

AUTHORIZATION OF THE NATION'S SURFACE TRANSPORTATION PROGRAM A BLUEPRINT FOR SUCCESS

During the 20th Century, the Federal government led the way in building our nation's greatest infrastructure systems. From the Works Progress Administration projects completed during the Great Depression to the creation of the Interstate Highway System in the 1950s and 1960s, the 20th Century will be remembered as a time when Americans took pride in building a strong and lasting infrastructure foundation. Since that time, Federal leadership and investment decreased and the condition of the nation's infrastructure deteriorated. It is clear that infrastructure systems are directly related to public safety, national security, and economic competitiveness and there is a Federal interest per Article 1, Section 8 of the United States Constitution. Transportation infrastructure and commerce is a Federal responsibility. A strong Federal role in policy and funding is necessary to assure a national surface transportation system that meets national needs.

The American Society of Civil Engineers (ASCE's) *2017 Infrastructure Report Card* graded the nation's infrastructure a "D+" based on 16 categories, remaining consistent from ASCE's 2013 Report Card. In 2017, for surface transportation categories:

- Roads received a grade of "D," showing no change from 2013;
- Bridges received a grade of "C+," showing no change from 2013;
- Transit received a "D-," a decrease from 2013's grade of a "D;" and
- Rail received a grade of "B," up from a "C+," an increase from the 2013 Report Card.

These grades are a clear indication there is a tremendous need to invest in the nation's infrastructure and these investments must be consistently maintained.

The failure to achieve higher grades is caused by factors, such as deferred maintenance on aging systems and decreased funding from all levels of government, as well as a lack of compelling national leadership. Throughout the 20th Century, our nation's leaders envisioned large scale infrastructure plans that inspired the public and contributed to unprecedented economic growth. Now, much of that infrastructure is reaching the end of its design life and we are seeing increasing problems with deterioration across all public infrastructure.

The nation continues to under-invest in infrastructure at the Federal level. The total of all Federal spending for infrastructure as a share of all Federal spending has steadily declined over the last 40 years according to the Congressional Budget Office (CBO). A key reason for the decline is the fact that Federal revenues supporting the Highway Trust Fund (HTF) have not been adjusted since 1993; however, the demands on the systems have steadily grown. As a result, current levels of highway and public transportation investment cannot be maintained solely with trust fund resources and Congress has had to rely on the U.S. Treasury's General Fund to shore up resources. Currently, the HTF is allocating more than the revenues it receives, with the HTF having a \$13 billion deficit in fiscal year (FY) 2017. Forecasts show the HTF will have a \$18.3 billion deficit by FY 2022, cutting the annual Federal highway and transit investment and leading to HTF insolvency.

Unfortunately, the cost of the underinvestment in transportation infrastructure is significant for the nation and its citizens. ASCE's 2016 economic study, *Failure to Act: Closing the Infrastructure Investment Gap for America's Economic Future*, found that our deteriorating infrastructure will cost the American economy more than 2.5 million jobs and suppress the growth of our Gross Domestic Product (GDP) by \$3.9 trillion by the year 2025. This economic impact of failing to invest in infrastructure is a cost to every family; a defacto hidden tax. Furthermore, the nation's surface transportation systems are facing a funding gap of \$1.1 trillion over the next 10 years with our current spending levels. This continued inaction will not only lead to a further deterioration of the nation's surface transportation assets, but also will act as a drag on the economy due to impediments with the movement of goods and people. This means a continuation of high levels of traffic casualties, wasted time and fuel, and increased air pollution due to increasing congestion.

If we are going to build and maintain an infrastructure that will serve the needs of the current century, we will need bold and brave leadership as well as a compelling vision. We must be certain to preserve and maintain the foundations that past generations have built for us, but at the same time recognize a new, overarching approach is needed. The authorization of the nation's surface transportation act is an excellent place to start.

This document focuses on surface transportation specifically, but the needs reach across all aspects of the nation's infrastructure. To compete in the global economy, improve our quality of life, and raise our standard of living, we must successfully build America's public infrastructure for the 21st Century.

In 2019, Congress must authorize the Federal law that funds the nation's surface transportation programs. The ASCE, representing more than 150,000 civil engineers, believes the authorization should focus on five goals for surface transportation:

- Strengthening and expanding infrastructure investment;
- Maximizing infrastructure effectiveness;
- Building for the future;
- Ensuring the safe movement of people and goods; and
- Enhancing infrastructure delivery.

Furthermore, sustainability, resiliency, and ongoing maintenance must be an integral part of improving the nation's surface transportation system. As infrastructure is built or rehabilitated, life-cycle cost analysis should be performed to account for initial construction, operation, maintenance, environmental, safety, and other costs reasonably anticipated during the life of the project, such as recovery after disruption by natural or manmade hazards.

I. Expanding Infrastructure Investment

Key Components:

- **Increase Funding to Provide Adequate Infrastructure Investment**
- **Long-term Viability of Fuel Taxes for Transportation Finance**
- **Innovative Financing**

ASCE supports a reliable, sustained user fee approach to building and maintaining the nation's surface transportation systems. Despite the \$70 billion transfer from the General Fund to the HTF, lasting until 2020 under the Fixing America's Surface Transportation (FAST) Act; the HTF in 2018 had a \$14 billion shortfall between expected outlays and total generated revenue. This shortfall is expected to increase by \$17 billion in 2021. Because the U.S. does not have a long-term funding solution, the U.S. Department of Transportation (US DOT) projects that the cumulative shortfall, under the current 10-year window, in the HTF highway and mass transit accounts, will be over \$170 billion.

Simply put, Congress needs to approve a long-term HTF revenue solution in order to operate, maintain, and improve a national surface transportation network that boosts economic competitiveness and job creation.

Establishing a sound financial foundation for future surface transportation expansion and preservation is an essential part of authorization. Despite increased funding levels in the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Moving Ahead for Progress in the 21st Century (MAP-21), and FAST Act, the nation's surface transportation system requires even more investment. The current 10-year spending level of \$941 billion, from all levels of government, is well below the estimated \$1.1 trillion needed to improve conditions over the next decade.

The Federal Transit Administration (FTA) estimates a maintenance backlog of \$90 billion needed to bring all transit systems up to a state of good repair. The U.S. has been underfunding its highway system for years, resulting in an \$836 billion backlog of highway and bridge capital needs. The bulk largest portion of the backlog (\$420 billion) is in repairing existing highways, while \$123 billion is needed for bridge repair, \$167 billion for system expansion, and \$126 billion for system enhancement (which includes safety enhancements, operational improvements, and environmental projects). The Federal Highway Administration (FHWA) estimates that each dollar spent on road, highway, and bridge improvements returns \$5.20 in the form of lower vehicle maintenance costs, decreased delays, reduced fuel consumption, improved safety, lower road and bridge maintenance costs, and reduced emissions as a result of improved traffic flow. With funding as the cornerstone of any attempt to authorize the nation's surface transportation programs, it is imperative that a variety of funding issues be advanced.

Increase Funding to Provide Adequate Infrastructure Investment

ASCE supports the following items for infrastructure investment and believes that all revenue options must be under consideration as Congress works to authorize the surface transportation program:

- Revenue sources for the HTF to maintain current levels of highway and mass transit investment – nearly \$42 billion per year for highways and \$13 billion per year for transit.
- Additional investment, beyond current levels, to maintain the current conditions of the surface transportation infrastructure as defined by the US DOT Conditions and

Performance Report, and for system improvement, including congestion relief, freight mobility, and traffic safety.

- **A 25 cent per gallon increase in the motor fuels user fee over the next five years** to accomplish the above levels of investment.
- A **maintenance of effort requirement** to ensure that all levels of government are making comparable financial commitments to improve the nation's surface transportation system.
- The user fee on motor fuels should be **indexed to the Consumer Price Index (CPI)**, in order to preserve the purchasing power of the fee.
- **All motor fuels should be taxed equitably.**
- Congress should **preserve the current firewalls** to allow for full use of trust fund revenues for investment in the nation's surface transportation system.
- The authorization should **maintain funding guarantees.**
- Tolling; mileage-based user fees; standard and electric vehicle taxes; state, regional, and/or local sales taxes; dynamic pricing; container fees; and transit ticket fees **must all be considered in the development of revenues** for the maintenance and improvement of the surface transportation system.
- Looking to the future, Congress should **establish a broad national pilot program** to better understand how a Mileage-Based User Fee (MBUF) could be implemented.
- **Flexibility should be maintained.** The goal of the flexibility should be to establish an efficient multi-modal transportation system for the nation.
- Encourage continued **freight mobility** to guarantee the efficient movement of freight, reduce system congestion, and support the nation's economic growth.
- A national MBUF pilot program **should examine key issues** including, but not limited to, developing a mileage collection system, administrative costs, and revenue allocations.
- As one of the findings in the Transportation Research Board's (TRB) congressionally mandated report, "Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future," Congress should direct and provide sufficient funding for the US DOT to develop modeling tools and databases in order to support modernization investment decisions. Furthermore, many of the key findings of the report should be included in future investment discussions.

While the motor fuels user fees are an important element of the current revenue stream feeding the HTF, that revenue continues to erode in value due to its inherent inelastic nature and improving vehicle fuel economy. Three strategies must be advanced to remedy this condition. First, raise the motor fuels user fee by 25 cents per gallon over the next five years. This would provide a much-needed infusion of funding towards the estimated \$1.1 trillion ~~need~~ needed from all levels of government over the current decade. In tandem with raising the motor fuels user fee, ASCE believes that it is important to shore up the weakness of the motor fuels user fee and its inability to retain value over the long term by adding a provision to the law that would index it based on the Consumer Price Index (CPI). This would allow the rate to adjust, thus reflecting the current economic conditions of the nation. To ensure equity within the user-based system, all motor fuels and electric vehicle batteries not currently providing a user fee contribution must be included. Finally, we must continue to explore alternative revenue mechanisms for future use to ensure long-term HTF stability.

With the establishment of firewalls on the HTF, a condition was created wherein the states could count on their funds in a long-term investment strategy and have certainty in advancing complex and high-dollar multi-year projects. These firewalls must be maintained to ensure the integrity

and viability of the HTF. This will be especially important as user fees are increased and HTF levels rise.

Long-term Viability of Fuel Taxes for Transportation Finance

ASCE supports the need to address the issue of future sources of revenue for surface transportation funding. Congress should allow for the exploration of the feasibility of the most promising funding options that will ensure the viability of the HTF. A MBUF for funding our nation's surface transportation systems needs further study. Recommendations, as well as current state MBUF state programs, must be evaluated to ensure a comprehensive Federal approach. This data will be critical in determining how to generate HTF revenue as the nation's dependence on gasoline as a fuel source for automobiles is reduced.

Innovative Financing

While recognizing that innovative financing is not a replacement for new and consistent funding, ASCE supports innovative financing programs and advocates making programs available to all states where appropriate. The Federal government, including agencies such as the Build America Bureau, should make every effort to ensure financing options are readily available. It should be noted, however, that innovative financing does not produce revenue, and should not be seen as an alternative to increasing direct user fee funding of surface transportation infrastructure.

Innovative financing techniques can greatly accelerate infrastructure development and can have a powerful economic stimulus effect compared to conventional methods. This is the current approach in Texas, Colorado, and Virginia, where expanded and accelerated transportation investment programs have been utilized.

ASCE recognizes Public Private Partnerships (P3s) as one of many methods of financing infrastructure improvements. ASCE supports the use of P3s only when the public interest is protected, and the following criteria are met:

- Any public revenue derived from P3s must be dedicated exclusively back to comparable infrastructure facilities in the state or locality where the project is based.
- P3 contracts must include performance criteria that address long-term viability, life cycle costs, return on public and private investment, takeover and turnback, and residual value.
- Transparency and public participation must be a key element in all aspects of contract development, including all terms and conditions in the contract. There should be public participation and compliance with all applicable planning and design standards, and environmental requirements.
- The selection of professional engineers as prime consultants and subconsultants should be based solely on the qualifications of the engineering firm.
- A small and disadvantaged business program should be included with establishment of participation goals, outreach provisions, and local company and human resources preferences.
- There must be included a life-cycle perspective, meaning private partner(s) provide financing in addition to "bundled" project delivery phases including design, construction, operations, and maintenance.

ASCE supports the development of P3 selection and contract provisions by governing agencies to protect the public interest. Examples include input from affected individuals and communities, design and construction quality, environmental impacts, construction impacts, effectiveness,

accountability, transparency, equity, public access, consumer rights, safety and security, sustainability, long-term ownership, completion schedule, maintenance condition, operational performance and reasonable rate of return.

II. Maximizing Infrastructure Quality/Effectiveness/Efficiency

Key Components:

- **Transportation System Safety**
- **System Preservation**
- **Operations and Maintenance**

Transportation System Safety

Current safety practices and incremental improvements do not go far enough in addressing the need to reduce the fatalities, injuries, and economic costs associated with highway crashes. ASCE supports the mission of Vision Zero to reduce traffic-related fatalities and serious injuries through improvements in all aspects of highway system performance, including prioritizing moving people and goods over vehicles. The further development of highway safety professionals is essential to achieving any type of improvement in the safety of the surface transportation system.

ASCE supports a program where significant enhancements in highway safety and the resulting reduction of highway crashes can be achieved by:

- Establishing a national highway safety goal;
- Supporting key safety provisions included in the FAST Act's Highway Safety Improvement Program;
- Maintaining complete, current, and accurate traffic crash data systems;
- Inspecting and auditing existing roadway systems to identify roadway hazards and safety improvement opportunities, and implementing highway and other engineering-related improvements proven effective in reducing the potential for, and severity of, traffic crashes;
- Enhancing the organizational prominence of highway safety within Federal, state, and local transportation agencies to provide a more effective voice in agency administration, leadership development, and program direction;
- Requiring the safety, interests, and convenience of all users – drivers, bicyclists, transit users and pedestrians of all ages and abilities – be considered in the planning, design, construction, operations, and management of transportation projects networks.
- Improving work zone safety and mobility, including safe accommodations for bicyclists and pedestrians when such infrastructure is closed to accommodate a work zone;
- Broadening the use of alternative roadway design, including alternative intersections and interchanges within urban and rural areas;
- Broadening the use of temporary design to pilot safety improvements before investing in full design and construction;
- Continuing to improve understanding of motor vehicle performance characteristics, as well as the interaction between vehicle standards and highway system design on highway safety, and to improve the overall effectiveness of existing motor vehicle standards;
- Encouraging universities to continue to include highway safety issues in educational programs for engineering and other highway professionals;
- Incorporating new technology, better management practices, and a better

- understanding of the effect of human factors into all levels of transportation systems;
- Supporting additional funding for highway safety research and for the education of highway safety professionals;
- Expanding the development and application of Intelligent Transportation Systems (ITS) programs to enhance highway traffic safety;
- Supporting the planning and development of connected and autonomous vehicles (CAV) as part of an integrated transportation infrastructure system which can enhance transportation assets and prevent traffic-related fatalities and serious injuries;
- Increasing law enforcement to address dangerous driver behavior and other factors contributing to crash causation;
- Improving and expanding public education programs to increase driver awareness of attitudes and behavior that affect highway safety; and,
- Providing flexibility in Federal aid funding programs for high priority highway safety improvement programs, and to continue targeting national safety problems through categorical funding.

According to the National Highway Traffic Safety Administration (NHTSA), 37,133 people were killed on U.S. roadways in 2017. Furthermore, NHTSA estimates that car accidents cost the U.S. \$871 billion per year in economic costs and societal harms. While the fatality rate in 2017 is a 1.8 percent decrease from the previous year, as our roadways become more crowded, we need to make more positive strides in reducing roadway fatalities and serious injuries.

Reducing exposure to obstructions, adding or improving median barrier systems, and improving shoulders offer opportunities to reduce crashes, injuries, and fatalities. Our nation's economy and our quality of life require a highway and roadway system which provides a safe, reliable, efficient, and comfortable environment for all users, and nearly 40,000 fatalities annually are unacceptable.

Safety Contingency Funds

It is unfortunate that occupationally related roadway construction work zone fatalities remain steady year-over-year. One challenge for stakeholders arises when the contractor and agency determine that enhanced safety equipment or practices are needed beyond those originally specified in the bidding process. Recognizing this shortcoming, some state DOTs have developed innovative contracting methods for road construction work projects whereby a "safety contingency fund," an amount incidental to the roadway construction project's total budget, is set aside to cover the cost of needed enhancements to ensure roadway work zone safety. The highway construction industry calls on Congress to explore the use of such innovative contracting methods as an example of Innovative Project Delivery, outlined in 23 USC 120(c)(3)(B), by adding the following clause (vii): "contractual provisions that provide safety contingency funds to incorporate safety enhancements to work zones prior to or during roadway construction and maintenance activities."

Highway Safety Improvement Program

ASCE supports current language in the FAST Act which ensures that Highway Safety Improvement Program (HSIP) funds are used for HSIP eligible projects and cannot be flexed to other safety programs. Especially with the advent and continued deployment of connected and automated vehicles (CAVs), it is critical that we invest in roadway infrastructure projects that will improve safety for human drivers and CAV technology. Executives from both General Motors

and BMW have testified that the one thing that Congress can do to help deployment of CAVs is to invest in good traffic signs and pavement markings.

System Preservation

The surface transportation system does not meet today's needs. The transportation system must be evaluated in a comprehensive, mode-inclusive manner, to move more people and goods efficiently in order to grow the economy and to meet today's needs as well as the demands of future generations.

One out of every five miles of highway pavement in the U.S. is in poor condition, costing motorists \$120.5 billion, or \$533 per driver, in extra vehicle repairs and operating costs per year. Additionally, a TRB report entitled "Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future" suggest that the total cost of renewing and modernizing the interstate system could cost state and local governments between \$45 and \$70 billion annually. Unfortunately, the current 10-year spending of \$941 billion for surface transportation improvements is well below the \$2 trillion needed to maintain a state of good repair and substantially improve these conditions. At a minimum, a major goal of the surface transportation program must be to protect the investments that have been made through timely repair and maintenance of transportation assets.

The current state of the infrastructure is such that we cannot wait to replace existing structures and so must be committed to timely repair and maintenance. Further, possible effects due to climate change such as extreme temperature swings, higher sea levels, and increases of extreme weather including hurricanes will continue to degrade the quality of the nation's surface transportation infrastructure. Embedded in any plans for future improvements to the nation's surface transportation system should be a strong component aimed at preserving the current system.

Operations and Maintenance

ASCE strongly endorses Federal leadership in increasing the focus on transportation operations and maintenance and thereby enhancing performance, in particular by addressing congestion relief, maintaining a state of good repair, and preserving our investment in the transportation system.

There is a clear and present need for an increased focus on transportation operations and maintenance at all levels – Federal, state, regional, and local. This need is based on several factors:

- An aging transportation infrastructure particularly in areas where there has been historic disinvestment;
- Growing congestion and incident problems are affecting the performance of the transportation system;
- Increased number of fatalities and serious injuries on roadways, especially the rise of pedestrian fatalities;
- Capacity constraints and costs of new construction are forcing the examination of alternative solutions and place a premium on maintaining and improving the transportation system within its existing or reduced footprint;
- Ever growing changes in climate and severity of storms as well as legacy environmental impacts from the transportation, such as air and water pollution;
- Customers' desire for affordable, safe, and reliable travel choices and better information to meet their mobility needs; and

- An efficient and responsive transportation system is critical to meeting homeland security priorities.

An increased focus on transportation operations can enhance performance of the transportation system regarding:

- Reduced traffic congestion by investing in improved public transportation, passenger rail, and Active Transportation and Demand Management (ATDM) systems to effectively move more people;
- Multi-modal options that enhance infrastructure connectivity that include, but not limited to, bicycle and scooter access, CAVs, and pedestrian mobility;
- Improve safety, public safety responses, and incident management to ensure the mission of Vision Zero is upheld;
- Improved economic competitiveness including interstate commerce, better traveler and shipper information, as well as enhanced network and facility management to ensure we have an economy that can compete in a 21st century marketplace; and
- Examining the total life-cycle cost on an asset and building more resiliently while ensuring energy conservation and reduced environmental impact remain key in project delivery.

ASCE considers it essential that the following issues regarding Operations and Maintenance be considered in the authorization bill:

- Homeland security initiatives. Transportation operations and homeland security can benefit from joint planning and sharing of resources such as communications infrastructure and traffic control and monitoring operations. Transit security and preparedness, international border security, asset security and tracking, vulnerability assessment, and creation of system resiliency are important priorities for both transportation operation and homeland security.
- Planning for the future. By recognizing that environmental conditions are changing, assets must be built to withstand ever-growing strains and changes in the climate. Therefore, assets must be built in a more resilient manner as the total life-cycle cost is examined.
- Support for state and local agencies. Beyond establishing transportation operations and management as a national priority, the Federal role should be to support and assist state and local entities in accomplishing related goals. This includes support of research and development, provision of tools, promotion of best practices, and enhancement of education and training at all levels.
- Provision of flexible funding. Flexibility in funding could greatly enhance the opportunity of meeting operations and maintenance needs. Expanding funding eligibility for operations and maintenance programs, enabling direct funding to local and regional operating agencies, and simplifying and clarifying Federal funding processes are important initiatives that should be considered.
- Encouragement of public-private partnerships. The private sector has much to offer in the areas of operations, management, and technical skills. Partnership with the public sector can better serve the transportation needs of the country. In addition, installing transportation infrastructure as part of a development/redevelopment project should be considered, which would recognize the dependence between transportation and land use.
- Support specific programs. The following programs are also of significance and require special attention:

- Incident management programs;
- Intelligent Transportation System programs including CAVs;
- Support for regional cooperation and partnerships; and,
- Congestion mitigation programs.

ASCE encourages the use, maintenance and operation principles included in the TRB report entitled, “Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future,” be considered a viable option to improve our nation’s roadways.

Furthermore, the US DOT should encourage local matching and innovative funding. The Federal government has a role in exploring and promoting best practices related to innovative funding for operations and maintenance.

III. Building for the Future: Sustainable System Expansion and Intermodality

Key Components:

- **Sustainable System Expansion**
- **Resilience**
- **Freight Mobility**
- **Rail Systems**
- **Transportation Research Programs**

Sustainable System Expansion

To compete in the global economy, improve our quality of life and raise our standard of living, we must successfully renew America's public infrastructure. Faced with that task, the nation must begin with a significantly improved and expanded surface transportation system. The surface transportation system authorization must be founded on a new paradigm; instead of focusing on the movement of cars and trucks from place to place, it must be based on moving people, goods, and services across the economy.

Beyond simply building new roads or transit systems, an intermodal and technology-centric approach must be taken to create a new vision for the future. This new vision must address resiliency in the face of climate change; a strong link to land use; sustainability of the system; growth of technology in our infrastructure assets; the use of commodities; equity; and anticipation of changes in demographics - especially age and urbanization.

ASCE supports the vision of a National Intermodal Transportation System that is economically efficient, technologically and environmentally sound, provides the foundation for the nation to compete in the global economy and will move people and freight in a safe, reliable, and energy efficient manner. All transportation modes under this framework should be incorporated into the Strengthening Mobility and Revolutionizing Transportation (SMART) city infrastructure planning to ensure optimal choices for the community. CAV technology under this framework should support stronger planning, design, operation and maintenance of surface roadways, and prevent traffic-related fatalities and serious injuries. Support for partnerships among the Federal, state and local governments, with various citizens, groups and firms from the private sector are essential to further develop a truly intermodal, passenger-driven system.

ASCE supports government policies that encourage anticipation of and preparation for possible impacts of climate change on the built environment. Global or local climate change could pose a potentially serious adverse impact on the nation's surface transportation system. According to the TRB, "the greatest impact of climate change for North America's transportation systems will be flooding of coastal roads, railways, transit systems, and runways because of global rising sea levels, coupled with storm surges and exacerbated in some locations by land subsidence." Long-term transportation plans should consider climate change impacts and their effect on infrastructure investments particularly in vulnerable areas. Today's investment decisions will affect how well the infrastructure adapts to climate change far into the future.

Programs of the Federal, state and local governments must emphasize the need to consider a wide range of multimodal options and new technologies in the development of transportation plans, programs and projects, and in the comprehensiveness and usability of information systems available to individuals and others engaged in the movement of people and freight.

A primary emphasis of passenger intermodalism is to facilitate connections between the private automobile and other access modes and public transportation systems. For example, park-and-ride facilities provide critical connections for mass transit commuters using automobiles or other modes such as biking or scootering for a portion of their trips. Another example is the use of intelligent transportation systems to generate on-demand information on door-to-door multi-modal trip options, thus providing convenient opportunities for people to evaluate and choose more efficient routes and mode choices. Of course, the best example of intermodalism is linking land use, technology, and transportation; designing our communities so that people are encouraged to leave their automobiles at home and use walking, biking, micro mobility, and public transportation to meet their daily mobility needs while allowing for technology to enhance these options.

No matter how good a solution is, if it is not affordable, it will not solve the problem. Financial resources are very limited throughout the country. Construction costs have increased significantly, and Federal and state funds are not keeping pace with demand. Wise investment in transportation infrastructure requires sensitivity to available funding. Virtually all project development processes offer a range of options with different costs, corresponding to different levels of value. However, the importance of understanding alternatives based on the value to price ratio and life-cycle cost is often underestimated.

Frequently, one objective is given as an absolute mandate, which must be met at all costs. Alternatively, the concepts of “return on investment” and “right sizing” recognize the growing importance of evaluating the value-to-price ratio on proposed alternatives. Performance measures such as cost per existing trip, cost per new trip, and cost per time saved for a representative trip may be used to better understand the return on a proposed investment.

Advancing projects already in the “pipeline” that were justified on outdated criteria may not lead to the most effective investment strategy. States should be encouraged to analyze long range plans to identify projects that could be “right-sized” to be more cost effective and more responsive to the goals and metrics above. An audit process should:

- Articulate US DOT criteria to help local jurisdictions better understand what project elements may and may not be funded by state DOTs given current budget realities.
- Work with local or regional bodies to help identify common project prioritization criteria.
- Develop a program to reframe and broaden the technical criteria that would be considered for projects, link transportation and land use, enhance technology use with assets, leverage connections with US DOT systems, and more fully consider multiple modes of transportation.

Specifically, ASCE would support plans that strive to achieve these outcomes:

- Increased safety;
- Reduced congestion;
- Decreased reliance on single occupancy vehicles even with introduction of CAVs;
- Increased security;
- Improved environmental stewardship;
- Improved incident response;
- Improved mobility and mode choice;
- Facilitated interstate commerce;
- Increased employment opportunities;
- Enhanced use of technology to improve transportation systems;

- Improved international competitiveness;
- Increased energy conservation; and
- Reduced life-cycle cost.

Resilience

Resilience is critically important to the overall health of our nation's infrastructure network. ASCE's *2017 Infrastructure Report Card* emphasizes the importance of preparing for the future by utilizing new approaches, materials, and technologies to ensure our infrastructure is more resilient and sustainable. This goal can be achieved by:

- Developing active community resilience programs for severe weather and seismic events to establish communications systems and recovery plans to reduce impacts on the local economy, quality of life, and environment;
- Considering emerging technologies and shifting social and economic trends – such as autonomous vehicles, distributed power generation and storage, and larger ships – when building new infrastructure, to assure long term utility;
- Improving land use planning at the local level to consider the function of existing and new infrastructure, the balance between the built and natural environments, and population trends in communities of all sizes, now and into the future; and
- Supporting research and development into innovative new materials, technologies, and processes to modernize and extend the life of infrastructure, expedite repairs or replacement, and promote cost savings.

Building infrastructure that is designed to meet future needs and withstand future hazards often comes with a higher initial price. However, it is a worthwhile investment that pays for itself down the road. In January 2019, the National Institute of Building Sciences (NIBS) issued the *Natural Hazard Mitigation Saves: 2018 Interim Report*. The 2018 Interim Report highlights the significant savings that result from implementing mitigation strategies found in up-to-date building codes, in terms of safety, and the prevention of property loss and disruption of day-to-day life. The Institute's project team looked at the results of 23 years of federally funded mitigation grants provided by the Federal Emergency Management Agency (FEMA), U.S. Economic Development Administration (EDA) and U.S. Department of Housing and Urban Development (HUD) and found mitigation funding can save the nation \$6 in future disaster costs, for every \$1 spent on hazard mitigation.

By becoming a more resilient nation, we can ensure our infrastructure is built for the future and our nation's limited federal resources are spent wisely, with mitigation and preparedness in mind. Therefore, we urge Congress to support and include resiliency goals in all infrastructure related legislation to ensure we are preparing for the future and limiting our long-term costs. Houston, and each of the cities making significant investments during recover from natural disasters, urge Congress to make these investments in a way to minimize future economic, environmental, and social risk.

Freight Mobility

As the U.S. economy has expanded to global markets, the movement of goods and services has concurrently increased its reach. Freight must now move across vast distances, usually through a combination of modes. The Interstate Highway System has resulted in a truck-dependent model, and thus goods do not always move seamlessly from one mode to the next. To meet the demands of the global economy, the surface transportation authorization must

enhance and improve connectivity and level of service to the major intermodal terminals including seaports, airports, rail terminals, ports of entry, and inland intermodal terminals. Inherent in the authorization must be a paradigm shift that focuses on the movement of people, goods, and services, rather than simply cars and trucks.

The volume of freight being moved on the nation's railways continues to increase. Despite this volume increase, our nation's railways under the current 10-year window have a \$29 billion maintenance deficit. Frequently, freight and passenger rail generally share the same network, and a significant potential increase in rail demand will add to freight railroad capacity challenges. Increased funding in rail should focus on separating freight and passenger rail where there is adequate footprint and upgrading signals and communications to improve operations where they must continue to use the same rail lines. To meet the challenges of rail capacity, the surface transportation authorization must enhance and improve operations where freight and passenger rail share infrastructure such as elevating bottle necks at tunnels and bridges. Authorization must continue to provide for a strong Federal role in freight mobility and intermodal connectors. This should include continued support for the Fostering Advancements in Shipping and Transportation for The Long-Term Achievement of National Efficiencies (FASTLANE) grant program.

In short, we should encourage continued freight mobility to guarantee the efficient movement of freight, reduce system congestion, and support the nation's economic growth.

Rail Systems

Additionally, ASCE supports the development, construction and operation of an expanded passenger rail transportation system within the United States, including advanced technology high speed ground transportation (HSGT) systems. As regional and intercity transportation corridors in the United States become increasingly congested, investments in intercity passenger rail systems, including HSGT, are increasingly attractive as part of an overall transportation mobility strategy to provide added capacity and high-quality service. Investments in this technology are cost effective, environmentally responsive, and energy efficient and should be considered as companion investments to traditional highway and air modes. These investments include both conventional wheel-on-rail systems and new technologies. Other nations, in Europe and Asia in particular, have invested heavily in the development and construction of new HSGT systems and intercity passenger rail networks over the past four decades. While the U.S. has spent substantial sums in highway and air passenger networks, North America has lagged in the development and implementation of efficient, relatively low-polluting, and high-capacity intercity passenger rail and HSGT networks.

The Federal Transit Administration (FTA) still estimates a maintenance backlog of \$90 billion needed to bring all transit systems up to a state of good repair. ASCE encourages the use of innovative financing methods like revenue bonds and tax-exempt financing at the state and local levels, public-private partnerships, and state infrastructure banks to reduce the backlog. The Society continues to recommend that the mass transit account continue to be included within the HTF.

Transportation Research Programs

Research and technology are critical to achieving national transportation goals in infrastructure performance and preservation, safety, quality of life, economic health, environmental quality, sustainability, and security. Increased levels of funding for research and technology activities

are justified based upon generally high returns on research investment. Total research and technology funding for activities corresponding to the innovation title in the FAST Act should be at least \$550 million per year.

The HTF has been an essential source of funding for surface transportation research and technology (R&T) for decades. Research results have led to many benefits including: materials that improve the performance and durability of pavements and structures; design methods that reduce scour (and consequent threat of collapse) of bridges; intelligent transportation systems technologies that improve safety and reduce travel delay; methods and materials that radically improve our ability to keep roads safely open in severe winter weather; innovative management approaches that save time and money; analytical and design approaches that reduce environmental impacts and improve the aesthetic and cultural aspects of transportation facilities; and many more.

One key way to reduce the investment gap (the difference between HTF revenues and funding needs as outlined by the Conditions and Performance Report) is through research. Research outcomes can improve the performance and durability of transportation infrastructure, the results being reduced operations and maintenance costs and less frequent replacement of infrastructure elements thus reducing the life cycle cost of the infrastructure. This can only be accomplished through strong Federal leadership in transportation research. The Exploratory Advanced Research Program funded in the FAST Act has the potential to be the lead program in providing improved materials, designs, and processes that can transform the performance of the nation's surface transportation infrastructure.

Other research programs that can continue to contribute to the improvement of the highway system include the Federal Highway Administration's (FHWA) research and technology program, the National Cooperative Highway Research Program (NCHRP), and state department of transportation programs largely funded through State Planning and Research (SPR) funds. In the transit area, the main programs are those of the Federal Transit Administration (FTA) and the Transit Cooperative Research Program (TCRP). The University Transportation Centers (UTC) program supports research across most transportation modes.

ASCE strongly supports avoidance of earmarking in Federal research programs and endorses free and open competition among non-Federal entities to perform research utilizing Federal funding.

Within the context of the general principles set out above, ASCE supports the following actions regarding specific surface transportation R&T programs:

- Funding for the research and technology portion of the State Planning and Research (SPR) program should be maintained to help support state-specific activities while continuing to encourage the states to pool these resources to address matters of mutual interest.
- University research should continue to be supported through the University Transportation Centers (UTC) program using a competitive selection process that guarantees quality participants and fairness in the allocation of funds.
- Examine and support the findings included in the National Academies of Sciences, Engineering, and Medicine, Committee for a Study of the Future Interstate Highway System, and the Transportation Research Board (TRB) congressionally mandated report entitled, "Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future."

- Based on the success of the Strategic Highway Research Program (SHRP II), we should continue to ensure that critical research and implementation of research be part, in key areas, of surface transportation.
- The Federal Transit Administration's (FTA) research program should be free of earmarks and allocations and given flexibility to work with its stakeholders to develop and pursue national transit research priorities.
- The Transit Cooperative Research Program should be authorized at a minimum of \$20 million per year.
- The Research and Innovative Technology Administration (RITA) should have a well-defined scope and responsibility and appropriate funding, in addition to currently authorized research funding, so that it may supplement and support the R & T programs of the modal administrations.

IV. Enhancing Infrastructure Delivery

Key Components:

- **Expedited Project Decision Making**
- **Expedited Project Delivery**
- **Support Performance-Based Ownership of Infrastructure**
- **Procurement of A/E Services**
- **Core Competencies of Government Agencies**
- **Demand Transparency for the American Taxpayers**

ASCE applauds the array of provisions contained in the FAST Act to increase innovation and improve efficiency, effectiveness, and accountability in the planning, design, engineering, construction, and financing of surface transportation projects. Congress must now provide oversight to ensure that the changes to the law are implemented and the US DOT will need to interpret the language and seek input from relevant stakeholders.

Expedited Project Decision Making

While the goal of the FAST Act is a streamlined process, some of the statutory language is complex. Going forward, ASCE supports maintaining the progress made under the FAST Act on project delivery and recommends Congress take an active role to ensure that these changes are efficiently implemented.

Expedited Project Delivery

With structural, safety and service issues spurring the need for renewing, replacing and expanding an aging infrastructure, the nation's long-term economic vitality and quality of life will be affected by whether project planning, financing, and delivery systems can keep up the necessary pace.

Expedited project delivery can be achieved by reforming processes for planning, financing, and delivery of infrastructure, and doing so in a way that retains and builds upon vitally important and successful principles and practices. For example, improving the environmental review process cannot be at the expense of protecting and enhancing environmental quality; streamlining project delivery cannot be at the price of weakening market forces, reducing competition, or project quality.

In order to expedite the delivery of surface transportation projects, ASCE supports the following recommendations as put forward by the ***National Surface Transportation Policy and Revenue Study Commission***:

- Revise Council of Environmental Quality regulations to allow additional factors to narrow the number of alternatives considered as “reasonable alternatives”:
 - Alternatives should be appropriate for project-level (rather than planning-level) decisions;
 - Alternatives should reflect community values; and
 - Alternatives should reflect funding realities.
- Standardize the “risk design” approach under Federal regulations so that project sponsors can proceed with design activities for any project during the environmental impact statement (EIS) process.

ASCE supports provisions in the FAST Act that work to expedite the project delivery process. These measures should now be implemented without further delay, including Sections 1304 and 1309.

Congressional action should strive for efficiency in delivering infrastructure projects to shorten delivery times and decrease costs. Through enhanced efficiency in project delivery, life-cycle cost principals should be implemented to ensure most effective use of provided revenue.

Support Performance-Based Ownership of Infrastructure

ASCE encourages the owners of surface transportation infrastructure, public and private, to become performance-based owners. We encourage the following:

- Use of performance-based standards for the procurement, design, operation, maintenance, and reuse/decommissioning of infrastructure;
- Use of infrastructure rating tools, such as the Institute of Sustainable Infrastructure's Envision, that encourage sustainable engineering practices and life-cycle performance of infrastructure projects;
- Inclusion of a comprehensive life-cycle cost analysis in the decision-making processes;
- Encouraging the use of innovative technologies; and
- Consideration of the effect of the overall resilience on the affected community.

ASCE believes that broad adoption of the principles of performance-based-ownership will lead to significant reductions in the life-cycle cost of surface transportation infrastructure, increased public safety, and improved sustainability.

Procurement of A/E Services

Qualifications-Based Selection (QBS) Procedures

ASCE believes that the selection of Professional Engineers as prime consultants and subcontractors should be based on the qualifications of the engineering firm. Qualifications including education, training, experience, past-performance, capabilities, personnel and workloads should be evaluated when selecting an engineering firm.

Cost of engineering services, while important and meriting careful negotiations, is related to work to be performed which often is not clearly defined at the time the engineer is selected. Therefore, selecting consultants based on cost is not recommended.

ASCE supports qualifications-based selection (QBS) procedures such as those specified by the Brooks Architect-Engineers Act of 1972, 40 U.S.C. 1101 et seq., the numerous similar state and local laws, and the American Bar Association's Model Procurement Code for State and Local Governments for the engagement of engineering services. ASCE recommends that the application of these procedures to the development of a scope of work and the selection, procurement and administration of contracts for engineering services be the responsibility of technically qualified staff of the project owner.

Design-Build Source-Selection Procedures

ASCE supports the use of QBS criteria when using the two-phase competitive source-selection process required by the Federal Acquisition Reform Act of 1996 (Pub.L.104-106) for design-build contracts awarded by government agencies. The Act clearly contemplates retaining the essential QBS concepts embodied in the Brooks Act and requires that the contracting agency ("owner") devote sufficient architectural and engineering (A/E) services to prepare the design-build solicitation (which must identify the disciplines needed in the design-build team), and to represent the owner's interests throughout the project duration. The contract between the owner and the design-build team must establish a means for direct communications between the owner and the designer, as well as communication with other team members. The owner should provide predetermined reimbursement to the firms selected to submit complete design-build proposals.

Core Competencies of Government Agencies

ASCE believes that as policy makers, regulators and owners that our government agencies must have the technical capacity to guide and deliver our infrastructure programs. In order for the United States to deliver a 21st century infrastructure system our government agencies at the Federal, states, and local levels must be fully staffed with competent Engineers, Scientists and Technical Specialists. Whether it is environmental review, writing policy, in-house design, managing consultants, program management, or as project owners our Public Sector plays an integral role in the delivery of surface transportation programs and projects which will only be enhanced by the continued employment of competent and experienced technical staffs.

Demand Transparency for the American Taxpayers

In an attempt to improve accountability of the federal programs to the American taxpayer, both the Moving Ahead for Progress in the 21st Century Act (MAP 21) (Sec. 1503 (c)) and the FAST Act (Sec. 1402) included provisions intended to improve transparency by providing real-time public information on the use of core federal highway and transit investments, as was the case for the American Recovery & Reinvestment Act of 2009. However, U.S. DOT has done little to effectively implement these provisions. Congress should order a status report on the Sec. 1402 provision, modify that section to include the creation of visual graphics and other user-friendly features that convey the status of the requested information for each given year (updated quarterly), and require U.S. DOT to provide members of Congress with the same notifications of new project awards for apportioned funds as is currently required for the discretionary grant programs.

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Approved by the Public Policy Committee on April 28, 2019

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