduct or facilitate training programs designed to maintain and improve skills of analysts.
- Provide a documentary repository for past benefit-cost studies.
- Conduct evaluations of selected past studies, in order to identify needed areas of improvement in procedures.
- Disseminate and monitor the effectiveness of selected methods for approximating the value of benefits and costs, including standard values for some frequently used project outputs.
- Sponsor the development of improved methods and procedures.
- Monitor, through selective audits, the quality of current benefit-cost analyses.

#### Reduce Legislative Barriers to Benefit-Cost Analysis.

In some environmental protection programs, the Congress has expressed its opposition to the use of benefit-cost analysis. While policy decisions in these areas may reflect a broader set of considerations, it is important to demonstrate the potential contributions of benefit-cost analysis to the development of more effective environmental policies. Congress should be persuaded to abandon prohibitions and opposition, and to accept the contribution that benefit-cost analysis can make to improving public decisions.

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#### Statement of Principles and Guidelines, Federal Infrastructure Task Force III

#### IMPROVING THE MAINTENANCE OF INFRASTRUCTURE

#### I. OBJECTIVE

The purpose of this statement of principles and guidelines is to provide guidance to federal agencies and their state and local partners that will enable them to ensure effective and efficient maintenance of capital assets and reduce or avoid deferring needed maintenance.

The term "maintenance" applied here is used broadly. It includes preventive and routine maintenance, minor and major repairs, rehabilitation, and even replacement costs if a component has deteriorated to a point where partial or full replacement is cost effective. Some maintenance expenditures, thus, may be funded from operating funds and some from capital funds.

The term maintenance used here excludes work aimed primarily at expanding the capacity of a facility or otherwise upgrading it in order to serve needs different than, or significantly greater than, those originally intended.

Federal concerns include not only capital assets that it owns and maintains but also assets obtained by other governments with federal support and assets regulated by the federal government.

The findings and recommendations contained here have two primary purposes: (1) to reduce long-term costs by identifying infrastructure maintenance early enough to avoid higher costs later, and (2) to help public officials better prioritize maintenance needs and make more informed decisions on maintenance budgets by providing them with fuller information on the implications of maintenance options.

#### II. FINDINGS

Importance of Maintenance. Maintaining public infrastructure assets is a major responsibility and cost of federal, state, and local governments. Dollars for maintenance compete with many other claimants for public funds. Proper maintenance is vital if government agencies are to deliver quality services to citizens effectively and efficiently. Every capital asset suffers wear and tear of its components through usage and due to the attrition caused by environmental conditions, damage by accident, and

improper design or operation or inadequate maintenance. Adequate attention to maintenance needs is important in the design and construction of facilities as well as after they are operational.

Deferral of Maintenance. Maintenance of existing infrastructure-roads, bridges, water and sewer systems, dams and reservoirs, buildings, and other public facilities-often does not receive adequate attention-whether the infrastructure is owned by federal, state, or local governments. This is especially so in times of tight budgets. Seldom, for example, are the likely cost and service consequences of not doing maintenance reported. If maintenance is deferred, this can result later in poor quality public facilities, reduced public safety, higher later repair costs, and poor service for the public-both citizens and businessesincluding added vehicle wear and tear, sewer back-ups into homes, and flooded streets. In its final report to the President and the Congress in 1988 (Fragile Foundations), the National Council on Public Works Improvement made a strong case for reducing deferred maintenance.

Recent Initiatives Focusing on Maintenance. Recently, two major approaches have developed to deal with the too prevalent practice of deferring infrastructure maintenance. One requires the preparation of maintenance management systems as part of the planning and federal funding of state and local surface transportation projects under the *Intermodal Surface Transportation Efficiency Act of 1991* (ISTEA). The other is an initiative by the Governmental Accounting Standards Board (GASB) to develop guidelines for reporting information on capital assets.

GASB's work is expected to include guidelines on reporting the condition of these assets, their ability to meet service needs, and the estimated cost (if any) to return assets to acceptable condition. GASB sets accounting standards to guide state and local governments, and it works with the Federal Accounting Standards Advisory Board (FASAB), a recently established body that recommends federal accounting standards and has also begun to consider capital expenditure accounting issues.

Under ISTEA, new construction of highways and transit facilities is no longer the central focus; good management and maintenance of existing facilities now receives emphasis. Three maintenance management systems are required before federal grants can be made. They cover pavements, bridges, and public transportation facilities and equipment. The purpose of these management systems is to develop proposals for optimal allocation of limited funds to help minimize life-cycle governmental and user costs. Analysis of maintenance needs is required, making use of inventory and condition assessment data. The analysis and resulting plans are required to be aired in public.

Other examples of maintenance planning are increasingly common among agencies directly responsible for facilities:

- The U.S. Army Corps of Engineers has a mature maintenance planning process for its navigation facilities that is directly linked to its annual budget process. It includes regular condition assessments and performance-based evaluations of facility operations in relation to the missions being performed. The process is a dynamic one that responds to changing needs. In recent years, as user fees have begun to fund a significant share of the Corps' maintenance costs, the Corps has found itself in partnership with the Inland Waterways Users Board (IWUB) whose members pay the fees and are very sensitive to cash flow projections that reflect the relationship between revenues and expenditures. Conversely, IWUB is skeptical about traditional Corps rules based on net benefits to the national economy.
- New York City has established a regular condition survey of all its city-owned buildings and public facilities as a result of a city charter requirement enacted after the West Side Highway collapse several years ago. The survey is automated and provides well justified cost estimates of maintenance needs for the city's annual budget process.
- The U.S. Department of Energy is in the second year of a five-year effort to establish a Capital Asset Management Program (CAMP) based on condition assessments, life-cycle planning that evaluates alternative "what if" scenarios, and prioritization of maintenance needs in the context of changing departmental missions.

### III. PRINCIPLES AND GUIDELINES ON MAINTENANCE

The task force recommends that federal, state, and local agencies apply the following principles and guidelines when they make decisions about the maintenance of capital assets. These principles and guidelines focus on

two complementary approaches to improving the effectiveness and efficiency of maintenance: (1) planning and (2) accounting and reporting.

#### Planning for Maintenance

Maintenance Should Be Planned. Maintenance is too important to be just allowed to occur when the need for repairs arises. Federal, state, and local agencies should develop annual maintenance plans, with the objective of enabling the public assets to continue to deliver quality service in the most cost-effective manner.

Multiyear maintenance plans should be provided in support of the first-year plan and budget. These plans are needed to enable public officials to consider the future costs and service quality implications of various levels of maintenance, changing demands for service, and the implications of any maintenance that the plan defers. Routine maintenance as well as large-cost items, such as major repairs and rehabilitations, should be included. The plan should specify why major maintenance elements have been included, including external factors such as expected increases in the usage of facilities. In addition, intentional lack of maintenance or minimal maintenance strategies recommended because of declining demands for service or obsolescence of facilities, should be explained.

Assess Condition of Infrastructure. Agencies should regularly assess the condition of their infrastructure assets. This information is vital as an early step toward estimating maintenance needs.

Systematic, reliable, and efficient procedures should be used. Condition assessment is well developed for roads, bridges, and transit. It is less well developed for many other assets, such as water and sewer systems. Where adequate methodologies for condition assessment do not exist, research programs, new technologies, and user review processes should be used to establish them.

Before the condition assessment, agencies will need to develop an inventory of facilities to include in the maintenance plan. The inventory should include relevant, significant characteristics of each facility (such as materials used, capacity, past loads, and past maintenance and problem history).

Infrastructure System Needs Should Be Reviewed Periodically. The planning process should also provide for periodic review of each infrastructure system for which an organization has responsibility (for example, the transportation system, the water system, and the school system). This can provide a much improved perspective on maintenance needs. For example, a bridge (or building or road or park facility) in poor condition might be found, based on information about future land use and demographic changes, not to be needed currently or in a few years—thus changing the cost-effectiveness of repair options. Obsolescence is an important consideration.

Explicitly Consider Future Maintenance Costs When Selecting New or Replacement Capital Assets, Including Low-Maintenance Design Alternatives. When procuring new facilities, or purchasing new capital equipment, or replacing or rehabilitating major components of existing capital assets, the planners and designers should consider future maintenance requirements and options to reduce future maintenance costs.

In some instances, this may lead to selection of assets with higher initial costs, but whose added cost is shown by analysis and experience to be more than compensated for by future savings on maintenance, as well as yielding more trouble-free service. For example, designing for more expensive materials in some instances can lead to less frequent repairs and reduced repair costs—and would minimize future service interruptions.

This analysis effort will require the agency to estimate such elements as future asset deterioration, the asset's service life for different maintenance options, the costs of various repair strategies, and the likely impacts of deterioration on such features as service interruptions, safety, and business impacts. The timing of the benefits and costs associated with each maintenance option should also be examined explicitly. These analyses should consider not only "immediate" performance, such as pavement rideability, water main breaks, and number of service interruptions, but also should consider other, longer-term impacts, such as safety, pollution, and costs to users of the facilities (including citizens and businesses) and costs to the local economy. If quantitative data cannot be obtained, the best available qualitative information should be provided.

Such information, combined with information from regular condition assessments, will enable the government to make more informed decisions about the level and mix of funding needed and which maintenance-related activities to undertake and when.

Use "Value Analysis-Value Engineering." Agencies not doing so should incorporate some form of "value analysis-value engineering" and life-cycle costing into their development of maintenance strategies, at least for major repairs. This approach involves examining each element of a proposed asset, the asset as a whole, and the asset's relation to the overall service to which it contributes—to ascertain that the asset is really needed and is provided in the most cost-effective way possible.

Prioritize Maintenance Needs. Agencies should use regular condition assessments and other relevant information to prioritize maintenance needs. This information should include the importance of the asset (e.g., usage information), the likely impacts on service levels and performance, risks to health and safety, and costs to the government and users (assuming, as usually will be the case, that not all such needs can be funded right away). This will help the agency determine which maintenance

actions should be undertaken and when, given funding constraints.

These priorities should consider the interrelationships of projects, for example, by combining lower priority with higher priority projects when doing so would substantially lower the overall costs while maintaining a standard of quality. This might occur, for example, if a lower priority road repair project could be combined with a higher priority underground pipe project so that the road work would need to be done only once.

Give Explicit Attention to Preventive Maintenance. As has been found often, "an ounce of prevention is worth a pound of cure." Too often, agencies have been faced with major needs to catch up on repairs, and preventive maintenance is neglected. This can lead to a never-ending cycle of playing catch-up, usually costing more and providing lower quality services to customers. Each agency should develop annual preventive maintenance work plans and budgets as a high priority. Adequate preventive maintenance planning requires a multiyear perspective, including consideration of designs based on life-cycle costs, performance, and usage of the asset as well as costs.

Communicate the Maintenance Plan Effectively. It is not enough for an agency merely to develop plans on its own without communicating with those who will be affected. Federal, state, and local infrastructure agencies should communicate effectively about the plan with those who will be served and those who will have to act on it. This includes persons both within and outside the agency. Different communication approaches will likely be needed for the various types of users of the plan, such as department executives, cost-sharing partners, OMB, Congress, federal-aid recipients, federally regulated infrastructure agencies, the media, and the public. In most cases, communication should start early in the planning process and should be actively pursued as a two-way learning experience.

Use the Plan as a Means to an End. The goal of all infrastructure is to deliver services, and the goal of maintenance is to ensure regular, cost-effective delivery of those services. To be useful, plans must be carried out, and to be carried out, they must be manageable in scope, careful in their use of resources, and executed with commitment and persistence. Thus, the planning process should collect only the information needed and collect it only as often as needed. Planning and reporting should not become as big a job as the maintenance itself.

#### Accounting and Reporting for Maintenance

Report Condition of Infrastructure. Agencies should regularly report to upper management, elected officials, and the public the condition of their infrastructure assets. This reporting, using the latest available information, should occur at relevant times during the decisionmaking cycle (such as during preparation of the annual budget). The findings of the condition assessments process (discussed earlier) should be reported in a clear, understandable way.

Report Costs of Unfunded Maintenance. The costs of needed maintenance should be estimated by establishing condition standards for each capital asset and calculating the cost to return assets to an "acceptable" condition based on established standards. This amount should be reported annually to public officials and the public as part of the budget and financial reporting processes.

In many cases, no universally accepted standard may exist. Developing more than one condition level might be useful. For example, condition level might be categorized by different serviceability levels (e.g., a "minimally acceptable" and a "fully acceptable service" condition). A combination of expert and political judgment, along with citizen inputs, is likely to be needed to establish these standards. The standards, however, should be reasonably consistent over time to avoid being haphazard or manipulated.

By subtracting the amount of maintenance dollars budgeted from the cost to bring assets to acceptable condition, the agency can establish the amount that is unfunded. This cost estimate is sometimes called "unfunded maintenance" or "deferred maintenance."

As with the establishment of "acceptable" condition standards, unfunded maintenance costs might be presented for different serviceability levels, such as by reporting both the amount needed to return the assets to a "minimally acceptable" and to a "fully acceptable" level.

The cost of unfunded maintenance might also be categorized by priority/importance (e.g., high priority versus lower priority, based on each asset's usage and risk/safety/impact potential).

#### Report the Consequences of Unfunded Maintenance.

Estimates of unfunded maintenance are important to enable management, elected officials, and citizens to obtain a more accurate picture of the financial condition of the government. The information on unfunded maintenance reported by the infrastructure agency should include not only the dollar gap but also the performance implications of the unfunded maintenance, including the risks to health and safety and likely economic losses. These estimates also indicate the magnitude of what might be a major deferred liability. The information, especially when tracked over time, also can encourage public officials to consciously and explicitly consider and take appropriate actions to correct the deficiencies and to gain support from the public for the corrections.

Agencies should include with maintenance budget requests estimates of likely consequences if the maintenance is not funded. This information should indicate the consequences of significant unfunded maintenance in terms of both cost and performance. Maintenance

expenditures should be justified in the same performance terms as new construction so that these priorities can be considered in relation to one another (as well as to other funding claimants).

Report Degree of Uncertainty. Agencies should identify and include in their maintenance-needs reports the extent of uncertainty in the estimates used by them in making their major maintenance decisions. Predicting the future (such as future usage and service life of a facility) is difficult at best. However, it is better to obtain the best available professional estimates on these elements than not to consider information on future costs, service lives, and performance.

The organization providing the estimates also should provide information on the key analytical assumptions made and the magnitude of the uncertainty in the estimates. This might be done, for example, by providing ranges of estimates on the key numbers, rather than a single value. More sophisticated methods are available for estimating the magnitude of uncertainties, but these will not always be practical to use.

#### IV. RECOMMENDED IMPLEMENTATION STEPS

Issue Principles and Guidelines. The President should issue general principles for infrastructure maintenance to be followed by all federal infrastructure agencies, and should charge OMB with responsibility for establishing a process to more fully develop and oversee guidelines that require each federal infrastructure agency to plan for maintenance and to account for and regularly report publicly on amounts of needed maintenance that are not funded. The principles and guidelines should be adapted for use in directly administered federal infrastructure programs, federal-aid infrastructure programs, and federal programs that regulate infrastructure. OMB's oversight responsibilities should be exercised in consultation and cooperation with the federal infrastructure agencies.

Agency budget offices and OMB, in their guidelines on budget submission, should request information on the amounts needed for maintenance, both the amount requested and the amount not requested but needed to return assets to "acceptable condition."

The President should request FASAB to accelerate its consideration of capital expenditure accounting and reporting principles and standards, parallel to GASB, and work as rapidly as possible toward issuing consistent standards applicable to federal, state, and local governments to facilitate understanding of maintenance needs by public officials and citizens.

Reduce Legislative Barriers to Good Maintenance. Legislative bodies should avoid enacting legislation that limits agencies' ability to make rational decisions about whether to maintain assets or replace them with new assets. Many public officials and others believe that past legislative limits have led to wasteful investments that were not based on adequate analysis. For example, some federal programs may have led to investing in new roads without adequate consideration of the associated maintenance costs, and may have imposed rigid quarterly or annual expenditure controls that reduced a program's ability to provide maintenance when it is needed. Such provisions distort public choices and can lead to decisions that are not cost effective.

Report Exemplary Federal Maintenance Planning, Asset Accounting, and Reporting Efforts. Federal infrastructure agencies should identify exemplary efforts in maintenance planning, accounting, and reporting, and share these findings widely with other federal agencies and their state and local partners.

Sponsor Pilot Efforts Aimed at Testing a Complete Process of Maintenance Planning, Asset Accounting and Reporting in One or More Federal Agencies. Many federal agencies are developing, or have developed, a process for capital asset analysis including a number of the elements described earlier. However, most current efforts fall short in some important features, such as the annual calculation and reporting of the magnitude of unfunded maintenance and its implications. Therefore, the President should direct that pilot projects aimed at testing a complete process of maintenance planning, accounting, and reporting be undertaken in one or more agencies.

Include Condition Ratings for Major Facilities in the Reports to be Required under the Government Performance and Results Act of 1993. The condition of major federally owned and supported facilities, particularly those that serve the public (such as national highways, veterans' hospitals, social security offices, dams, national parks, and post offices) should be considered as being part of the results of federal program activity and should be included as performance indicators in the annual performance reports to be submitted to the President and Congress under this act.

Establish an Infrastructure Clearinghouse. The President should establish an ongoing clearinghouse that collects and disseminates information on infrastructure, including a major component on maintenance. INTERNET and other means of timely information exchanges among federal infrastructure agencies and others should be used to facilitate this activity.

Provide Education, Training, and Technical Assistance. To encourage explicit and thorough consideration of maintenance needs, the President should enhance and coordinate the many existing efforts in various federal agencies that support a variety of education, infrastructure, training, and technical assistance activities. These activities should include comprehensive coverage of maintenance, including maintenance planning, accounting,

and reporting. Under authority of the *Intergovernmental Personnel Act*, these opportunities also should be made available to state and local officials.

This assistance should be designed to help state and local governments make cost-effective decisions regarding infrastructure maintenance, and should provide: (a) model systems, procedures, and information for condition assessments, prioritization of maintenance options, and cost analysis of various types of infrastructure maintenance practices; (b) training curricula and training programs on maintenance for various types of infrastructure; and (c) access to federal laboratories.

Expand Research. Federal research, development, and testing of materials, processes, and procedures relating to infrastructure maintenance should be coordinated and expanded. A number of federal and federally assisted initiatives are ongoing, including: research programs within federal agencies, the Federal Construction Council, federal laboratories, the Building Research Board, the Transportation Research Board, ten university-based Transportation Research Centers, and the Civil Engineering Research Foundation. Coordination among these activities is sporadic; it should be improved.

Research activities are an important federal effort. The federal government often is in the best position to undertake and sponsor research, particularly when that research will be helpful to most or all parts of the nation. Substantial savings at all levels of government are possible, for example, from breakthroughs in achieving longer lasting materials for roads, bridges, water and sewer pipes, and building construction, and from the development of more affordable methods and instruments for conducting condition surveys. The federal government is in the best position to support and/or encourage such developmental work. This effort might be in the form of directly funding such efforts, such as in current projects to examine road maintenance materials, and in the form of various incentives for states and private industry to undertake such work.

The President should direct that the diverse federal efforts to determine which developed materials, processes, and procedures are most cost-effective (and under what conditions) be coordinated and assessed. The findings of such studies should be rapidly disseminated to interested federal, state, and local agencies—perhaps in innovative ways (such as teleconferencing, video conferencing, and computer networks), as well as reports, conferences, and direct technical assistance.

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#### Statement of Principles and Guidelines, Federal Infrastructure Task Force IV

# MAKING FEDERAL REGULATION OF INFRASTRUCTURE MORE EFFECTIVE, EFFICIENT, AND EQUITABLE

#### I. OBJECTIVE

The purpose of this statement of principles and guidelines is to help establish a more accountable, equitable, effective, and efficient approach to federal regulation of infrastructure. These improvements should be based on a stronger and more equal intergovernmental partnership.

This new approach is necessary because, in many cases, state and local governments are co-regulators in partnership with the federal government, as well as regulated parties themselves. Much of the success in meeting the federal regulatory objectives depends on a strong state and local partnership.

#### **II. FINDINGS**

Federal regulations affecting state and local governments have increased dramatically in recent years, with important implications for the nation's infrastructure programs. Although the goals and accomplishments of many regulations are salutary, these federal regulations and mandates—both singly and in combination—are generating serious problems for state and local governments. Such problems can negatively affect the construction and maintenance of the nation's infrastructure in both direct and indirect ways. In particular:

Certain federal mandates impose heavy fiscal burdens on state and local governments, and the combined costs of all federal mandates have been growing faster than federal aid. Such mandated costs are projected to continue growing at a rate that will threaten other important policy objectives unless remedial actions are taken. For example, the Environmental Protection Agency estimates that local government spending on environmental projects will need to increase by over 50 percent between now and the year 2000 just to meet the costs of existing and pending regulations. In some localities, user fees for environ-

- mental systems are expected to double or quadruple during this time period.
- Costs of this magnitude threaten to distort local budgets and priorities, squeezing resources for other vital public services like education, law enforcement, and public health.
- Federal regulations and mandates can have non-fiscal effects that are as important as their financial impacts. These include lengthy delays in the construction, maintenance, or expansion of public facilities, the prescription of inefficient and inflexible procedures that are poorly adapted to local circumstances, the blurring of public accountability, and unnecessary conflict with the institutional and representational responsibilities of state and local governments.
- Such consequences reflect weaknesses in the federal regulatory and policymaking processes, which too often fail to recognize the cumulative effects of mandates, support overly ambitious goals without providing adequate administrative and financial resources, fail to establish clear priorities or define appropriate performance standards, and lack responsiveness to differing local needs and preferences.
- These problems ultimately undermine the federal government's ability to achieve its regulatory goals, and they perpetuate a system that, by routinely promising more than it can deliver, invites public cynicism and disaffection.
- Policies and measures undertaken to ameliorate such problems have shown some signs of effectiveness in certain instances, but have been ineffective overall.

## III. PRINCIPLES FOR INTERGOVERNMENTAL REGULATION

In order to minimize regulatory problems while still accomplishing regulatory objectives, Congress and the

federal agencies should adhere to the following principles when enacting or promulgating new regulations or revising existing statutes and rules:

- 1. Effective regulation in an intergovernmental framework requires mutual cooperation and genuine partnership among the federal, state, and local governments.
- 2. Limited resources at all levels of government require that Congress and the federal agencies clearly define their regulatory objectives, establish appropriate standards of performance, and seek the most efficient and scientifically sound methods of achieving their regulatory goals.
- 3. Congress should design, and agencies should administer, regulatory programs in ways that promote effective, flexible implementation and continuous improvement in achieving required outcomes. Among other things, this requires recognizing differences in state and local institutional structures, resources, conditions, and servicing responsibilities, and opportunities to offer incentives and use market mechanisms to help achieve required outcomes.
- 4. Citizens have a right be treated fairly and equitably in the regulatory process. Protecting this right requires careful balancing between uniform protection of fundamental rights, deference to local democratic processes, public participation and accountability in the regulatory process, and freedom from unreasonable regulatory burdens.

# IV. GUIDELINES FOR IMPLEMENTING INTERGOVERNMENTAL REGULATORY PRINCIPLES

1. Intergovernmental Partnership: Accomplishing federal regulatory objectives frequently requires active cooperation from state and local governments. To achieve such cooperation, federal regulators should recognize that states and localities have independent constitutional responsibilities, possess widely varying fiscal and institutional resources, confront different problems and conditions, and are accountable to their own citizens and democratic processes.

Within this institutional framework, inflexible and burdensome mandates are counterproductive. They invite unnecessary conflict rather than cooperative problem solving, and they impose uniform, ill-fitting solutions on communities where adaptations to varying local conditions are needed.

To avoid such problems, we recommend that the following guidelines be applied whenever regulations are enacted or promulgated:

 Proposed regulations should be limited to cases of demonstrated need and widely recognized national purposes. Congress and regulatory agencies should be expected to clearly document the

- existence of a significant market failure or a problem of national scope that state or local governments are unable or unwilling to address through independent action or voluntary cooperation. They also should explore nonregulatory options before concluding that regulation is required.
- If a need for regulatory intervention has been documented, Congress and federal agencies should give serious consideration to a full range of regulatory options and select the least burdensome mechanism capable of achieving the objective. In addition, Congress should refrain from enacting rigid and inflexible provisions that direct the rulemaking process. Federal agencies should not regulate more prescriptively than required by law.
- As an integral part of considering such regulatory options, Congress and federal agencies should actively consult with prospective state and local implementors to elicit their perspectives on feasible procedures and requirements and to build a foundation for effective cooperation. Consultation periods should be long enough to generate well-considered and documented responses.
- In order to promote effective implementation further, Congress and federal agencies should conduct and regularly update a detailed, systematic inventory of all regulatory demands and costs placed on state and local governments. Such cumulative requirements, as well as the existing responsibilities and services of state and local governments, should be taken into account when considering additional regulatory requirements.
- An effective intergovernmental partnership also requires that Congress and federal agencies support the development and adequate funding of applied demonstration and compliance assistance programs, to promote education, training, technical assistance, and information sharing among all partners in the regulatory implementation process.
- 2. Efficiency: Because society's resources are limited, the benefits of public regulation must be optimized by employing resources as efficiently as possible. To help accomplish this objective, we recommend that Congress and regulatory agencies consider the following procedures:
  - Both the need for and the specific standards included in environmental, health, and safety legislation and regulations should be based on—and, when appropriate, revised in response to—the generally accepted findings of well-established, peer-reviewed science. If existing scientific knowledge is inadequate, regulatory agencies should promote research that will remedy such deficien-

- cies before issuing permanent standards or requirements.
- Agencies should make greater use of risk analysis to help them evaluate competing threats to public health and safety, and exposures to financial liabilities, and should select the most serious problems for priority attention.
- Once problems are prioritized, federal regulators and policymakers should be required to consider a full range of regulatory alternatives. In particular, Congress and federal agencies should give special consideration to innovative and potentially more cost-effective regulatory approaches, such as greater use of market incentives, tiered standards for jurisdictions of different sizes, and expanded use of properly designed performance standards (with quantifiable measures of outcomes) in place of rigid technical requirements. The search for alternatives should be made in consultation with affected parties.
- Once regulatory options have been identified, agencies should subject these alternatives to careful economic analysis in order to assure that direct and indirect costs, as well as benefits, are fully considered when selecting the most efficient alternative.
- 3. Effectiveness: Ambitious regulatory goals and standards are of little consequence if they cannot be effectively implemented and sustained. Experience shows that when regulations are too complex, they generate confusion, delays, and noncompliance. When regulations are too expensive, they generate opposition and circumvention. When they are unnecessary or inappropriate, they generate conflict, cynicism, and avoidance. Consequently, effective regulatory programs must be designed from the start with a recognition of which units and levels of government will be implementing the standards, what resources they have available, and what legitimate alternative demands are competing for those resources. To help accomplish such recognition, it is recommended that:
  - Congress and federal agencies engage in early, active and full consultation with state and local governments, independent technical and professional organizations, and other appropriate entities that will be involved in or responsible for implementing federal rules. One particularly promising method of doing this is to make greater use of negotiated rulemaking, which brings together implementing agencies and affected parties to negotiate the text of a proposed rule. Experience has shown that this process tends to generate more practical rules, greater commit-

- ment and acceptance, a wider range of technical options, and less subsequent litigation and delay.
- The federal agencies and Congress should provide maximum regulatory flexibility to state and local partners, and other regulated entities, using performance-based goals to allow for variations in the severity of regulatory problems, wide differences in jurisdictional capabilities, the use of innovation, and experimentation with alternative compliance strategies. Legislatively, Congress can often provide additional flexibility in federally funded infrastructure programs by replacing narrow categorical programs with broad, performance-based assistance such as the surface transportation block grant. Administratively, federal agencies should comply fully with the Regulatory Flexibility Act, which requires that federal agencies give special attention to the needs and resources of small communities and other small entities when formulating regulatory standards and procedures.
  - in a vacuum. Procedures and requirements that appear to be feasible in isolation may be unworkable within the framework of competing regulations and total responsibilities. For example, environmental and infrastructure problems typically have multimedia, multimodal, multiagency, and multigovernmental dimensions. Accordingly, Congress and federal agencies should recognize and be accountable for the full range of regulatory responsibilities that are imposed on state and local governments, so that federal goals can be prioritized and feasible standards and procedures can be devised.
- 4. Fairness, Equity, and Accountability: Variation and flexibility are not appropriate policies in all instances. All citizens, regardless of where they reside, are guaranteed equal protection under the law. Fundamental standards of human health and safety do not vary from one locale to another. Nor can local actions be permitted that impose negative consequences on citizens in neighboring jurisdictions.

At the same time, equality and fairness must be balanced with other constitutionally protected values, such as freedom, privacy, and local democratic processes. Moreover, common standards often can be achieved through cooperative and parallel actions, without the need for a uniform rule. Finally, federal policymakers should recognize that excessive uniformity and unreasonable regulatory burdens can give rise to perverse, unfair or inequitable results. For example, the costs and benefits of uniform requirements may vary

enormously from one jurisdiction to another, and the threats to health or safety may vary just as widely.

To balance these competing values and objectives, Congress and the federal agencies should:

- Restrict the issuance of uniform requirements and standards to the minimum level necessary to assure the protection of basic rights.
- Assure that regulatory burdens and responsibilities are fairly distributed in terms of region, jurisdiction, and the ability to pay.
- Write regulations in plain, non-legalistic language that can be readily understood by affected parties, and make these regulations easily available to the affected parties.
- Carefully monitor and oversee the performance of existing rules and regulations on a predictable and routine basis, in order to promote public accountability, evaluate accomplishments, assure effective implementation, assess evolving needs and priorities, and promote continuous improvement.
- Consider the ability of local governments, taxpayers, and the various classes of infrastructure users to pay for federal mandates.

#### V. RECOMMENDED IMPLEMENTATION STEPS

To help implement these principles and guidelines, we recommend that the following practices and procedures be considered or adopted by Congress or executive agencies, as appropriate:

- A. Best Current Practices: Several policies and procedures exist that are intended to promote the principles and guidelines outlined above. These include the Executive Order on Federalism, the Regulatory Flexibility Act, and the Negotiated Rulemaking Act. While some federal agencies have made a dedicated effort to implement these procedures, others have demonstrated less commitment. Consequently, we recommend that all federal agencies examine the following procedures as examples of best available practices for implementing these regulatory relief and analysis procedures.
  - Department of Housing and Urban Development: Guidance for implementation of Executive Order 12612 on Federalism.
  - Environmental Protection Agency: Guidelines for implementing the Regulatory Flexibility Act.
  - Administrative Conference of the United States: Recommended procedures for negotiated rulemaking.

In addition, we recommend that other federal agencies consider, for possible adaptation, the Environmental Protection Agency's efforts to enhance intergovernmen-

tal regulatory performance and consultation with state and local governments, through such techniques as:

- Creation of a State and Local Capacity Task Force, a Small Communities Coordinator, a Small Community and Local Government intra-agency management cluster, and support for the State Pollution Prevention Roundtable;
- Development of "user friendly" program guides, enhanced technical assistance programs, the use of testing laboratories and demonstrations to reduce risks associated with innovative technologies and solutions to compliance problems, and streamlined permit processes.

We also commend the National Conference of State Legislatures for improving awareness of federal regulatory developments through creation of *The Mandate Monitor*, and we recommend comparable actions be taken by other associations of state and local government officials to enhance their input into the regulatory process.

Finally, with respect to improving the efficiency and effectiveness of federal regulatory programs, we recommend consideration of performance-based strategic planning processes such as those at DOT and the Department of Energy.

B. Strengthening Existing Mechanisms: Although we believe it is helpful to promote wider adoption of the best available practices for implementing existing regulatory relief, consultation, and analysis procedures, many of these tools have inherent weaknesses that limit their effectiveness. As outlined in research studies conducted by the General Accounting Office and the Advisory Commission on Intergovernmental Relations (ACIR), these weaknesses include limited agency compliance, inconsistent implementation, and limited impacts on final rules and regulations.

To help overcome these limitations, we recommend adoption of the following changes and amendments in regulatory relief and analysis mechanisms:

- E.O. 12612 and the Regulatory Flexibility Act. The President and Congress, respectively, should strengthen these mechanisms by revising their language to clarify when assessments must be prepared and by placing the ultimate decision about using them in the hands of OMB, rather than with the specific regulating agency. In addition, these mechanisms should be incorporated into agency guidance documents in plain English and with enough elaboration to provide practical assistance in applying them.
- Negotiated Rulemaking: The Negotiated Rulemaking Act of 1990 and the Administrative Dispute Resolution Act are promising techniques that merit reauthorization by Congress. In addition, the use of negotiated rulemaking should be expanded by amending the act to (1) create a pre-

- sumption in favor of using negotiated rulemaking in those cases that meet selective criteria for suitability;<sup>1</sup> and (2) allow regulated entities or other affected parties to formally request that an agency consider utilizing negotiated rulemaking.
- The State and Local Cost Estimate Act: This act requires the Congressional Budget Office to prepare cost estimates of certain federal legislation likely to have significant fiscal impacts on state and local governments. However, such estimates are often prepared too late in the legislative process, and are not required for certain categories of legislation. We recommend that Congress strengthen this act by requiring preparation of cost estimates for alternative provisions of bills with major fiscal impacts prior to subcommittee markup, including estimates for currently excluded forms of legislation such as tax and appropriations bills. We further recommend that Congress authorize the preparation of an annually revised, comprehensive inventory and cost estimate of major intergovernmental regulatory programs and statutes.
- The Federal Advisory Committees Act (FACA): This act establishes stringent procedures for agencies to follow when gathering advice about regulatory and other matters from external parties. Historically, FACA has been interpreted by many federal agencies in ways that impede full and early consultation with state and local officials when developing or revising regulations. We recommend that federal agencies provide better training and information to agency personnel to avoid misunderstandings of FACA's requirements, and to emphasize non-FACA forms of fact-finding, listening to affected parties, and conferencing such as those used extensively by DOT. Exemptions, such as the one for EPA's state co-regulators, should be clearly set forth. We recommend that Congress consider amending FACA to broaden this exemption to include organizations of state and local officials when engaged in consultations with agencies over rules in which their members will be partners in implementation.

- Environmental and Other Statutes: Concepts of federal program flexibility and holistic decisionmaking have been expanded by EPA, in its use of economic incentives in regulatory programs, and by DOT, in its various transportation programs. We recommend that such innovative solutions and flexible approaches to regulatory compliance be continued and enhanced. Full advantage should be taken of existing opportunities for encouraging "holistic" decisionmaking, as in the consideration of pollution prevention programs and in decisionmaking with long time horizons. We further recommend that federal agencies carefully examine their enabling statutes to find opportunities for more efficient and fully effective approaches to writing and implementing regulations. Finally, we recommend that Congress authorize such flexibility when devising or reauthorizing infrastructure-related statutes.
- C. Fundamental Reforms: Finally, we recommend that Congress and federal agencies devote further research and give serious consideration to more fundamental changes in the regulatory process. These changes are designed to alter the basic rulemaking process in ways that would enhance priority setting in regulatory decisionmaking, encourage long-term decisionmaking and innovation, foster economically beneficial technology change, and restrict current incentives to use regulations as devices for shifting costs from the federal budget to third parties.

In the near term, potential changes that should be explored include:

- Approaches: These regulatory approaches increase the range of choices available to regulated parties for compliance. This, in turn, can speed compliance, reduce compliance costs, and encourage the development and use of innovative technologies. We recommend that Congress and federal agencies actively search for opportunities to promote such flexible approaches when enacting and implementing regulatory programs. EPA, for example, has more than 15 years of experience with this approach and a Regulatory Innovations Branch dedicated to it.
- that federal agencies consider implementing a zero-based regulatory review process. This would entail a comprehensive review of all rules required to implement specific regulatory programs and could be undertaken as part of an ongoing exercise in total quality management. In consultation with state and local governments and other interested parties, agencies would re-

<sup>&</sup>lt;sup>1</sup> For example, the criteria developed by the Environmental Protection Agency would restrict negotiated rulemaking to cases in which a limited number of issues and parties are involved, the parties share a degree of common ground, their fundamental values are not challenged by the rulemaking, and they are willing to negotiate in good faith. In addition, relevant statutes must be able to accommodate a variety of options, and it is helpful to confront a rulemaking deadline or other action-forcing mechanism. See EPA, Program Evaluation Division, "An Assessment of EPA's Negotiated Rulemaking Activities," December 1987, p. 2.

view basic regulatory principles, requirements, and options from the ground up, in order to streamline, update, improve, and make procedures and requirements user friendly. One potential model to explore is the current review of highway safety programs.

- Regulatory Demonstration and Assessment Partnerships: This proposal would establish intergovernmental regulatory laboratories and demonstration projects in order to promote the development and testing of appropriate regulatory standards, innovative technology, techniques of holistic outcomes assessment, and alternative implementation approaches prior to the promulgation of universal rules and regulations.
- Sunsetting Interim Guidance Documents: Federal agencies often issue guidance documents to provide interim or supplemental guidance to parties implementing or subject to regulatory programs. Because such guidance often carries the practical force of law without the formal safeguards of the rulemaking process, we recommend that federal agencies apply fixed sunset provisions to such guidance documents, and accelerate the issuance of formal regulations through appropriate consultation or negotiation processes.

In the longer term, we recommend serious exploration of the following additional opportunities for innovation:

- A Federal Regulatory Budget: The purpose of a federal regulatory budget would be to apply the priority-setting discipline of a financial budgeting process to the imposition of additional regulations by the federal government. Such a process would establish an annual limit on total compliance costs that could be imposed on regulated entities. Federal agencies would not be authorized to require compliance activities that exceeded budgeted amounts without triggering some form of reconciliation provision, special implementation procedures, or supplemental funding provision. Such constraints would establish new incentives for Congress and the federal agencies to promote more efficient regulatory approaches and clearer regulatory priorities. We recommend that the President establish or designate a high-level committee, task force, or commission to study the merits and feasibility of establishing a regulatory budget procedure.
- An Intergovernmental Regulatory Expenditure System: An intergovernmental regulatory expenditure system would combine elements of regulatory budgeting with features of the intergov-

ernmental aid system. Each state and local jurisdiction would be allocated a regulatory expenditure limit based on its ability-to-pay (which might be established by estimates of relative tax capacities, tax efforts, and expenditure demands of the type prepared by ACIR). Each jurisdiction would be required to implement all federal mandates up to but not beyond its expenditure limit. If mandated expenditures exceeded a jurisdiction's regulatory limit, new flexibility would be introduced into the regulatory requirements. For example, such a jurisdiction might be entitled to establish its own set of regulatory priorities within the limits of its financial allocation. This could include the use of approaches which, while making progress toward full compliance, would schedule that progress in affordable annual increments. Alternatively, excess costs might be charged to the federal government.

We recommend that Congress and the President direct the Advisory Commission on Intergovernmental Relations or some other appropriate intergovernmental entity to conduct a detailed study of the design and feasibility of such a program.

• Federal Mandate Relief: Several bills have been introduced in both houses of Congress to provide relief to state and local governments from the steadily mounting burdens of federally imposed costs. Some would make the federal government responsible for reimbursing all incremental costs attributable to new federal regulations and mandates. Others call for estimating all the federally induced costs and developing plans to share costs, reduce costs, or abolish mandates. Hearings have begun on these pending bills. We call on Congress to work as rapidly as possible toward enactment of such legislation.

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#### Statement of Principles and Guidelines, Federal Infrastructure Task Force V

#### IMPROVING ENVIRONMENTAL DECISIONMAKING FOR PUBLIC WORKS

#### I. OBJECTIVE

More effective, efficient, consistent, and predictable environmental decisionmaking processes need to be applied throughout the nation's infrastructure programs. Practical and consistent steps need to be taken by both environmental protection agencies and infrastructure agencies, working together, so that the goals of each can be achieved to the greatest extent possible with less cost and less delay.

More specifically, opportunities should be sought and action taken to (1) fully integrate and simplify the process of applying for and deciding on environmental protection permits and other environmental approvals needed to authorize public works projects, (2) reduce the time and cost involved in this decisionmaking, and (3) more fully integrate the consideration of environmental quality values and requirements into infrastructure programs.

#### II. FINDINGS

The findings of the 1992 ACIR study Intergovernmental Decisionmaking for Environmental Protection and Public Works are sound. As necessary environmental protection statutes and requirements have been enacted and promulgated over the past two decades, they have:

- Created a set of complex decisionmaking processes with many separate, often sequential and inconsistent, and sometimes duplicative steps taken by many different agencies;
- 2) Stretched out the process of making infrastructure and environmental decisions, limited the flexibility available to find problem-related and performance-based means of reaching environmental and infrastructure goals, and sometimes lacked a sound scientific basis:
- Increased the unpredictability of the planning and decisionmaking processes, sometimes causing steps in the process to be repeated;
- 4) Led to inefficient uses of limited resources;

- Created unaffordable, unachievable, inefficient, and sometimes ineffective environmental processes and compliance requirements for nonfederal parties (especially small local governments);
- Created tensions within and among federal, state, and local environmental and development agencies.

This chain of events is counterproductive to the achievement of both environmental protection goals and infrastructure goals.

Steps are needed to overcome these unintended results of the efforts to foster greater environmental sensitivity, improved protection from environmental pollution and health hazards, and the transformation of development programs into programs that are compatible with nature.

#### III. PRINCIPLES

The processes for reviewing, coordinating, and approving environmental permits for infrastructure should be guided by the following five principles:

- A high-quality environment and continued economic development both are legitimate, high-priority national goals. These goals are compatible if pursued within a "sustainable development" framework.
- 2. A single, integrated, multimedia, government-wide environmental quality ethic based on Title I of the *National Environmental Policy Act* (NEPA) should be an integral part of all development programs—federal, state, and local.
- 3. Environmental analysis and compliance processes should be better integrated.
- 4. Environmental permits and approvals for public works should be based on sound, peer-reviewed science, and should be evaluated using performance measures of environmental outcomes. They also should be based on priorities for reducing environmental risks most effectively and effi-

- ciently, considering their true costs to society, their affordability, and the need to set achievable priorities for compliance.
- 5. Achieving consistency between environmental goals and development goals, and ensuring the affordability of these goals, should be based on a process that provides for wide-ranging public involvement, interagency and intergovernmental cooperation, and coordinated political action.

These principles are elaborated on below.

Legitimate and Compatible Goals. Defusing the tension between environmental protection and development programs depends on seeing both sets of goals as having legitimacy and seeking compatibility between them. This compatibility should not be seen as a simple compromise, but as an opportunity to find new ways to achieve both sets of goals at once. The President's Council on Sustainable Development should play an important role in identifying and promoting this opportunity.

Environmental Ethic. Many of the difficulties in receiving environmental approvals for public works projects have occurred as a result of inadequate consideration of environmental factors in the earliest stages of planning and designing public works. Thus, environmental problems sometimes come as a surprise late in the process of seeking approval to proceed, when permits or other types of approval are applied for. This can create the need to replan and redesign projects—activities that take considerable additional time and incur additional costs. To avoid this problem, each infrastructure agency should institutionalize a single, integrated environmental quality ethic throughout its entire leadership and professional staff so that environmental quality factors will be routinely and actively pursued throughout the agency's analytical and decisionmaking processes, and passed on to the state and local governments that they assist, regulate, or work with as co-regulators.

Integrated Environmental Processes. Many infrastructure projects must undergo general environmental analysis within the framework of NEPA as well as other federal, state, and local environmental requirements, including more specific types of analysis and review related directly to individual environmental permits and approvals that must be obtained. Currently, these are quite different, and frequently separate, processes. Time and money could be saved in many cases if these separate processes were better integrated to avoid procedural and substantive duplications, and conflicting approaches and decisions by multiple agencies. Joint and concurrent environmental reviews should be the goal. This integration should be established within and among all federal agencies in accordance with CEQ regulations (40 CFR 1502.25).

Performance-Based Evaluation of Environmental Outcomes. Environmental compliance too often is judged largely, or even primarily, as a matter of legal compliance with specified activities or "end of the pipe" specifications. This type of compliance may be unnecessarily costly and adversarial, and does not always yield significant improvements in the environment. Provisions for flexibility in complying with environmental goals offer opportunities for comparable, or even superior, improvements in the environment for the same or less cost. Such opportunities should be identified and pursued.

Costs of Compliance. Promising to achieve more than can be reasonably accomplished in any given time period creates frustration and a loss of confidence in government. Yet, the amount of infrastructure work that needs to be done to clean up the environment, prevent pollution, and avoid damage to the nation's ecological resources is prodigious, and the full costs of compliance often must be and should be included in the costs of infrastructure projects. Available technical, financial, and other resources to pursue these projects are limited. Therefore, compliance with environmental goals in infrastructure programs should be pursued through prioritization that makes best use of available resources in reducing environmental risks as quickly as possible over a period of years.

Public Involvement. All public works and environmental decisions should be made with active involvement of citizens and other affected parties. NEPA requires that all federal agencies provide opportunities for such involvement.

Public involvement should be institutionalized in all environmental and infrastructure programs as a process of two-way communication in which there is mutual education of the public and the government at every stage of the planning and decisionmaking process. This "close to the customer" approach should be designed to restore confidence in government and provide support for well-justified and achievable goals.

The need for making reasoned choices and justifying supportable choices should be communicated to the public in terms that can be readily understood and responded to constructively.

Governmental Partnerships. Multiple federal agencies frequently regulate a single infrastructure project. In addition, state and local governments may be co-regulators with the federal government, as well as regulated entities. It is essential, therefore, for all of these governmental units to be working within similar principles and guidelines. Otherwise, unnecessary confusion, inconsistencies, tensions, delays, and conflicts are likely. Common principles and guidelines, frequent consultations, and a spirit of cooperation and partnership among these entities should be developed.

#### IV. GUIDELINES

To put these principles into action, at least the following ten types of guidelines are needed:

- Integrate and improve the effectiveness, efficiency, consistency, and timeliness of the environmental planning and decisionmaking processes;
- Institutionalize the integrated environmental decisionmaking process and environmental quality ethic in each federal agency;
- Provide better coordinated, more complete, and higher quality information to support improved environmental analysis, planning, and decisionmaking;
- 4. Strategically manage agency resources to support integrated environmental decisionmaking;
- More fully develop and apply sound, peer-reviewed science in support of integrated environmental decisionmaking;
- 6. Enhance public involvement programs;
- 7. Forge stronger federal interagency linkages among environmental and infrastructure agencies;
- Develop, facilitate, and strengthen intergovernmental partnerships for environmental decisionmaking and infrastructure;
- Improve training for environmental decisionmaking in the federal, state, and local governments; and
- 10. Revise environmental legislation and regulations to more fully support integrated environmental decisionmaking.

These guidelines are elaborated on below.

Integrate and Improve the Environmental Decision-making Process. In accordance with the principles set forth above, top priority should be given to (a) integrating the many elements of the environmental decisionmaking processes with each other to promote efficient and effective concurrent reviews by all the responsible agencies; (b) balancing environmental requirements with development, infrastructure, and jobs goals; (c) bringing environmental requirements into line with good, peer-reviewed science and performance monitoring oriented toward desired environmental outcomes; and (d) providing the flexibility needed to get maximum performance for the investment of available resources.

To achieve these goals, the first step is to inventory, document, and compare the existing environmental decisionmaking processes. Some are broad analytical processes that seek public involvement in preparing a comprehensive assessment of societal and physical circumstances, while others are more narrowly focused on specific, single- factor, legal requirements. Levels of

detail in these two types of processes differ, as do provisions for timing, public disclosure, and the factors to be considered. The preparation of flow charts for each of these processes should be undertaken to facilitate comparisons among them.

The second step should be to identify and pursue opportunities for integrating appropriate processes with one another. For example:

- CEQ, or its successor agency, should continue its seminars on NEPA integration and follow up by issuing guidance to integrate environmental analysis and compliance processes.
- The coordinated, multimedia permit process for major projects being developed by the state of New Jersey should be evaluated as a potential model for other states and the federal government.
- The recommendation of EPA's Science Advisory Board that ecological regions be managed as a whole, perhaps using regional organizations, should be pursued.
- Risk-based models for comparing and managing clusters of environmental regulations, so that the worst risks would be dealt with first, should be given a high priority.
- The Arkansas model of NEPA integration should be considered by other states. In Arkansas, the in-house, multidisciplinary planning staff of the state Highway and Transportation Department works closely with the engineering staff from the beginning of the design stage to include environmental considerations, prepare environmental impact statements, and avoid most conflicts with federal environmental regulations.
- The FHWA and FAA NEPA integration model should be considered for use by other federal agencies. Both of these agencies use NEPA as the umbrella for all environmental requirements to be considered concurrently at the planning, design, and implementation stages.
- Alternative dispute resolution techniques for facilitating environmental decisions and avoiding litigation should be used frequently.
- Special permit processes should be used for cases in which innovative technologies for improving the environment are proposed. Such innovations often cannot be tried under standard permit requirements because of the uncertainties introduced by the innovative technology. Closer monitoring and other special conditions might allow these innovative projects to proceed.
- Federal interagency memoranda of understanding such as the one signed on May 1, 1992, by the secretary of Transportation, the administrator of

EPA, and the assistant secretary of the Army for Civil Works, to facilitate the consideration of Section 404 Clean Water Act permits for transportation projects, should be used as models for developing other memoranda of understanding on issues for which infrastructure and environmental protection agencies have common needs and interests.

Institutionalize the Environmental Ethic. Lessons learned from demonstration projects and individual examples of process integration should be applied broadly to institutionalize and infuse the environmental ethic into infrastructure agencies and to make the integrated environmental decisionmaking process more consistent, effective, efficient, timely, and predictable. These lessons should be published in clear and understandable language, with practical guidelines for implementation.

Provide Better Information to Support Integrated Environmental Decisionmaking. Access to baseline information on natural and cultural resources, similar to that provided for geological resources by the U.S. Geological Survey, can save time and costs in completing required NEPA analyses and documentation as well as in satisfying other environmental permit and approval processes. Ongoing programs, such as the National Wetlands Inventory and the Soil Conservation Service's Soil Survey have proven extremely useful for these purposes. Proposed initiatives for a Bureau of Environmental Statistics within a Department of Environment that could come about from the elevation of EPA, and a National Biological Survey under the Department of the Interior, hold the potential for contributing significantly to more effective and efficient environmental analyses and compliance decisions.

The federal government, in cooperation with state and local governments, should continue to initiate, complete, and maintain national inventories of all of the natural and cultural resources required to be considered in the environmental decisionmaking process. User-oriented procedures should be developed and made widely available to transform these data into a sound and objective basis for required analyses and decisions at both the program and project-specific levels affecting ecosystems of various sizes.

Strategically Manage Resources for Environmental Decisionmaking. Innovative management practices that prove successful should be identified and transferred into widespread usage. For example, strategic use of permit processing personnel to put their time where it will do the most good has shown promise in the Corps of Engineers and the state of New York.

 In the Corps, the practice of issuing "general permits" for large areas in which specific permits

- that are consistent can be issued automatically saves a great deal of processing time and energy.
- In the New York case, a recent study found that the bulk of the time of the environmental compliance staff was being spent on the review and processing of relatively routine permit applications, while too little time was left for projects of major significance and for participating in preapplication environmental analyses where preventive advice could expedite later permit processing. It was found that breaking out of routine permit processing systems that required a thorough review of every application on a first-come, first-served basis could make more effective use of scarce resources and make the jobs of staff more interesting and productive.

Some environmental review staffs also have been expanded with financing from permit processing fees. Legislation and training funds may be needed to authorize some management improvements.

More Fully Develop and Apply Environmental Science. Not enough is known about such subjects as how to manage large ecological systems, how to measure and communicate relative environmental risks, and how to estimate the environmental outcomes of specific regulatory practices. Research should be done to provide needed answers.

Enhance Public Involvement Programs. Many federal programs in addition to NEPA provide for public involvement or citizen participation. One of the most recent to require enhanced public involvement is the *Intermodal Surface Transportation Efficiency Act of 1991*.

Many state and local governments also have active programs of this nature. Often, they have been established, in part, to satisfy federal requirements.

In 1979, the Advisory Commission on Intergovernmental Relations completed a comprehensive study of citizen participation in which it identified 45 different types of involvement being used by governments. Many other surveys, handbooks, training courses, and other sources of help are available on this topic.

Forge Interagency Links. Federal agencies can and do learn from each other when they are in contact. Greater frequency of contact among federal infrastructure and environmental agencies should be arranged to facilitate improved environmental decisionmaking processes, sharing of baseline data, and exchanges of information about advances in developing and applying improved environmental science. Sharing the results of pilot studies and demonstrations also should be facilitated through these contacts. In addition, exchanging personnel among federal agencies and with state and local governments can have attitudinal as well as technical benefits. Personnel exchanges are authorized by the *Intergovernmental Personnel* 

Act of 1970, and Rural Development Councils in many states may offer convenient mechanisms for arranging personnel exchanges in rural areas.

Develop and Facilitate Intergovernmental Partnerships. Some federal and federally required environmental analyses are prepared by state and local governments, and most federal regulation of the environment is applied by state and local governments. Additional opportunities for developing these intergovernmental partnerships—most notably the potential state responsibility for issuing Section 404 permits—should be sought out and developed where the capacity exists in state and local governments to undertake these responsibilities.

Advantages include administration of requirements by officials who are closer to and more familiar with local conditions, and who are better able to supply and respond to other relevant information in the community. State and local governments also may be more able to combine diverse permit and approval decisions in an integrated review process, as is being demonstrated in New Jersey.

Where state and local governments need help in complying with federal requirements, that help should be supplied through the intergovernmental partnership. The federal government has a responsibility under the *Regulatory Flexibility Act* to give special recognition to the problems of small governments in responding to federal requirements. The establishment of a small-community coordinator in EPA, and a local government/small community dialogue group to advise EPA on these special needs, has been helpful to the federal and non-federal partners. This EPA example should be considered for adoption by other federal agencies.

Provide Environmental Training. The improved decisionmaking processes, more fully developed data bases, and new environmental science called for by this task force are significant departures from much current practice. If they are to be successfully implemented, many federal officials—from top management to operational practitioners—will need to be trained in new concepts and new methods of operating. The new guidelines will not be self-implementing. Adequate training for all those who need it should be supplied.

Revise Legislation and Regulations. Although some of the integration of processes recommended here, and the development of better baseline data, can be accomplished under existing legislation, it should be recognized that the full implementation of these principles and guidelines will not be possible without revising present legislation and related regulations. Pilot projects and special demonstrations should be used to set the stage for needed legislative revisions. For example, the *Government Performance and Results Act of 1993* may provide a convenient vehicle for testing outcome-based evaluations of the per-

formance of environmental programs on a pilot project basis. That act also would provide for broader application of the pilot project findings at a later time. Opportunities to enact legislation that would more fully integrate environmental decisionmaking processes should be sought.

#### V. RECOMMENDED IMPLEMENTATION STEPS

- 1. Establish an Integrated Environmental Ethic and Decisionmaking Process. The following actions should be taken to establish an integrated environmental ethic and decisionmaking process applicable to all federal agencies that administer infrastructure programs directly, provide financial assistance for infrastructure, or regulate infrastructure:
  - The President should revise and expand Executive Order 12088 (Environmental Compliance), or issue a new executive order, to establish governmentwide policies to integrate environmental decisionmaking based on (a) outcome-based performance standards, (b) improved science, and (c) risk-based priorities for compliance. The executive order should direct all federal infrastructure agencies to establish, and actively nurture, a strong environmental ethic within their programs, and should give CEQ, or its successor agency, responsibility for overseeing implementation of the governmentwide policies. The President also should convene a White House Summit on Environmental Integration to help focus attention on the importance of this governmentwide initiative.
  - CEQ, or its successor agency, should develop additional governmentwide guidance, in consultation with other federal environmental and infrastructure agencies and affected state and local governments, to assist in implementing the President's environmental integration policies. CEQ also should develop legislative proposals needed to facilitate the implementation of the President's policies, and a clearinghouse of best practices that can be used to implement the additional guidance. This guidance should advise federal agencies on the appropriate use of innovative management practices such as alternative dispute resolution techniques and the optimal allocation of environmental analysis and compliance review staffs in operating the integrated process.
  - OMB should revise its legislative review, regulatory review, and budget submission procedures to support the President's environmental integration policies.
  - The Congress should revise all environmental statutes to bring them clearly within the purview of NEPA integration policies and to establish early integration of reviews, performance-based

- compliance, efficiency, affordability, timeliness, and predictability as goals of the environmental decisionmaking process.
- Each federal infrastructure and environmental agency should review its environmental review and decisionmaking regulations and processes to incorporate and affirmatively support the principles of integration.
- 2. Pursue Pilot Projects. Under the Government Performance and Results Act of 1993, EPA, CEQ, or a consortium of federal environmental agencies should apply to OMB for a pilot project to begin developing outcomebased performance evaluation measures of environmental programs.
- 3. Improve the Knowledge Base for Environmental Decisionmaking. All of the federal environmental agencies should work through the Federal Geographic Data Committee (FGDC) to accelerate development and coordination of a comprehensive nationwide data base to support improved environmental decisionmaking by federal, state, and local governments.

The recommendations of EPA's Science Advisory Board should be used as the basis for an expanded program of environmental research based on improved risk assessments and concepts of ecological and/or watershed management. Other federal, state, and local environmental agencies should be consulted in expanding this research program. The resources of the Office of Science and Technology Policy, the National Science Foundation, federal laboratories, EPA's interagency research committee, the Department of Defense Strategic Environmental Research Program, and the National Academy of Sciences/National Research Council should be used to buttress this essential activity.

4. Provide Environmental Training. CEQ, or its successor agency, should be directed to continue its NEPA integration seminars and workshops, and to work with the Office of Personnel Management, the Federal Executive Institute, EPA, the other environmental and infrastructure agencies, and universities to increase training opportunities in support of environmental integration policies and guidelines. Provisions of the Intergovernmental Personnel Act should be used to encourage personnel exchanges among federal agencies and between the federal government and state and local governments.

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#### IMPROVING THE FINANCING OF INFRASTRUCTURE

#### I. OBJECTIVE

The purpose of this statement of principles and guidelines is to improve the effectiveness, efficiency, and equity of the financing for federal infrastructure programs. The approach taken is to establish financial planning and the selection of appropriate sources and amounts of funds and financing mechanisms as an integral part of infrastructure planning and decisionmaking, spanning the entire process from goal-setting to implementation. Financial planning should not be brought in just at the end of the process, as an afterthought or simply as an element of the implementation process, accepting all the goals, programs, and projects that may have been developed without consideration of their financial consequences.

#### **II. FINDINGS**

- 1. Rising Requirements for Funds. Very often, grand visions of infrastructure are framed, social policies are adopted, programs are developed, general requirements are mandated, and it is assumed that the necessary financing will come from somewhere. That assumption frequently no longer rings true. The costs of infrastructure programs (designed to accommodate growth, improve effectiveness and competitiveness, and provide adequate maintenance of existing facilities and equipment) and unfunded federal mandates (to protect the environment, accommodate the handicapped, and alleviate overcrowding in correctional facilities and other public institutions, for example) have accumulated faster than revenues have grown, sending infrastructure agencies, and the governments to which they belong, in search of additional funds.
- 2. Heavy State and Local Government Responsibility for Funding. State and local governments traditionally have been responsible for planning, designing, building, owning, operating, maintaining, and financing most public works. As federal aid has declined in recent years, and unfunded federal mandates have increased, the financial responsibilities of state and local governments have

increased even more. The traditional funding sources and mechanisms—including the general fund (containing revenues from such sources as property, sales, and income taxes), long-term borrowing (such as general obligation bonds and revenue bonds), dedicated taxes (such as the gasoline tax), and intergovernmental grants—often are insufficient.

- 3. The Search for Alternative Sources of Funds. During the 1980s, and even in the early 1990s, there has been increasing interest in using nontraditional mechanisms for raising funds to pay for infrastructure. For example:
  - The U.S. Department of Transportation joined that search in a major way in the 1980s through its Rice Center studies.
  - The U.S. Environmental Protection Agency has prepared a major new inventory of alternative financing techniques, Alternative Financing Mechanisms for Environmental Programs (1992).
  - Cost sharing and dedicated infrastructure trust funds became a regular part of the U.S. Army Corps of Engineers' financial planning in 1986.
  - State and local governments are negotiating more frequently with developers to fund all or portions of essential infrastructure.
  - Alternative pricing policies for western water are being examined.
  - The access of state and local governments to the debt capital markets has been affected significantly as the federal tax-exempt status of their bonds was relaxed in 1981, then tightened significantly in 1986. Congress now is considering whether to permit greater use of the tax-exempt bond market for infrastructure under the persistent prodding of the Rebuild America Coalition, the Anthony Commission on Public Works Finances, and others.
  - EPA has underwritten state revolving loan funds for wastewater treatment plants in every state.

- The mixing of federal gas tax dollars with private toll road funds—illegal for many years—was authorized in 1991.
- In 1993, a special federal study commission recommended a series of innovative federal actions to attract pension fund investments into infrastructure.

One of the strongest forces driving this search for additional infrastructure funds is rapid growth of unfunded federal mandates. These mandates are imposed by federal laws, court decisions, and administrative regulations, with little or no thought given to their costs. Many of these mandates are for environmental protection. Others are for the purpose of benefiting Americans with disabilities, reducing the crowding of prisoners, and ensuring fair wages and working conditions for infrastructure workers. The cumulative costs of these mandates are high and growing, but they have not been systematically estimated or provided for with planned funding. They have begun to displace other important state and local priorities without weighing the relative merits of competing priorities. Legally speaking, all mandates are of the highest priority but, scientifically speaking, EPA's Science Advisory Board has observed that not all mandates are of equal urgency or necessity.

4. Inefficient Uses of Funds. Some features of infrastructure programs, built in by the political process, have resulted in inefficient uses of scarce funds. For example, funding that is available only for capital improvements, in times when adequate maintenance funding is not available, has resulted in too much construction and reconstruction, and too frequent replacement of capital equipment, incurring greater costs than would have been incurred if routine maintenance had been performed.

Economies also can be introduced by making the ways in which funds are raised in the capital markets more efficient. Pooling of securities, use of credit enhancements, and the restructuring of debt-payment cash flows to meet the needs of existing investors and to attract new ones can all contribute to more cost-effective ways of raising capital. Applications of securitization, for example, can restructure pools of loans into securities that find global markets consisting of both institutional and individual investors. Federally sponsored securitization is being applied increasingly to several different types of debt instruments, including municipal bonds, and could be applied to leverage limited federal grant moneys to capitalize state revolving loan funds and bond banks more adequately.

The method of revenue collection also can lead to an inefficient use of funds. For example, the current system of fuel taxes and highway tolls favors vehicles with high weight-to-axle ratios, increasing road wear and maintenance costs. In the case of toll roads, frequent stops to pay small fees may result in traffic delays that represent a

private cost and add to air pollution. On the other hand, new technologies can change the equation. New collection devices are being introduced that can calibrate use, permit congestion pricing, and make tolls a very efficient way of exacting user charges.

5. Inequities of Funding. Responsibilities for funding infrastructure frequently fall unequally and inequitably on individuals and governments. For example, when general taxes pay for infrastructure services that are not used to the same extent by everyone, it is generally agreed that some users pay too much, while others pay too little. An example is unmetered public water. If payment for a service that is essential to the general public's health and safety is beyond the means of certain parties, then the case can be made for subsidized or even free service for some selected people. Again, public health and safety may dictate that individuals who cannot pay for water may receive basic service at reduced rates or even free until they (or others on their behalf) can pay.

At the governmental level, examples of inequity arise frequently in the distribution of intergovernmental aid and in the imposition of intergovernmental mandates. Although it is generally agreed that aid should be distributed in relation to needs and ability to pay, many current funding formulas do not follow these two principles very closely, and mandates seldom consider these principles at all. Numerous examples of unequal impacts of environmental costs have been presented to EPA.

## III. PRINCIPLES AND GUIDELINES FOR FUNDING INFRASTRUCTURE

In order to improve the funding of infrastructure programs, three principles should be followed:

- A financial planning process should be established and applied consistently to all federal programs affecting infrastructure either directly, through federal aid, or by regulation.
- A standard set of criteria for evaluating the effectiveness, equity, and efficiency of infrastructure funding sources and mechanisms should be established and applied consistently throughout the federal government as part of the financial planning process.
- Mechanisms for funding infrastructure should be chosen after a thorough evaluation of alternatives is performed using the standard criteria.

These three basic principles are elaborated on below and supported with preliminary guidelines.

#### The Financial Planning Process

The ability to put together a practical package of diverse funding mechanisms may be the key to finding the resources needed to support established federal infrastructure objectives. For each federal infrastructure program being proposed, mandated, budgeted, or reevaluated, a financial feasibility/affordability analysis should be prepared. The purposes of this analysis should be to gauge the financial feasibility and relative effectiveness of alternative infrastructure proposals from the viewpoint of all the parties responsible for funding the improvement and its subsequent operation and maintenance, and to identify the most affordable options. Preparing this analysis at an early stage in the review of legislative and rulemaking proposals can be an effective means of holding costs down. Moreover, the amount of available funds can and should help shape how much can be required and how the requirements can be met. Risk estimates based on worst-case scenarios may have to be tempered by assessments of costs and resulting improvements in performance.

The requirement for financial feasibility analysis should apply equally to judicial, legislative, and executive decisions affecting the demand for infrastructure. If funds cannot be raised without jeopardizing the fiscal health of the responsible parties, programs and mandates should be redesigned or stretched out to make them feasible.

The May 1992 report of EPA's Environmental Financial Advisory Board (EFAB), entitled Narrowing the Gap: Environmental Finance for the 1990s, provides a blueprint for the kind of financial feasibility that all federal infrastructure agencies should consider. Clear estimates of the financing needs are the first step, to be followed by an evaluation of potential funding sources and mechanisms, and the differing capacities to pay possessed by the governments and agencies responsible for implementing infrastructure proposals. It is likely that a package of several revenue sources will be needed to meet identified needs.

A multiyear time frame is particularly important for infrastructure planning. In part, this is because bringing capital projects into existence requires extensive engineering, long lags in acquiring various permits and completing public hearing and approval processes, and long construction periods. In addition, the large amount of investment in a typical infrastructure project requires payments to be spread over many years and provides benefits over long periods of time.

#### Criteria for Evaluating Alternative Funding Mechanisms

Generally, sources of funds can be judged by three criteria:

Equity: The attribute of raising revenues from those who benefit from the expenditure in proportion to their benefit or the costs they impose on society, with due regard to shared benefits and consistent with prevailing notions of ability to pay.

Efficiency: The attribute of raising the needed funds at a minimum administrative and transaction cost and

avoiding unintended distortions in the programs and financial markets.

Effectiveness: The attribute of raising funds in a sufficient amount and timely fashion when needed to meet the costs. In other words, a source of funds may in theory be equitable and efficient, but unless it yields sufficient funds in a dependable fashion when they are needed and has the elasticity needed to respond to changing demands, it is not effective. Legal restrictions, political acceptability, interjurisdictional economic competition, and, in the case of borrowing, financial market acceptability, all may limit the effectiveness of various sources of funds.

Guidelines for Applying the Benefit Principle. In general, those who benefit from infrastructure services should be asked to pay for them. User fees, dedicated taxes, trust funds, and special districts are commonly used to apply this principle. This works well when most of the benefits are identifiable, measurable, and direct, and when the beneficiaries can be billed conveniently at the point of use or where they live.

However, when many of these socially beneficial services are widely dispersed, indirect, or difficult to measure, general taxes may be the only efficient means of funding. In addition, when some people needing services do not have the ability to pay, or have only limited ability to pay, general taxes also may be the most equitable means of funding.

A special case of responsibility to pay for infrastructure occurs when identifiable parties cause pollution or impose other externalized infrastructure costs on society. In this case, the polluter or imposer of the cost should pay the costs they impose on society to the extent that those costs can be clearly identified and measured.

#### **Selecting Funding Mechanisms**

Selection among alternative sources of funding should be guided by the criteria of effectiveness, equity, and efficiency. The application of these criteria is seldom clear-cut, nor are the outcomes of analysis unambiguous; people and governments can disagree over the level and distribution of benefits of programs and projects and how their costs should be apportioned and revenues collected. Nonetheless, there is an overriding need to analyze financing implications and options at the very outset of the infrastructure investment analysis process (see Task Force I Statement), not as an afterthought. Only in this way can the benefits and costs be compared, and the concepts of equity, effectiveness, and efficiency of funding options be recognized.

Another tier of concern has to do with the selection of the source of funds and traditional versus nontraditional financing techniques. Governments have many alternatives in the selection of specific revenue sources and in the choices of facility operations and revenue collections. Much of the innovation that has occurred in the financing of infrastructure has been to establish new entities in the public sector or to enlist the private sector in the development, financing, construction, and/or operation of capital facilities formerly provided by the public sector.

There also are several intergovernmental concerns involved in transfers, mandates, and tax policy relationships. In our federal system, governments that own and operate infrastructure may find themselves in receipt of financial assistance (the fiscal carrot) or under mandate (the stick) when it comes to providing services. Furthermore, federal tax policy and federal securities laws and regulations have pervasive effects on the cost and availability of financing techniques used by state and local governments.

The Principal Choices. There are four major choices when selecting among potential mechanisms for funding infrastructure: (1) current revenues, (2) borrowing (pledging future revenues), (3) intergovernmental assistance, and (4) private-sector options.

It is important to recognize that all expenditures, including those on capital items, will ultimately need to be paid from revenues in somebody's budget, either today or in the future. Thus, the selection of sources of funds breaks down into a decision to finance improvements either from revenues currently collected by governments or others on their behalf or by promising to use future revenues to pay debt service or lease payments.

Deciding from what sources infrastructure will be funded is vital not only in deciding on the relative merits of one resource over another but also in the practical affairs of designing a financing plan. It is important at the outset to understand the distinctions between (1) own-source revenues that governments raise themselves and over which they have some degree of control and (2) intergovernmental payments that are funded by others and over which the recipients may have little or no control. Intergovernmental assistance is decided on by the assisting government, and its use may carry numerous conditions that limit its flexibility.

Alternatively, governments may elect to borrow or contract for the provision of infrastructure and related services with the private sector. In every case, again, revenues to pay for the facility and services will need to be raised sooner or later, by one government or another or by private parties. When raised either through taxes or charges, these revenues will most likely represent a cost in forgone opportunities to spend funds on other things. It is important, therefore, at the outset of infrastructure policy and planning processes to focus on sound criteria for selecting the appropriate sources of funding.

Traditional vs. Nontraditional Funding Mechanisms to Consider. Governments typically have relied on a limited number of traditional revenue sources, such as the local property tax and various forms of sales taxes (general

and selective) and income taxes (usually state). In addition, governments have commonly financed utilities (water, sewer, waste disposal) through user charges based on consumption and/or availability of service. Increasing pressure on raising sufficient funds through traditional mechanisms, greater acceptance of the benefit principle, and technological advances have all combined to increase the use of nontraditional sources of revenues. These include developer exactions, special taxing districts, and innovative user charges, such as congestion fees and differential waste disposal fees. As technology for recording usage and levying requisite charges (such as in highway user charges) improves, other opportunities will present themselves to better attune charges to benefits.

Both traditional and nontraditional mechanisms should be considered to fill any funding gaps. The advantage of traditional funding mechanisms is that they are in place and known—administratively, politically, and in terms of predictable productivity. However, they may be at their limits of effective use, economically, politically, or legally. If that is the case, the nontraditional mechanisms may offer the only alternatives available for generating additional revenues. Experimentation with alternative funding mechanisms should be encouraged.

In any event, whether traditional or nontraditional mechanisms are used, there are limitations beyond which spending of any unit cannot go, no matter what sources are enlisted in the effort. The nontraditional sources, at least up to now, have accounted for less than 20 percent of infrastructure budgets.

Pay-as-You-Go vs. Borrowing. When making choices between using current revenues or deferring their collection until the future through borrowing or lease-purchase arrangements, there is the added dimension of timing of benefits and payments. The arguments between the advisability of borrowing versus using current revenues (pay-asyou-go) are well understood, but are especially pertinent in the case of infrastructure financing. Whereas reliance on current revenues saves on interest costs and conserves borrowing capacity, it frequently is not an effective option because it provides insufficient funds to pay the large costs of an infrastructure project. Perhaps more important is the desirability of aligning costs to the benefits received over time. Capital improvements produce their benefits over many years, and it is logical that those who benefit from services over time should pay for them as they are used, especially when the users may vary from year to year.

State and local governments rely heavily on the capital markets to finance their infrastructure needs. While the realities of the federal budget place limits on the encouragement that can be provided for such borrowings through tax preferences and securities regulation, there is an overriding obligation to make such access as economical and efficient as possible and to focus on the public benefits of the expenditures to be financed, as op-

posed to the particular legal form of the borrower or its obligation. Where, for example, there may be incidental or derivative benefits to private parties as a result of financing arrangements, these should not unduly inhibit the use of tax- exempt borrowing for facilities that principally benefit the general public. To the extent possible, broad program objectives should be set and the states and localities should have freedom from detailed restrictions in accomplishing them as best they can.

Guidelines for Determining Who Should Pay. When governments, as distinct from identifiable private parties, pay for infrastructure, the question is which governments should raise the revenues from their own sources. Local benefits should be paid for locally; regional or metropolitan benefits should be paid for at that level (generally through a special district); statewide benefits should be paid for by the state; and national benefits should be paid for by the federal government. Often, however, a single facility serves more than one clientele, as when a single highway accommodates local, regional, and long-distance trips. In such cases, costs should be shared.

When one government mandates another government to provide infrastructure, it may have responsibility to pay part or all of the costs. When the mandating government is simply regulating services that would be provided in any event, the need is not so compelling. But when the mandate is to meet a national need or involves substantial spillovers, then the need for assistance is compelling.

The key to determining who should pay, and how much, is a careful analysis of who benefits (both directly and indirectly), over what period of time, in what proportions they benefit, and how able they are to pay in proportion to their benefits (or to the costs they impose on others). Governments, like private parties, have differing abilities to pay that should be considered when costs are mandated on them, when intergovernmental grants are distributed, and when revolving loan funds are set up and administered. Representative revenue capacity, tax effort, and expenditure needs (such as prepared by the U.S. Advisory Commission on Intergovernmental Relations) should be consulted when considering the ability of governments to pay a fair share of infrastructure costs. Governmental analyses also can be strengthened significantly by reference to the publications and evaluations of the credit rating agencies and municipal credit analysts who provide helpful guidance on the feasibility and reliability of various financing mechanisms, as well as the credit worthiness of governments that wish to employ them.

#### IV. INITIAL IMPLEMENTATION STEPS

The following five initial steps should be taken immediately to start establishing comprehensive financial planning and management processes in all of the federal government's infrastructure agencies:

- Issue governmentwide principles and guidelines for comprehensive financial planning in infrastructure agencies.
- Consider establishing financial advisory boards in each of the federal infrastructure agencies, using EPA's EFAB model.
- Remove legislative barriers to financing.
- Fill knowledge gaps that impede sound financial planning and the use of innovative funding mechanisms.
- Build agency capacities to perform financial planning.
- Use private financial services as appropriate.

Each of these initial steps is elaborated on below.

Issue Principles and Guidelines. The President should issue a single set of governmentwide financial planning and management principles, and establish a process for more fully developing, issuing, and overseeing guidelines that would require each federal infrastructure agency to continuously and comprehensively evaluate and improve the funding of its infrastructure objectives. These guidelines should show clearly how the President's principles should be applied to directly administered federal infrastructure programs, as well as federally assisted and federally regulated infrastructure programs.

Oversight responsibilities located in the Executive Office of the President should be exercised in consultation and cooperation with the federal infrastructure agencies. OMB should be given responsibility for compiling estimates of the cumulative federal, state, and local funding requirements resulting from federal infrastructure programs, policies, and mandates. There should be a reexamination of multiyear planning and budgeting by the federal government and implementation of capital budgeting and advance funding concepts in the case of physical infrastructure spending.

Establish Financial Advisory Boards. The Environmental Financial Advisory Board (EFAB) in EPA has put EPA much more closely in touch with the financial realities, capacities, and opportunities faced by its state, local, and private partners, and has developed many significant insights into the means by which environmental funding might be improved. EFAB, with its balanced representation and strong track record, provides a sound model for other federal agencies to consider in helping to strengthen their own approaches to ensuring more effective, equitable, and efficient funding of their infrastructure responsibilities. The Waterways Users Board, attached to the Army Corps of Engineers, provides another model.

Remove Legislative Barriers. Federal tax and securities laws, as well as state laws, limit access to revenue

sources and innovative financing mechanisms. As these barriers are encountered, consideration should be given to appropriate remedial legislation.

Fill Knowledge Gaps. The background materials identified and distributed to support the deliberations of this task force should be published and made available much more widely. In addition, an ongoing clearinghouse capable of continuing a similar service should be established. This service should include cataloging, evaluating, and promoting the use of innovative funding mechanisms such as revolving loan funds, structured municipal bonds, and new types of infrastructure securities.

INTERNET and other means of timely information exchanges among federal infrastructure agencies and others should be established.

The creation of new knowledge also should be pursued. For example, better cost-estimating methodologies are needed to enable consideration of future funding needs of federal mandates. Better tracking of program performance, benefits, and costs (through improved data systems and better public reporting arrangements) also would be valuable to financial planners. Pilot studies, under the *Government Performance and Results Act of 1993*, should be used to begin creating such new knowledge.

Provide Training and Technical Assistance. For the most part, the type of financial planning being recommended by this task force is not now being done in the federal government or elsewhere. Thus, as new principles, guidelines, and knowledge are developed, and begin to be used, there will be a growing need to familiarize increasing numbers of people with them. To meet this need, both formal training and a variety of technical assistance opportunities should be offered. The various federal infrastructure agencies, in cooperation with each other and with OPM, should develop and offer appropriate courses, manuals, personnel exchanges, and other such opportunities.

Partnerships with established training institutions should be explored. For example, the Federal Executive Institute frequently develops special courses for agencies, and the *Intergovernmental Personnel Act* allows state and local officials to enroll in federal training courses. The act also encourages intergovernmental personnel exchanges. Another type of opportunity is illustrated by the Western Infrastructure Leadership Institute led by the University of New Mexico and the University of Arizona.

Use Private Financial Services. Many private firms are highly skilled in techniques of financial analysis and planning, financial deal-making, and the creation of new financial instruments. Many public bodies may find it advantageous to use outside advisors to explore potential financing mechanisms to achieve portions of their financial planning. Proposals for innovative financing mechanisms, as well as advice on ways to make the mechanics

and techniques of the planning process itself more effective and efficient, are useful services that are needed and could be provided efficiently and effectively by experts who specialize in these concerns.

Innovate and Experiment with Financing Mechanisms. The arena of public capital finance is vigorous and dynamic. Experience has already been gained with financing mechanisms that pool and stretch resources by making municipal debt more attractive to existing investors and enabling it to attract new investors. Revolving loan funds, bond banks and pools, credit enhancements, and various forms of swaps and derivatives are devices to reshape and make more attractive the future cash flows that debt obligations represent. Proposals for securitizing streams of funds, including those based on grants, the establishment of new financial institutions in which there is a federal interest, and the development of infrastructure securities that are attractive to individual investors or, at the other end of the scale, to public pension systems are examples of innovation. Some of these represent greater collaboration with the private sector as well. As has been noted above, financing infrastructure represents a broad scale of policy concerns and revenue-raising entities and techniques. Innovation is to be encouraged, as is the testing of the efficiency, effectiveness, and equity of new and novel techniques in particular applications.

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#### **APPENDIX**

# The National Conference on High Performance Infrastructure

Thursday, July 29

9:00 a.m. Welcome and Overview

Hon. Edward G. Rendell Mayor, City of Philadelphia

9:30 a.m. Keynote Address

Budgeting for Performance Hon. Alice M. Rivlin Deputy Director

U.S. Office of Management and Budget

11:00 a.m. Views from the Congress

Bruce D. McDowell
U.S. Advisory Commission
on Intergovernmental Relations,
Moderator

Sen. Bob Graham, Member, Congressional Infrastructure Caucus

Rep. Bob Carr, Chairman, Transportation Appropriations Committee

12:00 Noon Luncheon

Bruce D. McDowell, Moderator, ACIR

Restoring Public Confidence in Infrastructure Investment Hon. Thomas M. Downs Commissioner

New Jersey Department of Transportation

2:00-3:30 p.m. Views from the Agencies

Bruce D. Long, Moderator Chief, Water Resources Branch Office of Management and Budget

Hon. Mortimer Downey
Deputy Secretary of Transportation

Hon. G. Edward Dickey
Acting Assistant Secretary of the Army
for Civil Works

Hon. David Gardiner
EPA Assistant Administrator
Policy, Planning, and Evaluation

4:00 p.m. Views from the Outside

Jimmy Bates, Moderator
Acting Deputy Director, Civil Works
U.S. Army Corps of Engineers

Robert Goodin

American Public Works Association

Michael J. Pompili

Assistant Health Commissioner

Columbus, Ohio

Thomas J. Harrelson National Academy

of Public Administration

5:00 p.m. Adjourn 7:00 p.m. Dinner

Introduction

Hon. Barbara Sheen Todd

Commissioner, Pinellas County, Florida

Improving the Performance of State, Local, and Private Partners

John Horsley

Founding Chairman, Rebuild America Coalition

Friday, July 30

9:00 a.m. Priorities for Implementing the Federal Infrastructure Strategy

Four Breakout Groups

11:00 a.m. Priorities for Implementing

the Federal Infrastructure Strategy

Reports of the Breakout Groups

12:30 p.m. Closing Luncheon

Introduction
Hon. Bruce M. Todd
Mayor, City of Austin, Texas

Reinventing Government: The Infrastructure Case

Barbara Dyer
Director

The Alliance for Redesigning Government

## **Recent ACIR Publications**

RTS 1991: State Revenue Capacity and Effort, M-187, 1993	
State Laws Governing Local Government Structure and Administration, M-186, 1993	
Significant Features of Fiscal Federalism, 1993 Edition, Volume II, M-185-II, 1993	
Significant Features of Fiscal Federalism, 1993 Edition, Volume I, M-185, 1993	
Federal Regulation of State and Local Governments: The Mixed Record of the 1980s, A-126, 1993	
The Role of General Government Elected Officials in Criminal Justice, A-125, 1993	\$25.00
The National Guard: Defending the Nation and the States, A-124, 1993	\$15.00
Guide to the Criminal Justice System for General Government Elected Officials, M-184, 1993	\$8.00
State Solvency Regulation of Property-Casualty and Life Insurance Companies, A-123, 1992	\$20.00
Intergovernmental Decisionmaking for Environment and Public Works, A-122, 1992	\$10.00
Federal Statutory Preemption of State and Local Authority: History, Inventory, and Issues, A-121, 1992	
Toward a Federal Infrastructure Strategy: Issues and Options, A-120, 1992	
Medicaid: Intergovernmental Trends and Options, A-119, 1992	
Local Boundary Commissions: Status and Roles in Forming, Adjusting and Dissolving Local Government Boundaries, M-183, 1992	
Characteristics of Federal Grant-in-Aid Programs to State and Local Governments:	\$0.00
Grants Funded FY 1991, M-182, 1992	\$10.00
Metropolitan Organization: The Allegheny County Case, M-181, 1992	
State Taxation of Interstate Mail Order Sales, M-179, 1992.	\$10.00
The Changing Public Sector: Shifts in Governmental Spending and Employment, M-178, 1991	\$15.00
Coordinating Water Resources in the Federal System: The Groundwater-Surface Water Connection, A-118, 1991	
Interjurisdictional Tax and Policy Competition: Good or Bad for the Federal System? M-177, 1991	\$10.00
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Local Sales Taxes, SR-12, 1989.	\$8.00
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State Regulation of Banks in an Era of Deregulation, A-110, 1988.	\$10.00
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Residential Community Associations:	\$15.00
Private Governments in the Intergovernmental System? A-112, 1989  Questions and Answers for Public Officials, M-166, 1989	\$10.00 \$5.00
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Assisting the Homeless: State and Local Responses in an Era of Limited Resources, M-161, 1988	\$10.00
Devolving Selected Federal-Aid Highway Programs and Revenue Bases: A Critical Appraisal, A-108, 1987.	
The Organization of Local Public Economies, A-109, 1987.	\$10.00
	\$5.00

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The President appoints 20 members—three private citizens and three federal executive officials directly, and four governors, three state legislators, four mayors, and three elected county officials from slates nominated by the National Governors' Association, National Conference of State Legislatures, National League of Cities, U.S. Conference of Mayors, and National Association of Counties. The three Senators are chosen by the President of the Senate and the three Representatives by the Speaker of the House of Representatives. Each Commission member serves a two-year term and may be reappointed.

As a continuing body, the Commission addresses specific issues and problems the resolution of which would produce improved cooperation among federal, state, and local governments and more effective functioning of the federal system. In addition to examining important functional and policy relationships among the various governments, the Commission extensively studies critical governmental finance issues. One of the long-range efforts of the Commission has been to seek ways to improve federal, state, and local governmental practices and policies to achieve equitable allocation of resources, increased efficiency and equity, and better coordination and cooperation.

In selecting items for research, the Commission considers the relative importance and urgency of the problem, its manageability from the point of view of finances and staff available to ACIR, and the extent to which the Commission can make a fruitful contribution toward the solution of the problem.

After selecting intergovernmental issues for investigation, ACIR follows a multistep procedure that assures review and comment by representatives of all points of view, all affected governments, technical experts, and interested groups. The Commission then debates each issue and formulates its policy position.