

THE U.S. INFRASTRUCTURE ADVANTAGE™



ASSOCIATION OF
EQUIPMENT MANUFACTURERS

INTRODUCTION

The backbone of America's economy is its infrastructure. To have the strongest, most resilient economy in the world, America must have the best infrastructure in the world. In short, we must have an *Infrastructure Advantage*.

America's competitors around the world understand this. They are making unprecedented infrastructure investments and working hard to overtake the United States. Meanwhile, America is underinvesting, and is on the verge of squandering the *Infrastructure Advantage* we inherited from the investments made by our grandparents and great-grandparents.

It is time for America to rebuild and modernize its vast infrastructure network—our roads, highways, bridges, transit systems, ports, waterways, locks and dams, water and wastewater pipelines, as well as broadband. We must renew and strengthen our Infrastructure Advantage if we are to have the world's preeminent economy in the 21st Century and beyond.

As equipment manufacturers representing the agriculture, construction, forestry, mining, and utility sectors in North America, several factors impact our ability to manufacture and sell our products to customers inside and outside of the United States. These factors include labor force skill, trade policies that facilitate commerce in overseas markets, and federal tax credits that boost reinvestment and expansion. Another important factor, which is the focus of this report, involves the maintenance and modernization of the U.S. infrastructure system.

What makes American manufacturers competitive is not so different from what makes the country economically competitive, and maintaining our infrastructure in a good and updated state of repair is yet another shared factor. In the 2016–2017 Global Competitiveness Report by the World Economic Forum, the United States remained in 3rd place behind Switzerland and Singapore. More ominously, the U.S. ranked 11th in infrastructure competitiveness, with the report noting that “stagnating productivity has called for a downward revision of growth prospects, highlighting the need for a renewed competitiveness agenda.”

If the United States is to remain a global economic leader, its infrastructure competitiveness ranking must be improved. The gradual demotion and stagnation of the United States' world infrastructure ranking is a direct consequence of an inability to strategically act on the opportunities that people, industry, and technology present in rethinking U.S. infrastructure.

This report makes the case for making U.S. infrastructure number one in the world and reclaiming the United States' *Infrastructure Advantage*. It outlines the consequence of not taking meaningful steps to regain this advantage, and offers five policy areas that lawmakers and infrastructure stakeholders should reference when considering infrastructure policy proposals for modernizing U.S. infrastructure and identifying a sustainable funding source. Rather than re-litigate our infrastructure problems, this document offers solutions and moves the conversation forward.

THE INFRASTRUCTURE ADVANTAGE

For the past two years, AEM and its member companies have sought opinions from a broad range of diverse infrastructure stakeholders. Based on this feedback it is clear that the United States must support and promote the following vision in order to reclaim its *Infrastructure Advantage*—the safe and efficient movement of people and goods, connectivity between and within rural and urban America, as well as strong economic growth and robust job creation. To effectively compete in the global marketplace, America's infrastructure must be the best in the world. That is the *Infrastructure Advantage*.

Why is the Infrastructure Advantage Important?

Rebuilding and modernizing America's core infrastructure to reestablish an *Infrastructure Advantage* is not only important, it is essential if the United States is to maintain its position as the world's strongest economy. It makes America more competitive internationally and puts domestic industry on the path to higher economic growth, greater productivity, and stronger private-sector job creation.

In today's global marketplace, U.S. companies must compete with companies from around the world, including ones located in countries with much lower labor costs and regulatory costs than the United States. This puts U.S. companies at a competitive disadvantage, and it creates incentives for U.S. companies to move their operations to countries with lower costs in order to compete more effectively.

To level the playing field, the United States must invest in strengthening its comparative advantages. The smartest area to do this is through the country's infrastructure system, which is central to international competitiveness. It is critical to moving goods, ideas, and workers quickly and efficiently and providing a safe, secure, and competitive climate for business operations.

Our competitors around the world understand this. They are spending enormous sums and expanding their infrastructure, with China and India leading the way.

Meanwhile, America is headed in the opposite direction. America's infrastructure was once the envy of the world and gave U.S. companies a big competitive boost in the international marketplace. But in recent years we have been underinvesting in our infrastructure, resulting in a decline in our roads and bridges, transit systems, air traffic control systems, airports, railroads, ports and dams, and water infrastructure.

If America's businesses are to grow and remain competitive, and if foreign investors are to invest in businesses in the United States, then America needs to reclaim its *Infrastructure Advantage*. America must modernize and rebuild its infrastructure so that it is once again the envy of the world and ranks first in infrastructure competitiveness.

China, India, and other countries with low labor and regulatory costs are looking to the future by building a 21st century infrastructure capable of supporting a strong 21st century economy. This should be a wake-up call for the United States. It is time to accept the challenge. It is time to rebuild and modernize our infrastructure to ensure that America's 21st century economy is the world's strongest economy.

In the short term, significant investment will be required to modernize and rebuild America's core infrastructure. This infrastructure investment will create tens of thousands of jobs across a range of industries.

In the long term, the most important economic impact of the investment needed to create the *Infrastructure Advantage* comes as the investments are completed. The economic benefits of this investment are long-term competitiveness, productivity, innovation, lower prices, and higher incomes.

CONSEQUENCES OF LOSING THE INFRASTRUCTURE ADVANTAGE

Every day Americans see the impact of underinvestment in our core infrastructure—congestion, potholes, transit outages, water main breaks, a sluggish economy, and the list goes on. This should not come as a surprise.

The United States is currently investing half of what it spent on transportation infrastructure more than 50 years ago as a percentage of the gross domestic product—close to 1.5% now compared with nearly 3% in the early 1960's.

America is at a crossroads. We either significantly increase investment in the infrastructure that has driven our economy in the past, or we continue to underinvest. If we increase our investment to levels sufficient to reclaim an *Infrastructure Advantage*, the benefits will be significant.

But what if we instead simply maintain the status quo?

Over time, these impacts will affect businesses' ability to provide well-paying jobs, further reducing incomes. If this investment gap is not addressed throughout the nation's infrastructure sectors by 2025, the economy is expected to lose almost \$4 trillion in GDP, resulting in a loss of 2.5 million jobs in 2025.ⁱ

Upon completion of the Interstate Highway System, business logistics costs, as a percentage of United States GDP, were cut in half with a decrease from 16 percent in 1980 to eight percent in 2014.ⁱⁱ Failure to maintain and upgrade this system over the past 37 years has instead increased transportation costs for a variety of products, across many sectors. Congestion caused by highway systems that are at capacity and in disrepair cause 141 million hours to be wasted in freight truck productivity.ⁱⁱⁱ

Failure to take meaningful action on upgrading United States infrastructure could also impact agricultural product transportation. Currently, America enjoys a trade surplus with its agricultural exports. However, steps are needed to repair and upgrade the locks and dams system along U.S. inland waterways. These waterways serve as critical transportation channels that alleviate congestion on roads and rail by transporting agriculture commodities such as corn and soybean. For example, the agriculture sector could hypothetically see a 40% decrease in economic activity as the result of just one major lock disruption along the Upper Mississippi River and Illinois Waterway.^{iv}

STEPS TO RECLAIM THE INFRASTRUCTURE ADVANTAGE

This report outlines five areas that should be leveraged in any plan to reclaim the United States' *Infrastructure Advantage*. Within each area, this report includes infrastructure-related policy and regulatory suggestions that could be leveraged to facilitate promotion and implementation.

Focus on Networks and Systems

To achieve maximum efficiencies and benefits, infrastructure must be addressed on a network-wide and system-wide basis. A "project here and project there" approach will not work. America must tackle its infrastructure problems on a bigger scale. For example, the Interstate Highway System would not have produced the economic benefits that it has if it was simply a series of disconnected segments. The benefits are derived from the fact that it is a connected network. The same can be said for our national rail network. And this is especially the case when talking about the movement of freight.

As manufacturers, AEM and its member companies understand the importance of timely and reliable delivery—both in the transportation of finished products as well as in the parts and pieces that go into manufacturing those final products. As such, any proposal or plan must consider the effective and safe movement of people and goods as a primary objective. This requires efficient and well-designed networks and systems.

In the short term, AEM supports future implementation of dedicated transportation funding and policies that specifically target intermodal—ship to train to truck—network bottlenecks such as what was included in the 2015 federal surface transportation reauthorization. Establishing a dedicated multimodal freight discretionary grant program will ensure that authorized funding will go to freight-focused projects only. Further, user fees generated from freight providers would go towards this dedicated revenue stream.

In the long-term, the creation of a dedicated freight network will facilitate more efficient movement of products and goods, and directly alleviate personal vehicle congestion. AEM and its member companies support the continued development and implementation of a national freight plan.



Bobcat

Headquartered in West Fargo, North Dakota, and

with U.S. manufacturing facilities in Bismarck, Gwinner, and Wahpeton, as well as Litchfield, Minnesota, and Statesville, North Carolina, Doosan Bobcat North America knows how reliant manufacturers are on the surrounding infrastructure system—both in getting raw materials to its facilities that produce loaders, excavators, utility work machines, hydraulic cylinders, as well as attachments for its heavy wheel loaders and excavators, but also getting those component parts and final products out to customers. That process must be efficient, cost-effective and reliable from start to finish.

“We depend on predicable and economical transportation and delivery options in getting our products and our attachments to domestic and overseas markets,” said Doosan Bobcat North America and Oceania President Rich Goldsbury. “The infrastructure advantage afforded by our facility locations was a principal factor in choosing where we expanded and located our U.S.-based manufacturing operations. In certain cases, our manufacturing facilities are operating along a two-lane highway. As we identify new markets and products lines, it will be critical for us to have a plan and adequate resources both at the state and federal level to build that supporting physical infrastructure so that operations continue smoothly and our product delivery to other facilities and our customers is seamless—both logistically and economically.”

Maximize Use of Smart Technology

The integration of technology and infrastructure is already underway, but that integration is currently being implemented without a broad strategic plan in place. AEM and its member companies support the development and implementation of a national plan to upgrade and retrofit existing infrastructure systems with the latest in smart infrastructure technology. The need for this is two-fold: 1) to ensure that U.S. infrastructure is equipped to capitalize on the benefits that will come with technological advancements in areas such as embedded sensors, Information and Communication Technology, automation, and unmanned aerial vehicle use, and 2) to ensure geographic parity across the country, particularly in rural areas.

In the short-term, the United States can help reassert its *Infrastructure Advantage* by auditing cross-agency research and development activities in the context of how they advance infrastructure innovation in this country. Currently, innovations are produced and assessed in silos and opportunities are missed. Collaborative policies need to be put in place that facilitate idea sharing and innovative partnerships across all agencies, levels of government, and the private sector.

In the long-term, authorization for new federally supported infrastructure construction, maintenance or repair efforts must be contingent upon plans for technological upgrades and infrastructure adaptation. For example, self-driving cars and the need for sensor implementation is paramount to fully leveraging our infrastructure in a way that takes advantage of the advancements being made in the technological space across a range of industries. Roads, highways, bridges, and pipelines can and should do more for users. Federal infrastructure policy should require states and localities to demonstrate their commitment to implementing smart infrastructure across all assets and modalities. Infrastructure policy must put a premium on next generation infrastructure that takes full advantage of technological advancements that improve upon how current and future assets perform.



As an innovation company with its corporate headquarters in Silicon Valley, and locations across the country, Trimble integrates the digital and physical worlds by combining the Internet of Things, sensor-based monitoring, automation and data analytics into transformative solutions in a wide range of sectors including construction, agriculture, utilities, and transportation. The functionality and effectiveness of Trimble data-enabled solutions rely on a robust deployment of an expansive and reliable broadband infrastructure. To be effective the broadband network must provide ubiquitous and reliable connectivity from locations as diverse as a highway in Los Angeles to a peanut farm in Sylvester, Georgia.

“Increasingly, infrastructure must be integrated with technologies such as GPS,” said Steve Berglund, Trimble’s CEO. “Updating infrastructure assets must involve retrofitting them with technology that is going to enhance connectivity and circumstantial awareness. The need will intensify with more widespread adoption of autonomous vehicles, precision farming techniques, and automated work tools and machines. Our updated infrastructure will need to provide extended utility by actively interacting with the other elements that increase productivity, improve safety, or enhance quality of life—whether they are our personal devices, our vehicles, or our tools and machines. The end result will be an infrastructure that is smarter both in terms of performance but also its upkeep.”

Ensure Rural-Urban Connectivity

Our transportation networks and systems must be developed and improved in a way that provides connectivity between and within urban and rural America. For example, it is rural America that feeds and fuels America. The food, fuel, and fiber produced in rural areas must, however, move to urban areas and to world markets. This only happens if America's transportation networks and systems provide connectivity. It is imperative that policies recognize this and act accordingly.

In the short-term, agriculture product transportation must not be overlooked, and future implementation and resource allocation of a national freight plan must involve other infrastructure assets beyond surface transportation such as waterways, rail, locks, dams and ports. These assets are also critical economic drivers and should be included in the freight funding category assigned in future surface transportation solutions.

In the long-term, a plan and commitment to ensure rural America is able to take full advantage of autonomous transportation and sensor technology must also be a part of a national infrastructure plan. Rural communities of populations of 50,000 or less stand to benefit from these technologies, as well as the broadband network they rely upon to function. Rural America must be included in any national plan to retrofit existing or new infrastructure with technologies such as embedded sensors. Much like the federal support needed for public works projects, adapting rural infrastructure to technological advancements must be a part of the next wave of ensuring parity and connectivity between urban and rural America.



As a global manufacturer of farm equipment such as combines, forage harvesters, balers, hay tools, and tractors, CLAAS North America not only manufactures equipment critical to agriculture production, an economic driver for rural communities, but also operates facilities in the very rural communities that rely on this equipment. It's a company that contributes doubly to the rural community.

"Rural infrastructure and the critical connectivity it provides in feeding America and the world is just one reason why it must be a part of a larger, national infrastructure plan," commented CLAAS Global Sales America President Leif Magnusson. "We look very closely at logistic costs when looking at the larger production picture, and if we can keep that cost lower it means that we can provide our product to our customers—farmers and ranchers in rural communities—at a more competitive price."

Broadband connectivity is also an important infrastructure component when considering rural development planning. The Internet of Things (IoT) is transforming agriculture and working to help producers become more resourceful, sustainable, and productive. Closing the digital divide in rural America must be the focus of legislators and government agencies to enable rural communities to compete in the digital age.

"Well over 35% of rural America remains without fixed broadband support," said Magnusson. "We manufacture farm equipment that can transmit mission critical data for analytics that then turns into actionable decisions. Connected machinery, fleet vehicles, weather stations, and soil sensors are just some of the early stages of connected farm innovations taking place. The ingenuity of tomorrow's farm starts with the infrastructure investments of today."

Expedite Project Delivery

Modernizing and rebuilding America's core infrastructure is costly and takes time. Approvals today can take a decade, sometimes longer. Delay dramatically adds to costs, and prevents projects from getting off the drawing board. Delay also prolongs bottlenecks which waste time and energy, causing America to lag behind global competitors. The impact of keeping project delivery on time extends beyond the life cycle of a project, allowing for all industries to anticipate the economic benefits that come with infrastructure update and increased capacity.

In the short-term, Congress must tackle reforming existing and yet-to-be-determined regulations that impact the most pressing infrastructure assets. These include, but are not limited to, automated vehicle guidance, water and wastewater rehabilitation standards, and big data usage and privacy protection guidance. Tackling these regulations now will empower the private sector to continue to innovate. It will also provide state and local governments with helpful guidance in preparing for future federal funding opportunities.

In the long-term, AEM supports a two-year or less environmental approval process for future infrastructure project delivery plans. A legally enforceable deadline from approval of funds to a final permitting decision must complement this timeline so that project completion can be anticipated and appropriately planned for by state and local entities. AEM and its member companies support deputizing one agency to oversee large-scale, interstate infrastructure project approvals across all modalities and assets—from transportation to utilities.



Calder Brothers Corporation manufactures Mauldin Paving Products at its Taylors, South Carolina facility, offering a line of construction equipment such as asphalt pavers, asphalt distributors, motor graders, rollers, and water tank trucks—equipment that is integral in any road or highway worksite. In this case, manufacturer and contractor depend on a project approval and regulatory process that is streamlined and efficient.

“Predictability in project approvals over a multiyear horizon helps our customers determine if and when to place new orders, first and foremost,” commented Calder Brothers Corporation Executive Vice President Glen Calder. “If a contractor can reliably predict when projects will be approved, we both can plan accordingly to make sure they have the right equipment to handle these infrastructure challenges. Equally important is the confidence this multiyear predictably gives us as manufacturers to invest in research and development, as well as plan for future facility expansion and job growth.”

Provide Adequate and Reliable Resources

AEM and its member companies understand how important it is for U.S. infrastructure to have a funding mechanism that is reliably and responsibly resourced. As varied as infrastructure is, and as varied as its uses are, it is appropriate to consider multiple funding proposals based on the user, the mode, the product carried, and the frequency of use. What might work for highways may not work for waterways, and what is suitable for urban public transit may not be suitable for funding the infrastructure priorities of rural communities. As such, federal lawmakers must consider a range of options.

In the short-term, this should include the widespread adoption of user fees, such as a gas tax, for all publicly supported infrastructure assets, not just ports, waterways, toll roads, or high-occupancy-vehicle lanes in urban areas. The solvency of the Highway Trust Fund depends on identifying and supporting a sustainable funding solution.

In the long-term, AEM and its members support infrastructure financing policies that encourage partnerships with the private sector (P3s), and recognize that this must also be coupled with a strong federal investment, as many important and necessary projects are unable to generate a revenue stream sufficient to support P3 financing. In addition, one of the barriers to fully leveraging the P3 model is that not all 50 states have strong enabling legislation to fully facilitate these partnerships. While recognizing individual state and project needs, steps should be taken to standardize basic P3 enabling legislation at the state level.



With manufacturing facilities in Pella, Iowa, Vermeer Corporation produces a line of underground infrastructure solutions used on a range of utility infrastructure projects. These “unseen” infrastructure networks are critical to the ensuring urban and rural communities thrive. However, for

many of these underground networks, public funds are essential and badly needed to complete much-needed repairs and new installations, either as the sole source or as a means to leverage private investment.

“Just like with road and highway construction, the utility construction sector needs funding and financing certainty with its projects,” said Vermeer President and CEO Jason Andringa. “Utility infrastructure doesn’t always attract private investment and that’s why federal dollars play such an important role. Navigating a utility infrastructure project from start to finish requires using every option you have. This has to be the funding and financing approach we take to modernizing and repairing United States infrastructure.”

CONCLUSION

For the better part of a decade, stakeholders have painstakingly detailed the pitiful state of American infrastructure, highlighted the rising costs of inaction, and made continual appeals to decision makers at the federal level to do something—settling for piecemeal and short-term fixes—to stem the structural and functional decline of roads, bridges, ports, locks, dams, and water pipelines. Indeed, the path for the United States to retake the lead in the global infrastructure race appears steep.

What are the next steps in reclaiming the U.S. *Infrastructure Advantage* and making our infrastructure great once again?

AEM and equipment manufacturers will continue to push for a long-term plan to rebuild and modernize our infrastructure and help us reclaim the *Infrastructure Advantage*. This includes supporting efforts at the federal, state and local levels intended to make U.S. infrastructure the priority it should be.

On a parallel track, AEM and its member companies will urge lawmakers to consider the five policy priorities outlined in this document in short-term as well as long-term legislative efforts. It is time to stop restricting the policy making process to the question of funding the infrastructure systems of the 1980s and push forward with efforts to retrofit the existing system in a way that will ensure the safe and efficient movement of people and goods, facilitate connectivity between urban and rural America, and promote economic growth and job creation.

AEM and its member companies will continue to encourage greater dialogue and collaboration among a broad variety of infrastructure stakeholders about the next big national project, whether it is above or below ground, on a magnetic levitation guideway, an autonomous vehicle revolution, platooning trucks, or technological upgrades to our once-impressive network of intermodal assets. It is time for the United States to reclaim its *Infrastructure Advantage* and meet the needs of the 21st century global economy.

Endnotes

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ABOUT AEM

AEM is the North American based international trade association providing innovative business development resources to advance the off-road equipment manufacturing industry in the global marketplace. AEM membership comprises more than 950 companies and more than 200 product lines in the agriculture, construction, forestry, mining and utility sectors worldwide. AEM is headquartered in Milwaukee, Wisconsin, with offices in Washington, D.C.; Ottawa, Canada; and Beijing, China.

About The U.S. Infrastructure Advantage™

The U.S. *Infrastructure Advantage*™ was developed by a task force of executives from the equipment manufacturing industry after two years of engaging in discussions with, and soliciting ideas from, a wide range of infrastructure stakeholders. It will guide the strategic direction for AEM's ongoing infrastructure advocacy efforts and serve as a tool to assess infrastructure policy proposals at state and federal government levels. Those contributing include:

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