



AVIATION

Gridlock on America's runways eased from crisis levels earlier in the decade due to reduced demand and recent modest funding increases. However, air travel and traffic have reportedly surpassed pre-September 11, 2001, levels and are projected to grow 4.3% annually through 2015. Airports will face the challenge of accommodating increasing numbers of regional jets and new super-jumbo jets.

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Background

September 11, 2001, had a profound affect on the nation's aviation industry, one which will be felt for many years to come. One effect has been to divert attention from airport infrastructure issues; however, airport capacity issues must be brought back to the forefront if we are to avoid costly delays in the future. Demand for air travel is on the rebound, and the nation's aviation system must be ready to accommodate the projected growth. The demand will continue to outpace our ability to fund capacity improvements at our nation's air-carrier airports.

Conditions

In 2000, air travel in the United States was at an all-time high, with record numbers of flight delays and cancellations. This began to change in late 2000/early 2001 with the economic slowdown and, finally, the terrorist attacks of September 11, 2001. Passenger demand rebounded slowly in 2002 and 2003, in the face of the war in Iraq and the Severe Acute Respiratory Syndrome (SARS) epidemic. In September 2004, U.S. airlines carried 47.8 million passengers, an increase of 7.2% from September 2003.

Demand for air travel service is experiencing increases in passenger and air traffic levels that are predicted by the Federal Aviation Administration (FAA) to return to pre-September 2001 levels by 2005. Large carriers and regional/commuter airlines are projected by the FAA to grow an average of 4.3% per year through 2015. This equates to a 52% increase above the 2005 passenger demand. The tremendous growth in regional/commuter carriers and low-cost carriers will affect the number of aircraft operations at our busiest airports.

Additionally, airports face the new challenge in the anticipated growth of corporate jets that seat four to six passengers; a shift of 2% of today's commercial passengers to corporate jets would result in triple the number of flights. At the other extreme, larger planes carrying 800 or more passengers would represent a significant challenge for airports' current infrastructure.

The nation's air traffic control system remains a looming issue of concern. In the mid-1980s, the FAA estimated that it would take 10 years and \$12 billion to modernize the nation's air traffic control systems. Twenty years and \$35 billion later, the task is not complete, and the FAA

expects that it will take at least 3 additional years and an additional \$16 billion. Meanwhile, the number of aircraft handled by air traffic control is expected to increase from 45.1 million in 2004 to 58.4 million by 2015.

Airport and Aviation Facts:

- There are 510 U.S. airports with commercial service, accounting for 99.88% of passenger enplanements.
- The number of runway incursions has decreased from a peak of 407 in 2001 to 324 in 2003.
- In 2004, the FAA designated 3,344 airports as part of the National Plan of Integrated Airport Systems (NPIAS), including commercial service airports, reliever airports and selected general aviation airports.
- The FAA sets a performance goal of ensuring that 93% of NPIAS airport runways are maintained in good or fair condition—in 2003, the FAA rated 75% as good, 21% as fair, and 4% as poor. At commercial service airports, the runways fared better, with 80% good, 18% fair, and 2% poor.
- Accessibility—66% of Americans live within 20 miles of a commercial service airport.

There is general consensus that maintaining the integrity of the national airport system requires continual updates and a steady and predictable flow of capital. The FAA has estimated that planned capital development of \$9 billion annually is necessary to meet expanding demand. The Airport Council International (ACI) puts that number at \$15 billion. Neither the FAA nor ACI estimates include terminal modifications needed to accommodate new explosives-detection systems required for baggage screening.

One challenge to airport capacity-building is the fragmented nature of airport ownership. Local governments and the private sector represent the majority of owners and investors in air transportation infrastructure; they tend to focus on their own needs, and only secondarily on national, system-wide concerns.

There has been recent progress on airport infrastructure issues. In 2000, Congress passed and President Clinton signed the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century—FAIR-21. This multi-year FAA reauthorization bill included authorizations of \$9.9 billion for the Airport Improvement Program (AIP) for fiscal years 2001–2003, a significant increase over previous years. The bill also increased the Passenger Facility Charge to \$4.50 per boarding passenger. Congress followed this in 2003 by reauthorizing the AIP for 2004–2007 at \$14.2 billion for 4 years.

Airport funding comes from several sources:

- Airport bonds 59%
- AIP grants 21%
- Passenger Facility Charge 13%
- State and local funding 4%

- Airport revenue 4%

The median time to open a new runway is 10 years. The challenges faced when building new runways include reaching stakeholder agreement on purpose and need for the runway, completing the environmental review process, reaching agreement on noise mitigation and other issues, and designing and constructing the runway. New Administration and congressional actions are intended to streamline the environmental review process. New runways can increase an airport's capacity by as much as 30–60%.

Policy Options

The national aviation system faces a number of major challenges in the coming years. The old business model for airlines is being replaced by a newer, low-fare, low-cost model. Newer aircraft, some much smaller and some much larger, will soon be operational. In order to meet these challenges, the national aviation infrastructure must find ways to become more flexible, and must ensure that the necessary expenditure of capital to meet the infrastructure need is available.

The American Society of Civil Engineers (ASCE) supports the permanent extension and increase of user fees as necessary for continued funding of AIP through the Airport and Airway Trust Fund. All monies collected from these user fees should be deposited in the Airport Trust Fund, and the Airport Trust Fund should be removed from the unified federal budget. Revenue Aligned Budget Authority (RABA), which allows for the allocation of all trust fund revenues, should be established in the airport trust funds. Additionally, Congress must provide continued but separate non-AIP and non-PFC funding for security operations.

Specific ASCE recommendations:

- Full funding for the Airport Improvement Program (AIP) at authorized levels
- Removal of the Airport Trust Fund from the federal budget
- Increase in the cap on the Passenger Facility Charge (PFC)
- Full implementation of environmental streamlining
- Modernization of Air Traffic Control Systems

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BRIDGES

Between 2000 and 2003, the percentage of the nation's 590,750 bridges rated structurally deficient or functionally obsolete decreased slightly from 28.5% to 27.1%. However, it will cost \$9.4 billion a year for 20 years to eliminate all bridge deficiencies. Long-term underinvestment is compounded by the lack of a Federal transportation program.

C

Conditions

As of 2003, 27.1% of the nation's bridges (160,570) were structurally deficient or functionally obsolete, an improvement from 28.5% in 2000. In fact, over the past 12 years, the number of bridge deficiencies has steadily declined from 34.6% in 1992 to 27.1% in 2003. The Federal Highway Administration's (FHWA's) strategic plan states that by 2008, less than 25% of the nation's bridges should be classified as deficient. If that goal were met, 1 in 4 bridges in the nation would still be deficient. There were 590,750 bridges in the United States in 2000; however, one in three urban bridges (31.2% or 43,189) was classified as structurally deficient or functionally obsolete, much higher than the national average. In contrast, 25.6% (118,381) of rural bridges were classified as structurally deficient or functionally obsolete.

A structurally deficient bridge is closed or restricted to light vehicles because of its deteriorated structural components. While not necessarily unsafe, these bridges must have limits for speed and weight. A functionally obsolete bridge has older design features and, while it is not unsafe for all vehicles, it cannot safely accommodate current traffic volumes, and vehicle sizes and weights. These restrictions not only contribute to traffic congestion, they pose such major inconveniences as school busses or emergency vehicles taking lengthy detours. It is estimated that it will cost \$9.4 billion per year for 20 years to eliminate all bridge deficiencies. The annual investment required to prevent the bridge investment backlog from increasing is estimated at \$7.3 billion. Present funding trends of state departments of transportation call into question future progress on addressing bridge deficiencies.

Adding to these problems is the inability of the Administration and Congress to reauthorize the nation's Transportation Equity Act of the 21st Century (TEA-21), which has now had six extensions since the program expired on September 30, 2003. The progress made in the TEA-21, which authorized \$218 billion for the nation's highway and transit programs in 2001, is beginning to slip as America continues to shortchange funding for much-needed road and bridge repairs.

Even with uncertain funding due to the lack of a federal transportation funds reauthorization bill, additional revenues from state and local governments have begun to make an impact on bridge projects in all 50 states. Total bridge expenditures by all levels of government for capital outlays (including system preservation and system expansion) was at \$8.8 billion in 2003.

Policy Options

Solutions intended to ease the increasing demands on our transportation system and to improve highway conditions, capacity and safety are multifaceted, and do not always mean simply building more roads and bridges. America must change its transportation behavior, increase transportation investment at all levels of government, and make use of the latest technology. Cities and communities should be better planned to reduce dependence on personal vehicles for errands and work commutes, and businesses must encourage more flexible schedules and telecommuting.

By 2010, all levels of government should ensure that fewer than 15% of the nation's bridges are classified as structurally deficient or functionally obsolete.

Congress must fully re-authorize TEA-21 before it expires again in May 2005. Congress also must use all of the money that accumulates in the Highway Trust Fund to support investment in the nation's surface transportation program and protect the trust fund from abuse by removing it from the unified budget. Congress must provide adequate funding to meet current highway and transit bridge needs, and include enough funding for research and development of civil engineering innovations that offer cost-effective solutions to our transportation needs. Other solutions include private-public partnerships where appropriate, and multi-year capital and operating budgets.

Specific Recommendations Supported by the American Society of Civil Engineers:

- Set a national goal that fewer than 15% of the nation's bridges be classified as structurally deficient or functionally obsolete by 2010
- Reauthorize TEA-21 for at least five years, using a needs-based approach to arrive at the funding level
- Remove the Highway Trust Fund from the unified federal budget
- Increase funding for long-term fundamental highway research efforts at the national level
- Establish of a federal, multi-year capital budget for public works infrastructure construction and rehabilitation, similar to those used by state and local governments
- Encourage the use of life-cycle cost analysis principles to evaluate the total costs of projects
- Support environmental streamlining of transportation projects

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DAMS

Since 1998, the number of unsafe dams has risen by 33% to more than 3,500. While federally owned dams are in good condition, and there have been modest gains in repair, the number of dams identified as unsafe is increasing at a faster rate than those being repaired. \$10.1 billion is needed over the next 12 years to address all critical non-federal dams—dams which pose a direct risk to human life should they fail.

D

Background

Dams provide tremendous benefits, including water supply for drinking, irrigation and industrial uses; flood control; hydroelectric power; recreation; and navigation. However, dams also represent one of the greatest risks to public safety, local and regional economies and the environment. Historically, some of the largest disasters in the United States have resulted from dam failures. In 1889, 2,209 lives were lost when the South Fork Dam failed above Johnstown, Pennsylvania. The 1928 St. Francis Dam failure killed 450. During the 1970s, the failures of the Buffalo Creek Dam in West Virginia, Teton Dam in Idaho and the Toccoa Falls Dam in Georgia collectively cost 175 lives and more than \$1 billion in losses. Such dam failures as Silver Lake Dam in Michigan in 2003 (\$100 million in damages and economic losses of \$1 million per day) and the Big Bay Lake Dam in Mississippi in March 2004 (100 homes destroyed) are current reminders of the potential consequences of unsafe dams.

In order to provide safe, continuing service, dams require ongoing maintenance, monitoring, frequent safety inspections and rehabilitation. Aging dams often require major rehabilitation to assure their safety. Downstream development below dams is increasing dramatically, and continuing scientific research of dam failure mechanisms, such as earthquakes and major flood events, frequently demand repairs to dams constructed long before these advances were realized. Many state dam safety programs do not have sufficient funding or qualified staff to effectively regulate dams under their authority. State programs regulate 95% of the 79,000 dams in the United States, while the federal agencies own or regulate only 5% of the nation's dams.

Conditions

Like all man-made structures, dams deteriorate. Deferred maintenance accelerates deterioration and causes dams to be more susceptible to failure. As with other critical infrastructure, a significant investment is essential to maintain the benefits and assure the safety that society demands.

In the past two years, more than 67 dam incidents, including 29 dam failures, were reported to the National Performance of Dams program, which collects and archives information on dam performance as reported by state and federal regulatory agencies and dam owners. Dam incidents are such events as large floods, earthquakes or inspections that alert dam safety engineers to

deficiencies that threaten the safety of a dam. Due to limited state staff, many incidents are not reported; therefore, the actual number of incidents is likely to be much greater.

The number of high-hazard potential dams (dams whose failure would cause loss of human life) is increasing dramatically. Since 1998, the number of high-hazard-potential dams has increased from 9,281 to 10,213, with 1,046 in North Carolina alone. As downstream land development increases, so will the number of high-hazard potential dams. As these dams often require major repair to accommodate more stringent inspection, maintenance and design standards, financial support for state dam safety programs must keep pace.

Even more alarming, states presently report more than 3,500 “unsafe” dams, which have deficiencies that leave them more susceptible to failure. Many states have large numbers of unsafe dams, including Pennsylvania (725), New Jersey (583), and New Hampshire (357). Many state agencies do not report statistics on unsafe dams; therefore the actual number is potentially much higher.

The combined effect of rapid downstream development, aging/non-compliant structures and inadequate past design practices, coupled with a predicted increase in extreme events, demands fully funded and staffed state dam safety programs, as well as substantial and proactive funding for dam repairs.

Some progress is being made through the repair of small watershed dams constructed with assistance from the United States Department of Agriculture (USDA), beginning in 1948. This is only a small portion of the total number of non-federal dams. On the federal side, federally owned and federally regulated hydropower dams are in good condition; however, continuing budget restrictions and increased attention to security are placing pressure on and limiting many agency dam safety programs.

While the recent passage of the National Dam Safety and Security Act of 2002 (Public Law No: 107-310), which provides funding through grants, has improved state dam safety programs, it does not provide funding for needed repairs. It is estimated that \$10.1 billion is needed over the next 12 years to address all critical non-federal dams—dams that pose a direct risk to human life should they fail. In the meantime, the 79,000 dams in the U.S. National Inventory of Dams continue to age and deteriorate, yet there is no national funding program to fund the repair of unsafe dams.

Since the last ASCE Report Card, the National Dam Safety Act of 1996 was reauthorized in 2002, increasing the authorization to \$8.0 million. To date, however, funding has remained at pre-authorization levels of \$5.5 million. Under this program, state dam safety agencies have received grants totaling nearly \$22 million to assist with improving dam safety regulatory programs by procuring equipment, implementing new technology, and enabling more-frequent inspections. The program also provided opportunities for continuing education to dam safety engineers, and funding for research to advance the technology of investigations, construction, and rehabilitation of dams, but no funding to repair unsafe dams.

According to results of a study by the Association of State Dam Safety Officials, the total investment to bring U.S. dams into safety compliance or to remove obsolete dams tops \$30 billion. Except for a handful of state programs offering low-interest loans to dam owners, there are no funding sources for dam rehabilitation or repair. Private owners have the greatest need for funding. The Small Watershed Rehabilitation Act addresses less than 10% of the nation's dams—the remaining 90% demand similar attention.

On March 3, 2005, Representative Sue Kelly introduced H.R. 1105, the Dam Rehabilitation and Repair Act of 2005. The bill would provide \$350 million over 4 years for the repair, rehabilitation or removal of non-federal, high-hazard, publicly owned dams.

Four years ago, few state dam safety programs were adequately funded or staffed. Today, that situation remains the same. On average nationwide, there are 268 state-regulated dams per full-time equivalent (FTE) staff. In 13 states, this number exceeds 500, and four report more than 1200 dams per FTE staff. In 1998, a Texas House Committee recommended adding 15 staff members to that state's six-member dam safety team; today, there are still only six staff members responsible for inspecting nearly 7500 dams. One Texas official commented that, "because of inadequate staffing, some dams would not be examined for three centuries."

Since the last Report Card, Delaware has created a dam safety program, leaving Alabama as the last remaining state that has not passed dam safety legislation. As a result, an estimated 2,100 dam structures—perhaps more—are unregulated. At last count, 171 of these structures were classified as high-hazard.

Policy Options

There is still an alarming lack of public support and education about the need for proper maintenance and repair of dams. Unless a dam fails, dam safety is not usually in the public view, although it is an issue that affects the safety of millions of people who could be living and working in the path of a sudden, deadly dam failure.

Specific recommendations supported by ASCE:

- Establishment of comprehensive and fully funded dam safety programs in all 50 states, especially Alabama, the only state without an authorized dam-safety program
- Introduction and passage of legislation to create a loan fund for the repair, rehabilitation and removal of non-federal dams would provide seed money to advance the process of rehabilitating the most critical dams
- Full funding and expansion of the Small Watershed Rehabilitation Act
- Development of a comprehensive, Internet-based information resources system to support the maintenance and improvement of dam safety in the United States
- Reauthorization of the National Dam Safety Program Act in 2006
- Funding program in each state to assist with loans and matching grants

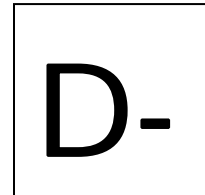
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DRINKING WATER

America faces a shortfall of \$11 billion annually to replace aging facilities and comply with safe drinking water regulations. Federal funding for drinking water in 2005 remained level at \$850 million, less than 10% of the total national requirement. The Bush administration has proposed the same level of funding for FY06.



Conditions

The nation's 54,000 drinking water systems face staggering public investment needs over the next 20 years. Although America spends billions on infrastructure each year, drinking water faces an annual shortfall of at least \$11 billion to replace aging facilities that are near the end of their useful life and to comply with existing and future federal water regulations. The shortfall does not account for any growth in the demand for drinking water over the next 20 years.

In 2001, the U.S. Environmental Protection Agency (EPA) released a national survey of drinking water infrastructure needs. The survey results concluded that approximately \$151 billion would be needed over 20 years to repair, replace, and upgrade the nation's 55,000 community drinking water systems to protect public health.

A year later, the agency issued *The Clean Water and Drinking Water Infrastructure Gap Analysis*, which identified potential funding gaps between projected needs and spending from 2000 through 2019. This analysis estimated a potential 20-year funding gap for drinking water capital, and operations and maintenance, ranging from \$45 billion to \$263 billion, depending on spending levels. Capital needs alone were pegged at \$161 billion, a \$10 billion increase from the 2001 estimate.¹

The Congressional Budget Office (CBO) concluded in 2003 that "current funding from all levels of government and current revenues generated from ratepayers will not be sufficient to meet the nation's future demand for water infrastructure." The CBO estimated the nation's needs for drinking water investments at between \$10 billion and \$20 billion over the next 20 years.²

Federal assistance has not kept pace with demand. Since FY 1997, Congress has appropriated only between \$700 million and \$850 million annually for the Safe Drinking Water Act State

¹ Operation and maintenance (O&M) costs are paid for by the local water utilities, not the federal government.

² The CBO approximation does *not* include the \$178 billion to \$331 billion in anticipated pipe replacement costs over the same 20-year period.

Revolving Loan Fund (SRF) program, enacted in 1987. The enacted funding level for FY 2005 was \$850 million, less than 10% of the total national requirements.

The Bush Administration has proposed an appropriation of \$850 million for FY 2006.

Policy options

New solutions are needed for what amounts to nearly \$1 trillion dollars in critical drinking water and wastewater investments over the next two decades. Not meeting the investment needs of the next 20 years risks reversing the public health, environmental and economic gains of the past three decades.

Without a significantly enhanced federal role in providing assistance to drinking water infrastructure, critical investments will not occur. Possible solutions include grants, trust funds, loans and incentives for private investment. The question is not *whether* the federal government should take more responsibility for drinking water improvements, but *how*.

The case for federal investment is compelling. Needs are large and unprecedented; in many locations, local sources cannot be expected to meet this challenge alone, and because waters are shared across local and state boundaries, the benefits of federal help will accrue to the entire nation. Clean and safe water is no less a national priority than are national defense, an adequate system of interstate highways, and a safe and efficient aviation system. These latter infrastructure programs enjoy sustainable, long-term federal grant programs; under current policy, water and wastewater infrastructure do not.

Equally compelling is the case for flexibility in the forms of federal investment including grants, loans, and other forms of assistance. Grants will be needed for many communities that simply cannot afford to meet public health, environmental and/or service-level requirements. Loans and credit enhancements may be sufficient for communities with greater economies of scale, wealthier populations and/or fewer assets per capita to replace.

- The American Society of Civil Engineers (ASCE) supports enactment of a federal water infrastructure trust fund act that would provide a reliable source of federal assistance for the construction and repair of water treatment plants to reduce the enormous funding gap.
- In the interim, ASCE supports annual appropriations from the federal general fund for the State Revolving Loan Fund (SRF) program at a minimum of \$1 billion annually.
- In addition, ASCE supports the establishment of a federal capital budget to create a mechanism to help reduce the constant conflict between short-term and long-term needs. The current federal budget process does not differentiate between expenditures for current consumption and long-term investment. This causes major inefficiencies in the planning, design and construction process for long-term investments. A capital budget system would help increase public awareness of the problems and needs facing this country's physical infrastructure, and would help Congress to focus on programs devoted to long-term growth and productivity.

- The American Society of Civil Engineers supports the funding of research into improved water reuse and purification technology, which may reduce capital, operations and maintenance costs for producing safe drinking water.

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U.S. ELECTRIC POWER GRID

The U.S. power transmission system is in urgent need of modernization. Growth in electricity demand and investment in new power plants has not been matched by investment in new transmission facilities. Maintenance expenditures have decreased 1% per year since 1992. Existing transmission facilities were not designed for the current level of demand, resulting in an increased number of 'bottlenecks' which increase costs to consumers and elevate the risk of blackouts.

D

Conditions

In 2003, the most recent year for which complete data are available, the total U.S. net generation of electricity rose slightly to 3.883 billion kilowatt hours. This represents a 0.6% growth in electricity generation over the 2002 level; however, it is significantly below the average annual growth rate of 2.4% between 1992 and 2003.³

To distribute that power, the U.S. electric transmission grid consists of nearly 160,000 miles of high-voltage (230 kilovolts and greater) transmission lines. In 1999, America's electric utilities spent more than \$3 billion maintaining and operating these links to customers, and \$2.3 billion on construction expenditures (including replacements, additions and improvements).⁴

Despite these investments, the state of the grid remains a cause for deep concern among experts. The Consumer Energy Council of America (CECA), a national association of utility officials, state regulators and consumer advocates, warned this winter that support for new investment in the transmission grid is declining.

The CECA noted that investment in the transmission grid was at a low of \$83 million per year from 1975 to 1999. It increased to \$286 million annually from 1999 through 2003. Although the investment increases are good, total U.S. transmission capacity decreased by approximately 19% per year between 1992 and 2002. Investment in transmission lines during the next 10 years is expected to be \$3 billion to \$4 billion per year, while the line-miles of transmission added will be only one third the rate of electricity demand. In addition, transmission maintenance expenditures have decreased at a rate of one percent annually since 1992, which can affect the reliability of the system.

³ In 2001, the U.S. actually experienced a decrease of two percent over all in electric power production. The decrease was unusual, in that net U.S. generation has historically increased from year to year. It was only the second time in more than 50 years that there was a decrease in net generation, according to the Energy Information Administration of the U.S. Energy Department (EIA).

⁴ Investor-owned utilities own 73% of the transmission lines, federally owned utilities own 13%, and public utilities and cooperative utilities own 14%, according to data from the EIA.

In 2002, the U.S. Department of Energy was equally blunt:

“There is growing evidence that the U.S. transmission system is in urgent need of modernization. The system has become congested because growth in electricity demand and investment in new generation facilities have not been matched by investment in new transmission facilities. Transmission problems have been compounded by the incomplete transition to fair and efficient competitive wholesale electricity markets. Because the existing transmission system was not designed to meet present demand, daily transmission constraints or ‘bottlenecks’ increase electricity costs to consumers and increase the risk of blackouts.”

Those fears were realized in August 2003, when the grid failed during the blackout that hit the Midwest, Northeast and portions of Canada. A series of power plants and transmission lines went offline because of instability in the transmission system in three states. The loss of these plants and transmission lines led to greater instability in the regional power transmission system; within four hours, there was a rapid cascade of additional plant and transmission line outages and widespread power outages. The blackout affected as many as 50 million customers in the United States and Canada, as well as a wide range of vital services and commerce. Air and ground transportation systems shut down, trapping people far from home; drinking water systems and sewage processing plants stopped operating, manufacturing was disrupted and some emergency communications systems stopped functioning. The lost productivity and revenue have been estimated in the billions of dollars.

In a letter to Congress in February 2004, the North American Electric Reliability Council (NERC), a consortium of public and private power producers that seeks to enforce compliance with voluntary reliability standards, was blunt in its assessment of the performance of the North American transmission grid:

“NERC’s analysis of the actions and events that led to the blackout showed that several violations of NERC operating policies contributed directly to the August [2003] outage. This is yet another clear signal that voluntary compliance with reliability rules is no longer adequate, and underscores the urgent need for Congress to authorize the creation of a mandatory reliability system that provides for the establishment and enforcement of reliability rules by an independent, industry-led electric reliability organization, subject to oversight by the Federal Energy Regulatory Commission (FERC) within the United States.”⁵

Not all utilities own transmission lines (that is, they are not vertically integrated), and no independent power producers or power marketers own transmission lines. Over the years, these transmission lines have evolved into three major national networks (power grids), which also

⁵ In November 2004, 15 months after the Northeast blackout, FERC announced plans to “[o]versee the development and enforcement of mandatory grid-reliability standards to protect the bulk power supply.”

include smaller groupings or power pools. The major networks consist of extra-high-voltage connections between individual utilities designed to permit the transfer of electrical energy from one part of the network to another. These transfers are restricted, on occasion, because of a lack of contractual arrangements or because of inadequate transmission capability.⁶

Over the past 10 years, utilities have been reluctant to put major investment into transmission lines without knowing how deregulation would affect these assets; therefore, the growth of the grid was slow and remains so. While the level of new transmission lines being constructed is low, the upgrading of existing transmission assets for a number of utilities is a major effort. Upgrades would provide the fastest and most economical approach to improvement of the grid, but there is a limit to the improvement using this approach.

Thus, the future of the U.S. transmission network is uncertain and is a continuing concern. Overall use of the transmission system is growing without significant additions of new construction or upgrades. Approval of new projects and the acquisition of new rights-of-way have been difficult. Many customers oppose having new transmission facilities built nearby. These transmission facilities support interstate commerce; but the siting and approval are generally a state and local governmental responsibility. In addition, the prelude to deregulation created and continues, to some degree, to cause limited investment in the transmission system.

The transmission grid is intended to be flexible, reliable and open to all exchanges, regardless of where the suppliers and consumers of energy are located. But neither the existing transmission grid nor its current management infrastructure can fully support this diverse and open exchange. The existing system was built for local needs, and is struggling to meet the demands of a global system brought about by deregulation. Electricity transactions that are highly desirable from a market standpoint may be quite different from the transactions for which the transmission grid was designed, and may stress the limits of safe operation.

The risks that they pose may not be recognized in time to avert major system emergencies, and, when emergencies occur, they may be of unexpected types that are difficult to manage without loss of customer load.

Meanwhile, new technology may alleviate the worst of the problem. Distributed generation—the small-scale production of electricity in fuel cells located at or near customers' homes and businesses—has the potential to improve the reliability of the power supply, reduce the cost of electricity and lower emissions of air pollutants, according to the Congressional Budget Office.

⁶ The three networks are the Eastern Interconnect, the Western Interconnect and the Texas Interconnect. The Texas Interconnect is not interconnected with the other two networks (except by certain direct current lines). The other two networks have limited interconnections to each other. Both the Western and the Texas Interconnect are linked with different parts of Mexico. The Eastern and Western Interconnects are completely integrated with most of Canada or have links to the Quebec Province power grid. Virtually all U.S. utilities are interconnected with at least one other utility by these three major grids; the exceptions are utilities in Alaska and Hawaii. The interconnected utilities within each power grid coordinate operations, and buy and sell power among themselves. Within each of these power grids, different types of equipment and facilities are owned by many different entities.

Policy Options

A safe, reliable electrical transmission grid is vital to the security and the economic health of the nation. The U.S. grid can no longer be allowed to operate under weak voluntary reliability guidelines from industry. The nation cannot afford to continue a piecemeal approach to the siting, construction and repair of the national transmission grid.

- Congress must require strict federal oversight of the conditions and operation of the grid by the FERC. In turn, FERC must adopt stringent, mandatory national standards for the safe operation, construction and maintenance of the transmission grid nationwide.
- Right-of-way acquisition must be accelerated under federal oversight.

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HAZARDOUS WASTE

Federal funding for 'Superfund' cleanup of the nation's worst toxic waste sites has steadily declined since 1998, reaching its lowest level since 1986 in FY05. There are 1,237 contaminated sites on the National Priorities List, with possible listing of an additional 10,154. In 2003, there were 205 U.S. cities with 'brownfields' sites awaiting cleanup and redevelopment. It is estimated that redevelopment of those sites would generate 576,373 new jobs and \$1.9 billion annually for the economy.

D

Conditions

Superfund

Despite nearly 25 years of effort and billions of dollars in federal expenditures, the cleanup of chemically contaminated waste sites remains a perplexing problem.

“Although substantial [cleanup] progress has been made over the past quarter century, a considerable amount of cleanup work remains,” said the U.S. Environmental Protection Agency (EPA) in late 2004.

Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) in December 1980. The program was initially intended to clean up about 400 high-priority hazardous waste sites nationally.

CERCLA also established the Superfund Trust Fund, which was created primarily from a corporate environmental income tax, and excise taxes on petroleum and specified chemicals. The Trust Fund received about \$1.5 billion per year before the legislative authority to collect the taxes expired on December 31, 1995.

Between Fiscal Year 1981 and Fiscal Year 2005, Congress appropriated \$29.3 billion to aid in the cleanup of hazardous waste sites under Superfund. Billions more were appropriated to clean up leaking underground storage tanks and “brownfields” sites. The states also have contributed billions to hazardous-waste cleanups.

But progress toward completing the nation's cleanup program for chemically contaminated properties has been sluggish. As many as 350,000 contaminated sites will require cleanup over the next 30 years, assuming that current regulations and practices remain the same, according to a recent EPA report. The national bill for this cleanup may amount to as much as \$250 billion.⁷

⁷ Approximately \$32 billion of this total will be needed for more than 700 sites on the NPL, which is reserved for the worst Superfund sites. The great preponderance of the total expenditure will be borne by

As of November 2004, there were 1,237 civilian waste sites on the National Priorities List (NPL), with another 10,154 still to be evaluated for possible listing.⁸

Even as needs have grown, annual congressional appropriations for Superfund have steadily declined in recent years, after topping \$2 billion in FY 1998. The appropriation for FY 2005 is \$1.257 billion, the lowest since FY 1986. The Bush administration has proposed a budget of \$1.279 billion for FY 2006, an increase of less than 2%.

Meanwhile, the pace of cleanups is slowing. For much of the 1990s, EPA averaged more than 70 construction-complete sites per year, but the number of newly completed sites has decreased dramatically since 2000. In FY 2003, there were just 40 NPL sites deemed to be complete, according to Resources for the Future, a nonpartisan environmental policy research organization.

Policy Options

The American Society of Civil Engineers recommends the following policies:

- Congress must 1) reauthorize the federal Superfund taxes on chemicals, petroleum, and corporations; or 2) create another federal funding mechanism to revive the Hazardous Substance Superfund cleanup program and remove the cost of cleanup from the general fund.
- Congress and the Environmental Protection Agency must develop and implement legislation, including economic incentive programs, that consider environmental costs and encourage hazardous waste reduction "at the source" (point of generation) and the design of reuse programs.

Brownfields

In 2003, a total of 205 U.S. cities had 24,987 brownfield sites awaiting redevelopment, according to a survey by the U.S. Conference of Mayors. In addition, more than 150 cities had successfully redeveloped 922 brownfield sites, returning more than 10,000 acres to economic productivity. These actions resulted in \$90 million in new municipal revenues to 45 cities, and more than 83,000 jobs to 74 cities, the survey found.

Of the 205 cities with idle brownfields, 148 reported that 576,373 new jobs and as much as \$1.9 billion annually could be generated were brownfield sites redeveloped.

the owners of the properties (private entities and various government agencies) and those potentially responsible for the contamination, according to the EPA.

⁸ The Defense Department and the Department of Energy list another 11,400 sites that must be cleaned up using annual department appropriations.

“[T]he most frequently identified impediment[s] to redevelopment of these sites [are] lack of cleanup funds, liability issues, and the need for environmental assessments,” the survey reported. “Three-quarters of respondents said that additional resources are needed to attract greater private-sector investment.”

The American Jobs Creation Act, which the President signed on October 22, 2004, contains two brownfields provisions. One authorizes tax-exempt facility bonds for “green building and sustainable design projects” that include a brownfield and that meet other requirements. The other allows tax-exempt entities to invest in the cleanup and redevelopment of brownfields without incurring unrelated business income taxes when the property is sold.

Another law, the Working Families Tax Relief Act, signed on October 4, 2004, reinstated the brownfields tax incentive through December 31, 2005. The incentive allows property developers to fully deduct the costs of environmental cleanup in the same year that the costs are incurred.

Finally, the Small Business Liability Relief and Brownfields Revitalization Act, signed in January 2002, provides for: 1) a program to provide assessment grants to characterize, assess, and conduct planning at brownfield sites, and to perform targeted site assessments; and 2) a program to provide remediation grants to capitalize revolving loan funds, or to be used directly to clean up one or more sites.

Assessment grants are limited to \$200,000, which EPA may increase to \$350,000 based on the anticipated level of contamination, the size, or the ownership status of a site. The remediation grants may be awarded on a community-wide or site-by-site basis, and are limited to \$1 million. The law authorizes \$200 million for each of five years for these programs, and dedicates \$50 million per year (or 25% of the amount appropriated, if less than \$200 million) for the assessment and cleanup of relatively low-risk sites contaminated with petroleum or petroleum products. Technical assistance, training and research are also authorized.

The law also authorizes \$50 million per year for five years to assist states in establishing or enhancing their voluntary cleanup programs, which addresses contaminated sites that do not require federal action, but require cleanup before they can be considered for reuse. States may also use these grants to capitalize a revolving loan fund or to develop a risk-sharing pool, an indemnity pool, or insurance mechanism to provide financing for response actions.

The 2002 Act clarifies the Superfund law’s “innocent landowner” defense. CERCLA provides a defense against liability for a person who unknowingly purchases contaminated land, provided that the person made “all appropriate inquiry” prior to the transaction. It spells out what comprises all appropriate inquiry that a purchaser must perform in order to qualify as an innocent landowner under the law. These provisions apply to all contaminated sites, not just brownfields.

In August 2004, EPA published a proposed rule that would require all appropriate inquiries to be signed by an environmental professional. The professional would be required to either have a

current professional engineer's license or to hold an engineering degree in addition to a minimum of five years of relevant experience.⁹

Policy Options

The American Society of Civil Engineers (ASCE) supports:

- Existing federal programs to finance the revitalization of America's brownfields
- A Brownfields Redevelopment Action Grant (BRAG) program within EPA to provide investment funds for local governments to leverage private investment in brownfields redevelopment in order to help preserve farmland and open spaces

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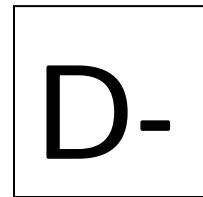
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⁹ The American Society of Civil Engineers was one of 25 parties that negotiated the proposed rule with EPA in 2003-2004.



NAVIGABLE WATERWAYS

A single barge traveling the nation's waterways can move the same amount of cargo as 58 semi-trucks at one-tenth the cost—reducing highway congestion and saving money. Of the 257 locks on the more than 12,000 miles of inland waterways operated by the U.S. Army Corps of Engineers, nearly 50% are functionally obsolete. By 2020, that number will increase to 80%. The cost to replace the present system of locks is more than \$125 billion.



Background

The U.S. Army Corps of Engineers maintains more than 12,000 miles (19,200 kilometers) of inland waterways, and owns or operates 257 locks at 212 sites on inland waterways. These waterways—a system of rivers, lakes and coastal bays improved for commercial and recreational transportation—carry about one-sixth of the nation's intercity freight, at a cost per ton-mile about half that of rail, or one-tenth that of trucks.

Waterways are excellent ways to move large volumes of bulk commodities over long distances. The cargo capacity of a typical barge is equivalent to that of 15 large railroad cars, or 58 semi-trucks. A representative 15-barge tow on a main stem waterway moves the same cargo as 870 trucks stretching 35 miles on the interstate highway system. That same 15-barge tow would require two 100-car unit trains, extending nearly three miles in length.

Locks and dams can affect the environment. They slow the natural velocity immediately upriver from their locations, so that organisms adapted to fast-flowing water are replaced by those adapted to slow-flowing water, and dams trap sediments that would otherwise flow farther downstream. More dredging may be necessary to keep the navigation channels open.

The 12,000 miles of inland and intracoastal waterways, as do highways, operate as a system, and much of the commerce moves on multiple segments. They serve as connecting arteries, much as neighborhood streets help people reach interstate highways. These waterways are operated by the Corps of Engineers as multi-purpose, multi-objective projects. They not only serve commercial navigation, but, in many cases, also provide hydropower, flood protection, municipal water supply, agricultural irrigation, recreation and regional development.

Conditions

Forty-one states, 16 state capitals and all states east of the Mississippi River are served by commercially navigable waterways. Domestic companies operating vessels on U. S. waterways increased 19.6% from 2002 to 2003.

Waterway usage is increasing, but the facilities are aging; many Corps-owned or -operated locks are well past their planned design life of 50 years. Of the 257 locks still in use in the United States, 30 were built in the 19th Century, another 92 locks are more than 60 years old. In other words, nearly 50% of all Corps-maintained locks were functionally obsolete by the beginning of 2005. Assuming that no new locks are built in the next 20 years, by 2020, another 93 existing locks will be obsolete—rendering more than 8 of every 10 locks now in service archaic.

As the system ages, the infrastructure cannot support the growing traffic loads, resulting in frequent delays for repairs. At the same time, the repairs become more expensive due to long-deferred maintenance.

The Inland Waterway Trust Fund, created in 1978, pays half the cost of the construction and major rehabilitation costs for specified federal inland waterways projects. It receives money from a tax on fuel (currently set at 20 cents per gallon) on vessels engaged in commercial transportation on inland waterways.

In recent years, there has been a number of major inland waterway infrastructure failures—a few years ago, the entire Ohio River system was closed for a time due to infrastructure breakdowns.

The fund earned \$106 million in FY 2005, including approximately \$91 million paid by the barge and towing industry, and \$15 million in interest. The Corps of Engineers received \$149 million for construction projects, leaving a balance of approximately \$307 million. In FY 2006, the Corps is planning to spend \$394 million on current maintenance projects, a sum that will not reduce the backlog of pending repairs that exceed \$600 million.

In addition, the Bush administration proposed in February to spend \$184 million from the trust fund for new construction in FY 2006. The trust fund balance remaining at the end of the year is expected to be \$228 million—enough to begin addressing a significant portion of the maintenance backlog.

The Corps estimates that it would cost more than \$125 billion to replace the present inland waterway system.

Policy Options

- Congress should amend the Inland Waterways Trust Fund Act of 1978 to allow all funds collected to be used for repair and construction of dams and locks. Congress should then appropriate the full fund balance each year to pay for the cost of rehabilitating the nation's oldest locks. The government needs to set a priority system for restoring locks that have outlasted their design lives, with an initial focus on all locks built in the 19th century. The current federal budget process does not differentiate between expenditures for current consumption and long-term investment. This causes major inefficiencies in the planning, design and construction process for long-term investments.
- In the interim, Congress must appropriate the full amount in the Inland Waterway Trust Fund to begin reducing the maintenance backlog.

- The American Society of Civil Engineers (ASCE) supports the creation of a federal capital budget to create a funding mechanism that would help reduce the constant conflict between short-term and long-term maintenance needs. This would help to increase public awareness of the problems and needs facing this country's physical infrastructure, and would help Congress to focus on specific programs devoted to long-term growth and productivity.

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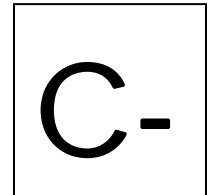
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PUBLIC PARKS & RECREATION

Many of our nation's public parks, beaches and recreational harbors are falling into a state of disrepair. Much of the initial construction of roads, bridges, utility systems, shore protection structures and beaches was done more than 50 years ago. These facilities are anchors for tourism and economic development and often provide the public's only access to the country's cultural, historic and natural resources. The National Park Service estimates a maintenance backlog of \$6.1 billion for their facilities. Additionally, there is great need for maintenance, replacement and construction of new infrastructure in our nation's state and municipal park systems.



Conditions

The National Park System

The U. S. National Park System (NPS) entertained more than 266 million recreational visits in 2003. The system consists of 388 park units, including more than 18,000 permanent structures, 12,000 miles of roads, 1,800 bridges and tunnels, 4,246 housing units, roughly 1,527 water and wastewater systems, more than 400 dams, and 200 solid waste operations.

The NPS is nearing completion of an effort to accurately evaluate the conditions of all NPS assets and has estimated the maintenance backlog for its facilities at as much as \$6.1 billion. However, as noted by the General Accounting Office (GAO) in a 1998 report, it has no formal method for evaluating the conditions of its assets. The NPS has since developed an asset-management program designed to assess the conditions of all of its assets in a standardized, consistent manner in two phases. First, in a basic review evaluation, intended to be conducted at all parks on an annual basis and second, a more in-depth review to take place every three to five years. The basic evaluations have been conducted at all but the four largest parks in the system, and the remaining four are expected to be completed by FY 2006.

The Bush Administration's FY 2006 budget request includes \$1.1 billion for the National Park Service, completing a \$4.9 billion commitment over 5-years for park facility maintenance and construction that began in FY 2002. During FY 2001-2002, the majority of nearly \$350 million in funding to address the maintenance backlog was spent on buildings, safety and utilities.

In 2001, just 35% of park roads were in good condition. The Administration's legislative proposal to reauthorize the nation's surface transportation systems included \$320 million in funds for park roads; however, the reauthorization process remains stalled in Congress, with significant action not likely until late spring 2005.

U.S. Army Corps of Engineers Facilities

The nation's largest provider of public outdoor recreation opportunities is the U.S. Army Corps of Engineers. The Corps works with states, counties, cities, concessionaires and other federal agencies by leasing lands to them for the development of public park and recreation facilities. At the Corps' 456 lake projects, there are roughly 4,300 public recreation areas. The Corps shares some of these costs with local governmental entities on a 50/50 basis.

The condition of Corps -managed recreation areas and those of its partners is a nationwide issue. More than 90% of the Corps lake projects were constructed before 1980. In fact, 40% of those same projects were constructed prior to 1960. A mix of Corps, public, and private sector providers has traditionally provided recreation opportunities at Corps lakes. Both Corps areas and other public recreation areas on Corps lands have borne the brunt of many years of heavy recreational use and lack of proper maintenance.

Further, modern recreational equipment and recreational use patterns of today's diverse population no longer fit Corps recreational areas. Equipment has changed drastically both in size and in infrastructure requirements. New uses for Corps lakes like sail boarding were never anticipated when Corps facilities were designed. Even more significant is the rapid diversification of this nation's population. While we know that use patterns and recreation preferences vary according to population segments, Corps facilities continue to provide recreation for the much less diverse population of the 1960s.

These public recreation areas are in need of modernization. Whether it is a problem with accessibility, inadequate RV hook-ups, meeting the needs of today's diverse population, or an issue with safety, these recreation areas require modernization to meet the needs of present customers, underserved populations, and future generations.

State, Local and Urban Parks

State parks represent less than two percent of the total outdoor recreation areas, but more than 29% of all visitors at outdoor recreation areas, state or federal.

Many large urban areas are using publicly funded parks, beaches and recreational harbors as focal points and amenities for redevelopment of blighted urban areas. These projects often use funding from multiple sources, including the federal, state and local governments, private companies and philanthropists, to clean up and revitalize neglected areas.

These success stories have made a huge difference in these communities, and demonstrate an ideal cost-sharing model for infrastructure renewal. There are, however, simply too few success stories.

There is also an opportunity to make use of our nation's urban open space to provide "green infrastructure" alternatives for transportation and stormwater management. Bicycle paths and walkways provide alternative urban transportation while stormwater greenways and wetlands help to prevent overflowing sewers and floods. These interconnected systems of green spaces

would conserve natural ecosystems; preserve biodiversity; sustain clean air and water; and reduce flood control, stormwater management and road construction costs.

Recreational Boating Facilities

Recreational boating infrastructure such as breakwaters, harbor dredging, fishing piers, boat slips and launch ramps serve as public gateways to our nation's waterways. Annual boat registrations have more than doubled in the past three decades. In fact, since 1988, annual boat registrations have steadily increased from 10 million to nearly 13 million boats – an increase of 23 percent. Approximately 78 million Americans enjoy recreational boating each year and are dependent on these facilities for public access. While boating continues to be a popular recreational choice among Americans, federal and state investment in boating infrastructure has generally declined in the last few years, in part because of federal and state budgetary issues. The public access opportunity provided by many of these facilities is being lost to more profitable land uses as existing marinas and boatyards are being sold for their land value and redeveloped for non-water dependent land uses. The need for public boating access is simply not keeping pace with the nation's growing population.

California's Department of Boating and Waterways recently determined that statewide, boating contributed approximately \$16.5 billion to the Gross State Product annually. In addition, boating contributed \$1.6 billion in state and local taxes annually. There were 8,500 boating related businesses in the state that provided more than 284,000 jobs to the economy.

The study concluded that there is a need for investment in the development of new facilities to accommodate the anticipated growth amounting to \$695 million through 2020. In addition to this amount, there is a need for upgrade or replacement of the existing facilities (approximately 2/3 of the inventoried facilities will need such work within the next 10 years) totaling more than \$1.8 billion over the next 10 years. The federal, state and local expenditures for these items are not even close to meeting this need.

Beaches

Coastal areas are vital to Americans, providing a home for 53% of the nation's population on just 17% of the land area, as well as popular vacation destinations for American and foreign tourists. In fact, coastal areas generate almost 31% of the U.S. gross national product. Beaches provide shore protection in these areas, and have a tremendous national economic impact.

Travel and tourism is the United State's largest industry, employer and earner of foreign exchange. Spending by foreign tourists alone supports 2.7 million U.S. jobs. The popularity of beaches dominates tourism, with 75% of summer travelers planning to visit beaches. In the U.S., coastal states receive about 85% of the country's tourist-related revenues, largely because of the popularity of beaches.

Beach erosion and shore protection are of major concern to tourism and, for more than 60 years, the federal government has worked in concert with state and local entities to maintain and restore the nation's beaches to benefit all Americans.

Policy Options

- Maintain a strong commitment to invest in the national parks, including appropriate cost-sharing between park visitors and the nation's taxpayers.
- Support legislation to allow the Corps to retain user fees generated by visitors and to use them to make improvements where the fees are generated, without offsets to its budget.
- Fully fund the Corps Recreation Modernization program to allow it to improve its own facilities and those of its partners, and to allow incentives for private-sector developers to take over Corps-managed areas.
- Support the Federal Shore Protection Program as established by Congress, including the ongoing nourishment and environmental restoration components of the program.
- Support State boating programs that have been established to direct the spending of user fees, motor boat fuel taxes and other taxes collected from Boaters towards the improvement of boating facilities and preservation of public access to the nation's waters for recreational pursuits.
- Support legislation that encourages access to beaches and coastal areas.

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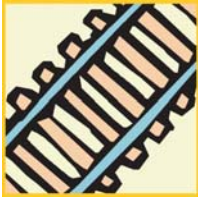
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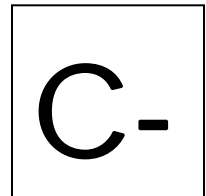
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RAIL

For the first time since World War II, limited rail capacity has created significant chokepoints and delays. This problem will increase as freight rail tonnage is expected to increase at least 50% by 2020. In addition, the use of rail trackage for intercity passenger and commuter rail service is increasingly being recognized as a worthwhile transportation investment. Congestion relief, improved safety, environmental and economic development benefits result from both freight and passenger market shifts to rail creating a rationale for public sector investment. The freight railroad industry needs to spend \$175-\$195 billion over the next 20 years to maintain existing infrastructure and expand for freight growth. Expansion of the railroad network to develop intercity corridor passenger rail service is estimated to cost approximately \$60 billion over 20 years. All told, investment needs are \$12-13 billion per year.



Conditions

Rail is a vital component in the nation's freight transportation system. Since deregulation of the railroad industry in 1980, railroads have streamlined their operations to reduce costs and provide competitive service to shippers. If current trends continue, however, railroads will be unable to maintain the current network or to expand the network to meet the challenge of growing freight traffic while still maintaining profitability. The result will be increased shipping costs and the shift of freight to trucks traveling on already overburdened highways. This will lead to increased traffic congestion, increased highway and bridge maintenance costs, increased frequency of highway bridge and roadway replacement, leading to increased air pollution, fuel consumption and travel times for passengers and freight traffic.

The U.S. freight rail system is comprised of three groups of railroad companies: seven Class I freight railroad systems, defined as systems with annual operating revenue of about \$272 million or more; 31 regional railroads, which are line-haul railroads operating at least 350 miles of road and that have annual revenues from \$40 million to about \$272 million; and more than 500 local railroads, line-haul railroads smaller than regional railroads. In 2000, these companies operated 220,000 miles of track held to high safety standards by the Federal Railroad Administration. Freight rail carried 40% of intercity ton-miles in 2000.

Railroads are capital-intensive businesses, with many track, structures, signal systems, rolling stock and other infrastructure elements to be installed, maintained, inspected and secured to guarantee safe operation. Deregulation allowed railroads to decrease some of these costs by selling and discarding underutilized components. Railroads also have shifted some infrastructure elements to shippers, reducing the capacity of their car fleet by 14% between 1990 and 2002, even while total car capacity increased 20%. Class I railroads have streamlined businesses, cutting labor costs and shedding under-utilized track, decreasing the overall network by 39%.

Railroads have passed most of these savings on to shippers in an effort to remain competitive with other modes of transportation and maintain their market share in the freight industry. Rail freight rates have been cut by up to 2% per year on average in the past 20 years.

This trend cannot continue. Ton-miles carried have increased by 64% since 1980, and the U.S. Department of Transportation (DOT) estimates that rail tonnage will increase by well more than 50% by 2020. Capacity has already become a problem in some areas for the first time since World War II, especially at intermodal facilities that represent the fastest growing segment of rail traffic.

Since deregulation, railroads have spent \$349 billion on capital improvements and maintenance of track and equipment. Capital expenditures have grown 56%, from \$3.6 billion in 1990 to \$5.7 billion in 2002, while the price level of railroad purchases of inputs rose only 38%. Expenditures on railroad and structures jumped 76%, from \$2.6 billion in 1990 to \$4.6 billion in 2002.

Class I railroads currently invest about \$2 billion annually for improvements above and beyond repair and maintenance. Continued investment at this level will result in freight losing freight market share over the next 20 years as the industry will not be able to keep up with growing demand. Most within the railroad industry agree that even with these continued substantial investments by the railroad industry, it will be unable to generate the revenues needed to sufficiently reinvest in tracks and equipment. Short-line and regional railroads face major needs for track and bridge upgrades to carry the newer 286,000-pound rail car. Without assistance, small railroads are unable to make upgrades and will cease to exist.

To simply maintain current share of freight carried, and anticipated increase in total freight carried, railroads would require \$175 billion to \$195 billion in investments over the next 20 years. The expenditures would break down like this: safety, \$13.8 billion; short-line improvements, \$11.8 billion; Class I infrastructure repair and maintenance, \$4-\$5 billion annually or \$80 billion to \$100 billion over 20 years; Class I infrastructure improvements (above and beyond repair and maintenance), \$3.5 billion annually or \$70 billion over 20 years. Up to \$142 billion would be available from freight railroad revenues and borrowing, but the remainder would have to come from other forms of public sector participation.

The consequences of inadequate rail infrastructure investment will be borne by the public, not just by the rail industry. The American Association of State Highway and Transportation Officials (AASHTO) has estimated that shifting all freight currently carried by rail to trucks would cost shippers an additional \$69 billion annually; this would mean higher prices for U.S. consumers. Increased truck traffic on the nation's highways will result in an additional \$54 billion in highway funds over the next 20 years required to maintain the roads.

In addition to freight transportation, the nation's rail infrastructure supports intercity passenger operations. Intercity rail operations are currently provided over a 23,000 mile network serving more than 500 cities in 47 states, with a train service level of approximately 260 trains per day. Most of this service is a basic system operated by Amtrak, with 13 states providing support for selected train service. While Amtrak operates most of its network over rail lines owned by the freight-rail companies, it owns and operates approximately 600 miles of track in the northeast,

including the Northeast Corridor, which has endured years of deferred maintenance and investment backlog on the Northeast Corridor. Amtrak and the DOT Inspector General have noted that this deficiency can no longer be ignored. Amtrak estimates the cost of infrastructure investment at more than \$2 billion in the next 5 years, only a portion of an estimated backlog of \$4 billion. Without this level of investment, Amtrak and the eight commuter railroads that use the Amtrak-owned infrastructure will be subject to increasing delays due to inspection-based slow orders or infrastructure problems. Beyond infrastructure renewal, the costs to expand the Corridor to support commuter and Amtrak service expansions necessary to support demand are estimated to exceed \$6 billion.

In addition to Amtrak's existing intercity operations, there is considerable interest in the development of corridor (less than 500 miles) railroad services—both high speed and conventional railroad service. Investments have already been made in more than a half-dozen states in instituting corridor passenger rail service; a total of 36 states are actively planning to expand corridor rail service. Costs to develop the projected corridor needs are estimated by AASHTO to approach \$60 billion—substantially less than the cost of adding equivalent highway capacity.

Amtrak and its funding partners provide vital transportation services in many parts of the country. For example, without regular intercity passenger rail service between Washington, DC and Boston, highways and airports would become even more crowded, and travel between these cities would be more cumbersome. Longer-distance trains add network connectivity and accessibility for many towns and cities in states that would otherwise not have access to transportation service.

Policy Options

Rail should be an important component in a national transportation infrastructure plan. While maintaining the freight-rail industry's right to operate as profitable businesses, there is a role for public involvement in expanding the rail network in critical areas.

Making appropriate cross-modal investments for a national network is a national planning issue that must be recognized and highlighted. ASCE supports the AASHTO recommendation to develop a national transportation plan. This will result in a cross-modal transportation plan and policy, including investment strategies to support the existing and growing need for investment in both rail freight and rail passenger systems. From a national investment standpoint, a strong argument can be made that a role for public funding exists, as public benefits result.

In addition, ASCE supports the establishment of a federal capital budget to create a mechanism to help reduce the constant conflict between short-term and long-term needs. This conflict often results from a lack of clarity between simply replacing aged and underperforming assets and providing for needed expansion to support future transportation demand—both freight and passenger. The current federal budget process does not differentiate between expenditures for current consumption (asset replacement or renewal to perpetuate the existing level of service) and long-term investment (to add capacity and improve performance in travel time and service frequency). This causes major inefficiencies in the planning, design and construction process for long-term investments. A capital budget system would help to increase public awareness of the

needs facing this country's physical infrastructure and help Congress to focus on programs devoted to long-term growth and productivity.

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ROADS

Poor road conditions cost U.S. motorists \$54 billion a year in repairs and operating costs—\$275 per motorist. Americans spend 3.5 billion hours a year stuck in traffic, at a cost of \$63.2 billion a year to the economy. Total spending of \$59.4 billion annually is well below the \$94 billion needed annually to improve transportation infrastructure conditions nationally. While long-term Federal transportation programs remain unauthorized since expiring on Sept. 30, 2003, the nation continues to shortchange funding for needed transportation improvements.

D

Conditions

The nation is failing to maintain even the current substandard conditions, a dangerous trend that is affecting highway safety and the health of the economy. While passenger and commercial travel on our highways has increased dramatically in the past 10 years, America has been seriously under-investing in needed road and bridge repairs.

Americans traveled 2.85 trillion vehicle-miles in 2002. While highway mileage is mostly rural, a majority of road travel (60%) occurred in urban areas in 2002. As vehicle-miles traveled continues to increase for all vehicles, it increased at a greater rate for commercial trucks, which has caused increased wear and tear on roads and bridges throughout the United States.

While some progress has been made in recent years, the current stalemate on the reauthorization of the nation's surface transportation programs is causing uncertainty that affects the long-term prospects for our nation's roads and bridges.

As the nation's highway users await enactment of long-term legislation, America continues to shortchange funding for much-needed road and bridge repairs. Traffic congestion costs the economy \$67.5 billion annually in lost productivity and wasted fuel. Passenger and commercial travel on our highways continues to increase dramatically. The average rush-hour commute grew more than 18 minutes between 1997 and 2000.

The American Association of State Highway and Transportation Officials (AASHTO) estimates that capital outlay by all levels of government would have to increase by 42% to reach the projected \$92 billion cost-to-maintain level, and by 94% to reach the \$125.6 billion cost-to-improve level. In contrast the Federal Highway Administration estimates that outlay by all levels of government would have to increase by 17.5% to reach its projected \$75.9 billion cost-to-maintain level, and 65.3% to reach its \$106.9 billion cost-to-improve level. In 1999, the total capital investment by all levels of government was \$59.4 billion, well short of the needed \$94 billion.

In 2003, the bipartisan leadership of the House Transportation & Infrastructure Committee introduced legislation which would have invested \$375 billion in state highway and transit improvement programs over the six-year period FY 2004-09, based on meeting the national concerns and investment requirements outlined in FHWA's 2002 report to Congress. Congressional leadership failed to bring this legislation to a vote before the full congress.

In 1998, the enactment of the Transportation Equity Act for the 21st Century (TEA-21), provided \$218 billion for the nation's highway and transit programs. Even with this added attention, 33% of America's urban and rural roads are in poor, mediocre or fair condition, according to FHWA. Although this is a slight improvement from previous years, conditions remain at substandard levels. Driving on roads in need of repair costs U.S. motorists \$54 billion per year in extra vehicle repairs and operating costs—\$275 per motorist.

FHWA ranks "poor" roads as those in need of immediate improvement. "Mediocre" roads need improvement in the near future to preserve usability. "Fair" roads will likely need improvement. "Good" roads are in decent condition and will not require improvement in the near future. "Very good" roads have new or almost-new pavement.

Substandard road conditions are dangerous. Outdated and substandard road and bridge design, pavement conditions, and safety features are factors in 30% of all fatal highway accidents, according to FHWA. On average, more than 43,000 fatalities occur on the nation's roadways every year. Motor vehicle crashes cost U.S. citizens \$230 billion per year, or \$819 for each resident for medical costs; lost productivity; travel delay; and workplace, insurance and legal costs.

Americans' personal and commercial highway travel continues to increase at a faster rate than highway capacity, and our highways cannot sufficiently support our current or projected travel needs. Between 1970 and 2002, passenger travel nearly doubled in the United States, and road use is expected to increase by nearly two-thirds in the next 20 years. Growth can be attributed to changes in the labor force, income, makeup of metropolitan areas and other factors.

More than 67% of peak-hour traffic occurs in congested conditions. The cost to the economy—in wasted time and fuel—in the 85 largest urban areas is \$63.2 billion each year. In addition, poor highway conditions hinder the effective transport of goods that help support the American economy.

Policy Options

Solutions designed to ease the increasing demands on our transportation system and to improve highway conditions, capacity and safety, are multifaceted and do not always mean simply building more roads and bridges. America must change its transportation behavior, increase transportation investment at all levels of government, and make use of the latest technology. Cities and communities should be better planned to reduce dependence on personal vehicles for errands and work commutes, and businesses must encourage more flexible schedules and telecommuting.

Congress must fully re-authorize TEA-21 at an appropriate level of investment before it expires for a sixth time in May 2005. Congress also must use all of the money collected for the Highway Trust Fund to support investment in the nation's surface transportation program and protect the trust fund from abuse by removing it from the unified budget. Congress must provide adequate funding to meet current highway and transit bridge needs, and include enough funding for research and development of civil engineering innovations that offer cost-effective solutions to our transportation needs. Other solutions include private-public partnerships where appropriate, and multi-year capital and operating budgets.

Specific recommendations supported by the American Society of Civil Engineers:

- Reauthorize TEA-21 for at least five years, using a needs-based approach to arrive at the funding level
- Remove the Highway Trust Fund from the unified federal budget
- Increase funding for long-term fundamental highway research efforts at the national level
- Establish a federal, multi-year capital budget for public works infrastructure construction and rehabilitation, similar to those used by state and local governments.
- Encourage the use of life-cycle cost analysis principles to evaluate the total costs of projects
- Support the environmental streamlining of highway projects.
- Address the long term viability of fuel taxes for transportation funding, and explore the viability of the most-promising options to strengthen this funding. In particular, the effects of fuel cell technology should be studied, as should creating a mileage-based system for funding our nation's surface transportation system as this technology comes to market and lessens the nation's dependence on gasoline as a fuel source for automobiles.

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SCHOOLS

The Federal government has not assessed the condition of America's schools since 1999, when it estimated that \$127 billion was needed to bring facilities to good condition. Other sources have since reported a need as high as \$268 billion. Despite public support of bond initiatives to provide funding for school facilities, without a clear understanding of the need, it is uncertain whether schools can meet increasing enrollment demands and the smaller class sizes mandated by the No Child Left Behind Act.

D

Background

In the United States, the funding, construction and operation of public kindergarten through 12th grade school facilities (K-12) is primarily a state and local responsibility. While there is an increasing federal role in school performance, there remains little to no federal role for school facilities. Just getting a clear nationwide picture of K-12 public education facilities is difficult. There has been no authoritative report since the Department of Education's report, "*Condition of America's Public School Facilities: 1999*." Other sources tend to vary widely and focus primarily on construction, without providing needs data.

While most states collect and report information on school facilities, some maintain information only on conditions; fewer, still, collect information on an ongoing basis. This leaves, at best, a hard-to-find and fragmented picture.

Conditions

The 1999 Department of Education report stated that school construction totaled \$24.7 billion in 1997. However, the report concluded that, as of 1999, \$127 billion was needed to bring the nation's school facilities into good overall condition. The National Education Association (NEA) reported in 2000 that the need was even greater, more than \$268 billion.

American Schools and Universities' 30th *Annual Official Education Construction Report* provides construction numbers that are most in line with the Department of Education report, stating the most recent numbers as \$28.6 billion (up from the 2002 figure of \$24.3 billion) in K-12 in construction, additions and renovations for 2003, with \$17.4 for new structures, \$5.2 billion for additions, and \$5.9 for renovations.

According to School Planning and Management, whose numbers are generally lower, school construction fell below \$20 billion in 2003 to \$19.9 billion, down from its 2003 \$21.6 billion estimate. For 2004, the figure is expected to drop to \$19.7 billion. The 2004 spending would be broken out as \$12.8 billion in new structures, \$4.1 billion for expansions and \$2.8 billion for renovation.

Public school enrollments increased from school year 2002-03 to school year 2003-04 by 394,000, to a total of 48,174,924.

Lacking an overall national picture of the condition of public schools, it is necessary to look state by state and, in some cases, school district by school district.

- Arizona—A state court ruled that funding school construction and repair through local property taxes was unconstitutional. This caused the state to shift hundreds of millions of dollars from other sources to fund school facilities.
- Arkansas—A report ordered by the state supreme court concluded that between \$2.9 billion and \$4.5 billion was needed over five years to bring the state's 6,569 school buildings up to specifications.
- California—A Rand Corporation report concluded that California has made progress in addressing K-12 public school facilities needs; however the state lagged behind the nation and other large industrial states in dealing with facility needs.
- Chicago—The City Board of Education recently informed the City Council that most public school construction and expansion projects will be indefinitely postponed; school capital funding would be diverted to basic building maintenance. The cutbacks are due to the loss of \$110 million in state construction funding for 2005.
- Colorado—The state is currently under a consent decree requiring that more funds be spent on school construction.
- Hawaii—The only state in the nation that runs its public schools is addressing a 10-year backlog of maintenance and repair with \$600 million in funding.
- Maryland—A state task force on public school facilities concluded at the end of 2002 that the proposed state school construction funding level of \$425 million is seriously inadequate to meet the state's needs.
- New Jersey—The New Jersey Education Law Center says that needed upgrades and new construction projects in the state's poorest districts could be as high as \$15 billion, well above the \$8.7 billion funded level of the New Jersey Schools Construction Corp.
- New York City—A court-appointed panel found that \$9.2 billion in new classrooms, laboratories, libraries and other facilities are needed in order to relieve crowding, reduce class sizes, and give the city's 1.1 million public school students adequate school facilities.
- Ohio—The state has instituted a \$23 billion school building project that will permit schools considerable access to upgraded facilities.

Policy Options

The first step in addressing the condition of the nation's schools is a realistic and ongoing needs evaluation. While school operations and facilities are primarily state and local concerns, their performance is an issue of national importance. A regular update of the Office of Education

Research and Improvement report, *Condition of America's Public School Facilities: 1999*, would provide a clear view of conditions nationwide.

Efforts to repair, rehabilitate or modernize the nation's schools face many hurdles. The complex relationships between local school districts and state and federal governments are constantly evolving. Coupled with other serious problems faced by the nation's school systems and new academic standards, school infrastructure must compete for both attention and money.

Given that children are our most precious commodity, we should accept nothing less than the best conditions for our schools. ASCE strongly believes that governments at all levels should make primary and secondary education a priority, and should provide the resources to support the necessary infrastructure.

Specifically, ASCE supports the following recommendations:

- Expand federal tax credits to support increased use of school construction bonds
- Continue and increase federal grants for high-poverty, high-need school districts
- Encourage school districts to explore alternative financing, including lease financing, and financing/ownership/use arrangements to facilitate construction
- Encourage school districts to adopt regular, comprehensive construction and maintenance programs
- Increase emphasis on research and development for design and construction to meet the rapidly changing teaching environment
- Establish a federal, multi-year capital budget for public works infrastructure construction and rehabilitation, similar to those used by state and local governments
- Encourage the use of life-cycle cost analysis principles to evaluate the total costs of projects.
- Consider direct federal funding for school construction

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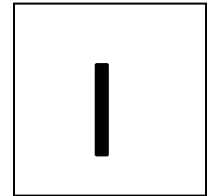
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SECURITY

While the security of our nation's critical infrastructure has improved since September 11, 2001, the information needed to accurately assess its status is not readily available to engineering professionals. This information is needed to better design, build and operate the nation's critical infrastructure in more secure ways. Security performance standards, measures and indices need to be developed, and funding must be focused on all critical infrastructure sectors, beyond aviation.



Background

Protecting assets against security risks has always been a priority for the owners and operators of the nation's critical infrastructure. However, before the attacks of September 11, 2001, most efforts were focused on isolated, relatively minor infractions such as vandalism, and not on high-profile, high-consequence attacks by well-organized terrorist groups. Now, a different kind of protection is needed, involving counter-terrorism (e.g., intelligence gathering, analysis, strategies, and tactics) and anti-terrorism (e.g., hardening of infrastructure through the use of surveillance systems, barriers, and operating procedures). An "all hazards" approach is warranted, with the inclusion of these new malevolent threats added to the list of hazards that our critical infrastructure must be prepared to endure and survive.

Conditions

There are numerous challenges to securing the nation's infrastructure. Beyond the enormous cost implications of security measures in all sectors, there is the fundamental difficulty of coordinating efforts across infrastructure sectors, jurisdictional boundaries, and geographic locations. Issues related to differences in equipment standards are solvable with sound engineering practices, but resolving differences in chains of command and cultural attitudes is much more complex and difficult. Information sharing is critical—but what information should be shared, and with whom? There is also the challenge of developing a thorough and comprehensive national response to terrorism against the backdrop of a deep-rooted desire of all Americans to preserve the basic constitutional freedoms that we hold dear, including the freedom of speech and assembly, and the right to be secure against unreasonable searches and seizures. Perhaps the most disturbing challenge is the difficulty in measuring progress. Is the absence of a large-scale attack the consequence of effective counter-measures, or simply the period of time between planned attacks? Regardless of the answer to this question, it is important to invest in protecting our infrastructure against these new threats, for without the additional layers of security, the occurrence and consequences of attacks would surely be more frequent and greater in scale.

Actions Taken

The Homeland Security Act of 2002 established a new Department of Homeland Security (DHS). The Information Analysis and Infrastructure Protection (IAIP) Directorate within the DHS

developed the requirements for a National Critical Infrastructure Protection (CIP) Program. The vision for the National CIP Program was initially communicated through the July 2002 “National Strategy for Homeland Security.” In February 2003, the President issued more specific strategies for physical protection of critical infrastructure and key resources and for the protection of cyberspace. In December 2003, the President issued Homeland Security Presidential Directive 7 (HSPD-7) to further direct and strengthen the CIP effort.

More recently, in February 2004, DHS launched its Protected Critical Infrastructure Information (PCII) Program. The PCII Program enables the private sector to voluntarily submit infrastructure information to the federal government to assist the nation in reducing its vulnerability to terrorist attacks.

To help develop ways of better protecting our critical infrastructures and to help minimize vulnerabilities, DHS established Information Sharing and Analysis Centers (ISACs) to allow critical sectors to share information and work together.

DHS also has led the development of the National Response Plan (NRP), which consolidates and reconciles multiple national-level incident-response plans into a single, focused, universally understood strategy. This effort includes the development of a new catastrophic incident response protocol that will greatly accelerate the delivery of critical federal assistance to domestic venues suffering from a mass casualty/mass evacuation incident.

In addition, DHS initiated the National Incident Management System (NIMS) and established the NIMS Integration Center, which ensures that federal, state, and local governments, and private-sector organizations, are all using the same criteria to prepare for, prevent, respond to, and recover from a terrorist attack or other major disaster.

Several information-sharing vehicles exist today that did not exist before September 11, 2001. The Homeland Security Information Network, which is available in all 50 states, makes threat-related information available to law enforcement and emergency managers, as well as to private-sector stakeholders through a web-based system.

The Customs-Trade Partnership Against Terrorism (C-TPAT) is a joint government-business initiative to build cooperative relationships that strengthen overall supply chain and border security. C-TPAT recognizes that U.S. Customs and Border Protection (CBP) can provide the highest level of security only through close cooperation with the ultimate owners of the supply chain: importers, carriers, brokers, warehouse operators, manufacturers, border infrastructure crossing facilities, and operators, and it asks businesses to ensure the integrity of their security practices and communicate their security guidelines to business partners within the supply chain.

The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (the Bioterrorism Act), which President Bush signed into law June 12, 2002, addresses the enhancement of controls on dangerous biological agents and toxins, protecting the safety and security of food and drug supply, and drinking water security and safety.

The Federal Transit Administration spearheaded efforts after September 11 to prepare for future attacks by focusing on three areas: (1) training all transit employees and supervisors, (2) improving emergency preparedness, and (3) increasing public awareness of security issues.

Recognizing the critical importance of the security of our nation's water infrastructure — particularly in the post-September 11 environment,—ASCE, the American Water Works Association (AWWA) and the Water Environment Federation (WEF), with a grant from the U.S. Environmental Protection Agency (EPA), developed a set of three security guidance documents addressing the design of online contaminant monitoring systems, and the physical security enhancements of drinking water, wastewater and stormwater infrastructure systems. The voluntary guidelines aim to assist drinking water and wastewater utilities in mitigating system vulnerabilities to man-made threats through the design, construction, operation, and maintenance of both new and existing systems of all sizes.

Professional organizations and public agencies formed The Infrastructure Security Partnership (TISP) as a forum for U.S.-based public and private sector non-profit organizations to collaborate on issues related to the security of the nation's built environment, including protection from both natural and man-made disasters. TISP acts as a national asset, facilitating dialogue on physical infrastructure security, by leveraging members' technical expertise and research and development capabilities in the design and construction industries. TISP offers extensive opportunities to its members and sponsors through its forums, education and training opportunities, communication and outreach mechanisms, and networking opportunities. TISP membership currently includes more than 180 organizations and agencies, reaching more than two million individuals and firms involved in the planning, design, construction, and operation of the nation's built infrastructure.

The National Commission on Terrorist Attacks Upon the United States (also known as the 9/11 Commission), an independent, bipartisan commission created by congressional legislation and the signature of President. Bush in late 2002, was chartered to prepare a full and complete account of the circumstances surrounding the September 11, 2001, terrorist attacks, including preparedness for and the immediate response to the attacks. The Commission was also mandated to provide recommendations designed to guard against future attacks. On July 22, 2004, the Commission released its public report.

Funding

The 2005 budget request of \$40.2 billion for homeland security is \$9 billion (29%) more than the 2003 level, and \$20.4 billion more than the 2001 level—an increase of 103% over the 2001 level of homeland security funding. The vast majority of this funding is slated for airport screening and deployment of existing technologies. The Government Accountability Office (GAO) has published numerous reports recommending more attention to vulnerabilities other than air travel, and a broader, more coordinated, and better-managed program of research and development of new technologies.

Since September 11, 2001, most critical infrastructure owners and operators have conducted preliminary vulnerability assessments of their facilities, and have updated and modified their security procedures to enhance deterrence, protection, response, and recovery. In addition,

training exercises and drills have been conducted with employees and contractors, and public outreach programs have been implemented at health, medical and research facilities; energy plants; water facilities; employment centers; public and private schools; and on public transportation systems, including bridges, tunnels, highways, and public transit. Industry has also invested heavily in protecting supply chains and the transport of hazardous materials.

Collectively, these steps have certainly improved the security of our nation's critical infrastructure systems since September 11, 2001; however, enormous challenges remain. Overcoming them will require a steadfast willingness to acknowledge the threats, think "outside the box," and to work with other sectors of the economy and professional disciplines. Sacrifices must be made in deference to a coordinated, integrated, and comprehensive public/private effort to prevent, protect, respond to, and recover from terrorist attacks. The security of our critical infrastructures, key resources, and our people depend on it.

Policy Options

America must design, build, and operate critical infrastructure by incorporating security as part of an "all hazards" approach. We must increase investment at all levels of government, and then spend that money wisely, leveraging the use of standards and protocols to enable interoperability between and among systems.

Congress must provide adequate funding to meet current infrastructure needs, and must include enough funding for research and development. Public and private partnerships must be forged, and professional and competitive differences must be managed, to ensure collective improvement in the security of the nation's infrastructures.

Specific recommendations supported by ASCE:

- Making information more readily available to professionals who can use the knowledge to better design, build, and operate critical infrastructures in more secure ways
- Continuing to conduct periodic vulnerability assessments in all infrastructure sectors
- Continuing to implement plans for security improvements, including education, training, exercises, and drills
- Increasing funding for long-term infrastructure security research efforts at the national level
- Establishing a federal, multi-year capital budget for critical infrastructure protection
- Encouraging the use of life-cycle cost analysis principles to evaluate the total costs of projects
- Supporting the Infrastructure Security Professional Advisory Network (I-SPAN) goals of bringing together state and local homeland security offices, other state and local government officials, and TISP member organizations, to review and assess needs for

public-private sector collaboration, and to address infrastructure protection and recovery from natural and man-made disasters through robust partnerships at the sub-national level

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SOLID WASTE

The nation's operating municipal landfills are declining in total numbers, but capacity has remained steady due to the construction of numerous regional landfills. In 2002, the United States produced 369 million tons of solid waste of all types. Only about a quarter of that total was recycled or recovered.

C+

Conditions

In 2002, the United States produced 369 million tons of solid waste of all types, according to unofficial industry estimates. This included municipal solid waste (MSW) that was generated by households, businesses, construction sites, and other sources.¹⁰ While per capita waste production has been fairly constant over time, MSW continues to increase with population growth.

Of the 369 million tons of solid waste generated in 2002, 98.7 million tons (26%) were recycled or composted, 28.5 million tons (8%) were burned in waste-to-energy (WTE) plants, and 242 million tons (66%) went to landfill.¹¹

In 1986, the Environmental Protection Agency (EPA) counted 7,683 municipal solid waste landfills in the United States. In October 1991, the EPA adopted stringent new federal regulations for landfill design and operation. By 1992, the number of U.S. landfills had declined to 5,345 facilities. By 1995, the EPA landfill census recorded only 3,581 facilities. In 2001, the agency counted 1,858 landfills—a decline of 78% in 15 years.

The nation's disposal capacity, however, has remained relatively constant, because new landfills are much larger than in the past, according to EPA. Nationally, states have disposal capacity for another 19–20 years, according to the National Solid Wastes Management Association (NSWMA). Nevertheless, a number of states are nearing the end of their ability to manage MSW within their borders. In 2000, five states reported that they had less than 10 years of landfill capacity. Two other large states—Massachusetts and New York—had 5–10 years of capacity remaining.

¹⁰ In 2001, the last year for which official government data are available, approximately 229 million tons of MSW were produced in the United States, according to the EPA, a decrease from 2000. The industry estimates are greater because they include a larger universe of wastes, such as construction debris, agricultural wastes, wastes from overseas, industrial wastes, and other non-hazardous wastes.

¹¹ A growing contributor to the waste stream is consumer electronics. Approximately 20.6 million personal computers became obsolete in the United States in 1998. Of those, only 11%—about 2.3 million units—were recycled, according to the National Safety Council. The EPA has begun a nationwide program to address the issue.

In addition, such waste-to-energy facilities as incinerators are at capacity and growing older, with little potential for the construction of new facilities.

The closing of thousands of landfills, and the construction of regional mega-landfills, have contributed to the increased shipment of municipal wastes across state lines for disposal. In 2003, states shipped 39 million tons of MSW to other states. Pennsylvania was the largest importer of MSW in 2003; New York, the largest exporter.

In order to maximize capacity, the nation must also experiment with newer technologies for solid waste management. One promising technology involves the use of bioreactor landfills to manage a growing volume of waste. A bioreactor landfill rapidly transforms and degrades organic waste. The increase in waste degradation and stabilization is accomplished through the addition of liquid to enhance microbial processes. This bioreactor concept differs from the traditional “dry tomb” municipal landfill approach.

Given the reduction in the number of landfills and the need to extend the life and capacity of the existing landfills, the operation of the landfills as bioreactors is a growing trend. Decomposition and biological stabilization of the waste in a bioreactor landfill can take place much more quickly than it can in a traditional “dry tomb” landfill, providing a potential decrease in long-term environmental risks and landfill operating and post-closure costs.

According to EPA, the potential advantages of bioreactors include:

- Decomposition and biological stabilization in years vs. decades in “dry tombs”
- Lower waste toxicity and mobility due to both aerobic and anaerobic conditions
- Reduced leachate disposal costs
- A 15– 30% gain in landfill space due to an increase in density of waste mass and to waste degradation
- Significantly increased landfill gas generation that, when captured, can be used for energy onsite or sold
- Reduced post-closure care

Policy Options

- The American Society of Civil Engineers opposes legislation that would restrict the interstate movement of municipal solid wastes to new regional landfills that meet all the requirements of federal law.
- ASCE supports legislation and regulations that would allow the use of alternative covers, the introduction of non-indigenous liquids, and other operational changes, to increase the effectiveness of solid-waste landfills.
- Project XL (eXcellence and Leadership), an EPA program begun in 1995 to provide limited regulatory flexibility for U.S. businesses to conduct pilot projects to operate bioreactor landfills, stopped receiving project applications in January 2003. Although

research projects approved for funding before 2003 are continuing, EPA should reopen the bioreactor research program to new projects, in order to build upon the progress made in the 1990s.

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TRANSIT

Transit use increased faster than any other mode of transportation—up 21%—between 1993 and 2002. Federal investment during this period stemmed the decline in the condition of existing transit infrastructure. The reduction in federal investment in real dollars since 2001 threatens this turnaround. In 2002, total capital outlays for transit were \$12.3 billion. The Federal Transit Administration estimates \$14.8 billion is needed annually to maintain conditions, and \$20.6 billion is needed to improve to “good” conditions. Meanwhile, many major transit properties are borrowing funds to maintain operations, even as they are significantly raising fares and cutting back service.

D+

Conditions

The Transportation Equity Act for the 21st Century (TEA-21), which expired in 2003, authorized more than \$41 billion in transit investments. However, the increased popularity of transit, as evidenced by robust increases in transit ridership and strong support for local funding initiatives, has led to growth in both the number and size of transit systems in the United States. While new investment brings badly needed transit service to more Americans, existing systems continue to require reinvestment to replace aging infrastructure; thus, the revenue that is available is spread more thinly. These conditions, together with an uncertain federal funding future, raise serious concerns for transit.

In recent years, transit use has increased faster than any other mode of transportation. An estimated 14 million Americans ride public transportation each weekday, and an additional 25 million use it on a less-frequent but regular basis.

In 2000, there were 614 local public transit operators serving 408 large and small urbanized areas, 1,215 operators serving rural areas, and 3,673 specialized services for the elderly and disabled in both urban and rural areas. These systems operate more than 106,395 vehicles; rail operators controlled 10,572 miles of track and served 2,825 stations. Between 1997 and 2000, the number of urban transit vehicles increased by 2.6%, track mileage grew by 6.6% and the number of stations grew by 5.4%. The number of passenger miles traveled by all transit passengers grew at an annual rate of 2.1% between 1991 and 2000. Passenger growth on transit rail lines grew even faster, at 3.2%.

Funding has increased during this period. In response to citizen demand for service, 42 of a total of 53 (79%) local ballot initiatives for public transportation, or with a public transit component, were passed in 2004. Much of this local revenue is intended to match federal investment. Total capital spending, from all sources, was \$12.3 billion in 2002, up from \$11.7 billion in 2001 and up 140% over the past 12 years. The federal contribution reached \$6.5 billion in 2001 before

slipping to \$6.2 billion in 2002. Ridership increased by 21.3% from 1993 to 2002—to more than 9 billion trips.

The Federal Transit Authority (FTA) rates system conditions on a five-point scale, 1 being poor and 5 being excellent. The most recent data found available show that federal investment through ISTEA and TEA-21 was beginning to stem the decline in the condition of the existing infrastructure:

- The estimated average condition of the urban bus fleet was 3.07 in 2000, up from 2.96 in 1997.
- Average bus age was reported to be 6.8 years in 2000, up slightly from an average age of 6.6 years in 1997.
- The estimated average condition of rail vehicles was 3.55 in 2000, down slightly from 3.7 in 1997.
- Track conditions are estimated to have remained constant since 1997, with 83% of all track estimated to be in adequate or better condition in both 1997 and 2000.
- The average condition of power systems improved slightly, with 88% of substations and overhead wire (power system component) estimated to be adequate or better, compared to 82% and 84% in 1997. Third rail (power system component) conditions improved dramatically, with 83% rated adequate or better in 2000, compared to 75% in 1997.
- Rail transit station conditions are mixed; while the percentage of stations rated adequate or better has increased by 77% in 1997 to 84% in 2000, the percentage in good or better has dropped from 54% in 1997 to 34% in 2000.
- The condition of other structures, such as tunnels and elevated structures, has improved, with 77% in adequate or better condition in 2000 compared to 72% in 1997.
- More than 50% of rural transit fleets are past their expected life-span.

The reduction in federal investment in real dollars since 2001 in the face of increased demand for transit service threatens the progress that has been made to stabilize the condition of our transit infrastructure.

The FTA uses the Transit Economic Requirements Model (TERM), based on economic and engineering concepts to estimate future transit capital investment needs. Using this data, \$14.8 billion is needed annually to maintain the conditions and performance of the nation's transit systems at the 2000 level. This assumes an annual increase in ridership of 1.6%. To improve the systems to "good" by 2020 would require an additional \$5.8 billion per year or a total of \$20.6 billion. The most recent data shows actual spending from all sources, was \$12.3 billion in 2002.

Policy Options

Solutions that would ease the increasing demands on our transportation system and improve transit conditions, capacity and safety are multifaceted. America must change its transportation

behavior, increase transportation investment at all levels of government, and make use of the latest technology. Cities and communities should be better planned to reduce dependence on personal vehicles for errands and work commutes, and businesses must encourage more flexible schedules and telecommuting. If one in ten Americans regularly used transit, U.S. reliance on foreign oil could decline by more than 40%, or nearly the amount of oil imported from Saudi Arabia each year.

Congress must focus its full attention on reauthorizing the nation's surface transportation programs when the chance arises again in early 2005. Congress also must use all of the money that accumulates in the Highway Trust Fund and protect it from abuse by removing it from the unified budget. Congress must provide adequate funding to meet current highway and transit bridge needs, and include enough funding for research and development of civil engineering innovations that offer cost-effective solutions to our transportation needs. Other solutions include private-public partnerships where appropriate, and multi-year capital and operating budgets.

Specific recommendations supported by ASCE:

- Reauthorization of TEA-21 for at least five years, using a needs-based approach to arrive at the funding level.
- Realize the full intent of transportation trust funds by removing them from the unified federal budget.
- Establish a federal, multi-year capital budget for public works infrastructure construction and rehabilitation, similar to those used by state and local governments.
- Encourage the use of life-cycle cost analysis principles to evaluate the total costs of projects.
- Continue research and development of new technologies to reduce construction and operating costs.

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WASTEWATER

Aging wastewater management systems discharge billions of gallons of untreated sewage into U.S. surface waters each year. The EPA estimates that the nation must invest \$390 billion over the next 20 years to replace existing systems and build new ones to meet increasing demands. Yet, in 2005, Congress cut funding for wastewater management for the first time in eight years. The Bush administration has proposed a further 33% reduction, to \$730 million, for FY06.

D-

Conditions

The federal government has directly invested more than \$72 billion in the construction of publicly owned sewage treatment works (POTWs) and their related facilities since passage of the Clean Water Act in 1972. Nevertheless, the physical condition of many of the nation's 16,000 wastewater treatment systems is poor, due to a lack of investment in plant, equipment and other capital improvements over the years.

Many systems have reached the end of their useful design lives. Older systems are plagued by chronic overflows during major rain storms and heavy snowmelt and, intentionally or not, are bringing about the discharge of raw sewage into U.S. surface waters. The U.S. Environmental Protection Agency (EPA) estimated in August 2004 that the volume of combined sewer overflows (CSOs) discharged nationwide is 850 billion gallons per year. Sanitary sewer overflows (SSOs), caused by blocked or broken pipes, result in the release of as much as 10 billion gallons of raw sewage yearly, according to the EPA.

Federal funding under the Clean Water Act State Revolving Loan Fund (SRF) program has remained flat for the past decade. With one exception, Congress appropriated between \$1.2 billion and \$1.35 billion from 1995 to 2004.¹² But in FY 2005, Congress cut wastewater SRF funding for the first time in eight years, reducing the total investment to \$1.1 billion.

The Bush administration has proposed further cuts for FY 2006, with a budget submittal calling for an appropriation of only \$730 million, a reduction of 33% from the FY 2005-enacted level.

Federal assistance has not kept pace with the needs, yet virtually every authority agrees that funding needs remain very high: the United States must invest an additional \$181 billion for all types of sewage treatment projects eligible for funding under the Act, according to the most recent needs survey estimate by the EPA and the states, completed in August 2003.

¹² The appropriation for state SRF programs was reduced to \$625 million in FY 1997.

A more recent report from the staff of the House Transportation and Infrastructure Committee stated the issue bluntly: “Without increased investment in wastewater infrastructure, in less than a generation, the U.S. could lose much of the gains it made thus far in improving water quality, and wind up with dirtier water than existed prior to the enactment of the 1972 Clean Water Act.”

That is only part of the story. In September 2002, EPA released a detailed gap analysis, which assessed the difference between current spending for wastewater infrastructure and total funding needs. The EPA Gap Analysis estimated that, over the next two decades, the United States must spend nearly *\$390 billion* to replace existing wastewater infrastructure systems and to build new ones (the total includes money for some projects not currently eligible for federal funds, such as system replacement, which are not reflected in the EPA State Needs Survey).

According to the Gap Analysis, if there is no increase in investment, there will be a roughly \$6 billion gap between current annual capital expenditures for wastewater treatment (\$13 billion annually) and projected spending needs. The study also estimated that, if wastewater spending increases by only 3% per year, the gap would shrink by nearly 90% (to about \$1 billion annually).

In 2000, the Water Infrastructure Network, a consortium of water and wastewater providers, researchers, environmentalists, engineers (including the American Society of Civil Engineers [ASCE]) and product manufacturers, released a study concluding that the annual investment need for all sewer treatment facilities is \$12 billion.

The Congressional Budget Office (CBO) released its own gap analysis in 2002, in which it determined that the gap for wastewater ranges, from \$23 billion to \$37 billion annually, depending on various financial and accounting variables.¹³

Policy Options

If the nation fails to meet the investment needs of the next 20 years, it risks reversing the public health, environmental, and economic gains of the past three decades.

The case for increased federal investment is compelling. Needs are large and unprecedented; in many locations, local sources cannot be expected to meet this challenge alone and, because waters are shared across local and state boundaries, the benefits of federal help will accrue to the entire nation. Clean and safe water is no less a national priority than are national defense, an adequate system of interstate highways, and a safe and efficient aviation system. Many other highly important infrastructure programs enjoy sustainable, long-term sources of federal backing, often through the use of dedicated trust funds; under current policy, water and wastewater infrastructure do not.

- The American Society of Civil Engineers supports enactment of a federal water infrastructure trust fund act that would provide a reliable source of federal assistance for the construction and repair of POTWs to reduce the enormous funding gap.

¹³ None of the estimates cited includes the costs of operation and maintenance (O&M), costs that are borne entirely by the local utilities and are not eligible for federal funding. The 2002 Gap Analysis, for example, put the total O&M cost at \$161 billion for the 20-year study period.

- In the interim, ASCE supports annual appropriations of \$1.5 billion from the federal general fund for the State Revolving Loan Fund (SRF) program.
- In addition, ASCE supports the establishment of a federal capital budget to create a mechanism to help reduce the constant conflict between short-term and long-term needs. The current federal budget process does not differentiate between expenditures for current consumption and long-term investment. This causes major inefficiencies in the planning, design and construction process for long-term investments. A capital budget system would help to increase public awareness of the problems and needs facing this country's physical infrastructure, and would help Congress to focus on programs devoted to long-term growth and productivity.
- ASCE supports funding research into wastewater treatment technology, which may reduce capital expenditures, as well as operation and maintenance cost. An example of technology that needs further study is membrane bioreactors.

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