



# **Mobilizing Investment in America's Transportation Infrastructure**

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*Figure 1 Parts of the members of the Studio at Denver Union Station*

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# Table of Contents

- Executive Summary..... 1
- Chapter 1. Goals ..... 2
- Chapter 2. Current Situation..... 4
  - 2.1. Failing Structure..... 4
  - 2.2. Roads and Bridges ..... 5
  - 2.3. Mass Transit..... 6
  - 2.4. Inter-City Rail ..... 7
  - 2.5. Freight Rail ..... 8
  - 2.6. Inland Waterways ..... 9
  - 2.7. Ports ..... 10
  - 2.8. Aviation ..... 11
- Chapter 3. The Urgent Need..... 13
  - 3.1. Shortfalls in Funding at All Levels ..... 14
  - 3.2. Outsized Project Delivery Costs ..... 15
  - 3.3. Weak Decision Making..... 16
- Chapter 4. The Strategies..... 19
- Chapter 5. Case Studies ..... 22
  - 5.1. Transforming Mobility in Los Angeles..... 22
  - 5.2. Proposed Project Framework ..... 23
  - 5.3. Project Profile: Mobilizing Transportation Investment in Los Angeles..... 24
- Chapter 6. Conclusions..... 28

# Executive Summary

America urgently needs to invest in its infrastructure. This paper outlines the elements of a national transportation investment strategy for the United States. Key objectives for the research included achieving a state of good repair on existing transportation systems, adding new and innovative transportation capacity to the United States, anticipating the impact of emerging technologies and re-thinking government financing strategies and roles. Environmental impact and equity considerations were also the top priority.

The work of the research was informed by site visits to two US metro regions Denver and Los Angeles, each of which has created new urban and regional rail networks over the past two decades. The paper describes how successive mayors each advanced the vision while creating new funding streams to support transportation infrastructure investment. It also explores how these generation investments have shaped those cities and their metropolitan regions. And while the research focused on transportation and related urban development concerns, this was not just about moving people and goods—but rather about how successful infrastructure development strategies can address the broader range of urgent issues facing the country, including climate resilience, growing social, racial and spatial divisions and global competitiveness.

## Chapter 1. Goals

America needs a 21st - century transportation network that will *decongest the nation's cities and metropolitan regions*, increasing capacity across systems and getting people from point A to point B in less time. Transportation infrastructure should provide *ennobling and exhilarating experiences*, inspiring a sense of pride and ownership in the spaces where we travel. Transportation infrastructure should be *equitable and accessible*, connecting Americans to good jobs regardless of where they live. Transportation infrastructure should be *safe*; traveling throughout the community should not put people at risk. Transportation infrastructure should provide *carbon neutral* solutions that ensure a healthy future for our environment. Transportation infrastructure should promote *smart growth*, delivering new systems that maximize land use without creating urban sprawl.



**Friction-Free movement** means de-congesting all modes, eliminating the “first and last leg” challenge for transit passengers, and upgrading systems so that they are less prone to failures. It will require more excellent investment to achieve a state of good repair, additional capital to increase efficiency, the use of new technologies to quicken the speed of travel, and reformed institutions to manage and finance these systems.

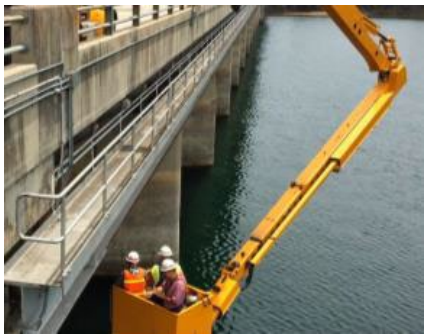


**Ennobling and exhilarating experiences** are shaped by design that inspires a sense of pride. Citizens must adopt a sense of ownership around transportation and appreciate the benefits of good design. New York’s Grand Central Terminal, London’s Saint Pancras International, and Denver Union Station show how transit stations can contribute to placemaking and enhance the identity of a particular place while generating value for investors.





**Equitable and accessible** transportation provides convenient travel options for all. In many places, low-income populations and communities of color possess fewer and more dangerous transportation choices. Strategic investments in bypassed cities and rural areas can also reduce their economic and social isolation. Improving access to quality transportation is an essential step towards greater financial prosperity for all these communities.



**Safe** transportation should remain a top priority for all governments, and the number of deaths related to automobiles should fall to zero. Americans must feel comfortable commuting to work – on foot, in a vehicle, or on transit – and state-of-the-art systems need to be engineered with the security of their users in mind.



**Carbon neutral** transportation means achieving net zero carbon emissions. Transportation is a massive source of carbon dioxide emissions in the US and around the globe, so it is imperative that communities tackle this pollution by limiting energy usage and using renewable energy sources when possible. The air we breathe and the water we drink depend on it.



**Promoting walkable, *transit-friendly development*** can increase transit ridership, reduce highway congestion, improve public health, reduce carbon production and expand affordable housing opportunities.

## Chapter 2. Current Situation

### 2.1. Failing Infrastructure

The decline of infrastructure in America has been well publicized in recent years - the United States received a D+ on the American Infrastructure Report Card from the American Society of Civil Engineers (ASCE) in 2017 and *Fortune Magazine* named 2016 “the deadliest year on American roads in nearly a decade” - and yet, little action has been taken to improve our transportation systems to even a state of good repair, let alone increase our capacity for moving people and goods.



As a result, Americans are suffering from the effects of an aged transportation network that can no longer meet modern demands. The ASCE estimates that the United States’ households lose \$3,400 in disposable income each year due to infrastructure deficiencies. On average, congestion alone costs drivers in the United States \$1,400 yearly, \$300 billion loss in productivity. In car-dependent cities like Los Angeles, drivers now annually spend 104 hours in rush-hour traffic jams. But cars are not just resulting in productivity losses; automobile crashes killed 40,000 Americans in 2016, a 14% increase since 2014, and each tank of gasoline burned has been estimated to create \$18.42 in health and climate costs.

Every aspect of our transportation system, moving people or moving goods, is outdated and congealed. By 2020, poor infrastructure across the nation will result in \$897 Billion in U.S. GDP losses. For the average American family, this means losses of \$1,060 per year or \$3 a day, and 877,000 fewer American jobs. For businesses, an additional \$430 Billion in transportation costs can be expected.

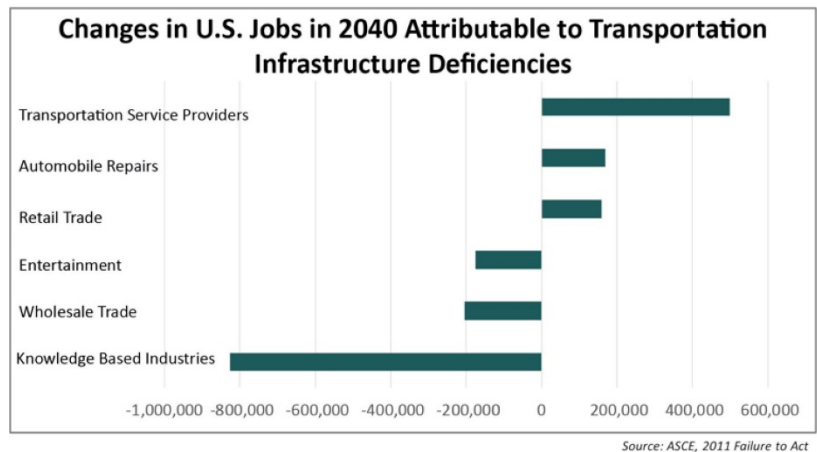


Figure 1 Changes in U.S. jobs attributable to transportation infrastructure deficiencies

## 2.2. Roads and Bridges

Roads are the most ubiquitous form of transportation infrastructure in the United States. Today, there are over 4.1 million miles of blacktop on which US drivers clock over 3.2 trillion miles yearly. Since President Eisenhower led the authorization for the national Interstate highway system in 1956 this limited access highway system has grown to 47,575 miles. However, this represents only about 1% of America's overall road infrastructure. Most roads are owned and operated at the local level, with local governments responsible for maintaining around 77% of the entire road infrastructure. Most American roads, representing about 71% of the total mileage, are also found in rural areas. Funding for road repairs primarily comes from taxes on gas and tolls from limited-access highways. At the Federal level, The Highway Trust Fund helps support road upkeep and is funded by an 18.4 cent per gallon tax on gasoline and a 24.4 cent per gallon tax on diesel. However, the federal gas tax has not been raised since 1993 and in 2015 Congress had to pass the Fixing America's Surface Transportation Act (FAST Act) to shore up the Trust Fund. Since 1993 39 states have raised gas taxes —5 of them in 2017 alone to cover the rising cost of maintaining highways.<sup>1</sup> With limited road funding, congestion is increasing and today the average American spends 42 hours in traffic every year. Poor road top conditions cost the average motorist over \$533 in repairs per year.



Figure 2 Surface Transportation Inventory

An essential part of America's road infrastructure is the bridges that allow for the crossing of challenging terrain. As of 2016, there were 614,387 bridges in the United States. Almost 246,000 of which are older than 50-years, the typical lifecycle for this type of infrastructure, and the average age is 43 years. Today 9.1% of bridges are structurally deficient, meaning that they are only able

<sup>1</sup> "States Raising Gas Taxes to Fund Transportation Improvements." Fox News. Accessed June 05, 2018. <http://www.foxnews.com/politics/2017/06/20/states-raising-gas-taxes-to-fund-transportation-improvements.html>.

to carry a limited capacity or have the potential to be closed in the future, significantly affecting travel times for both logistics and personal vehicles. The American Society of Civil Engineers estimates that there is an \$836 billion backlog in capital needs to support roads and bridges in the country.<sup>2</sup>

### 2.3. Mass Transit

American cities have seen considerable increases in the usage of their transit systems over the past 20 years. Nationally, buses are the most common type of public transit and account for roughly half of the 10.5 billion passenger trips in 2015. There are only 12 rapid transit metro systems in the United States, including the Tren Urbano in Puerto Rico. However, most of these legacy systems are a century or older. Many need massive investments to return them to a state of good

repair. Even the systems built in the post-World War II era, including the Washington and Los Angeles Metro systems, require significant new investments to maintain service standards. In recent years, many more cities have built or are building light and regional rail systems to accommodate growing populations.

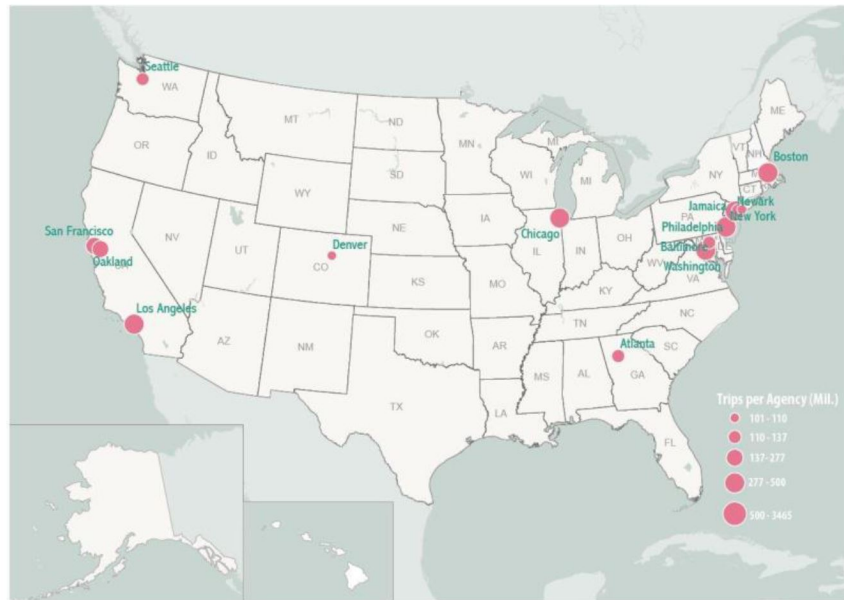


Figure 3 Mass Transit Inventory

Because of this, the linear distance of public transit routes has increased by over 26% over the last decade. This is primarily due to significant increases in light and regional rail systems. It is also not just urban areas that have seen growth in public transit, and rural areas are also increasingly served by commuter buses and paratransit shuttles. However, over 51% of Americans cannot currently get to a grocery store using public transit despite nation-wide urbanization trends.

<sup>2</sup> ASCE, “Roads”, Infrastructure Report Card, 2017.; American Trucking Associations, Reports, Trends & Statistics, 2017.

Many urban infrastructure systems are experiencing demand above and beyond what they were designed for. Typically, transportation agencies rely on local, state, or federal funds to supplement fair-box revenue which usually only accounts for 45% of needed operating expenses. However, many transit agencies are chronically underfunded, and that has led to over 30% of the nation’s mass transit tracks and stations not being in a “state of good repair.” The American Society of Civil Engineers estimates that mass transit will need over \$122 billion in investment by 2032<sup>3</sup>.

## 2.4. Inter-City Rail

Despite the size of the freight rail system, Amtrak only owns 623 miles of track, mostly in the Northeast Corridor, and the Alaska Railroad only owns 470 miles, all in Alaska. While the Alaska Railroad only operates on its own tracks, to provide national service Amtrak relies on over 20,000 miles of freight rail right of ways to reach over 500 communities and 46 out of the 48 contiguous states. Because of this, Amtrak is dependent on freight rail maintenance and scheduling to provide useful service to consumers, and many of the national routes face significant delays due to freight rail prioritization.

While the current passenger rail system in the United States is government-owned, there are several private high-speed rail (HSR) companies looking

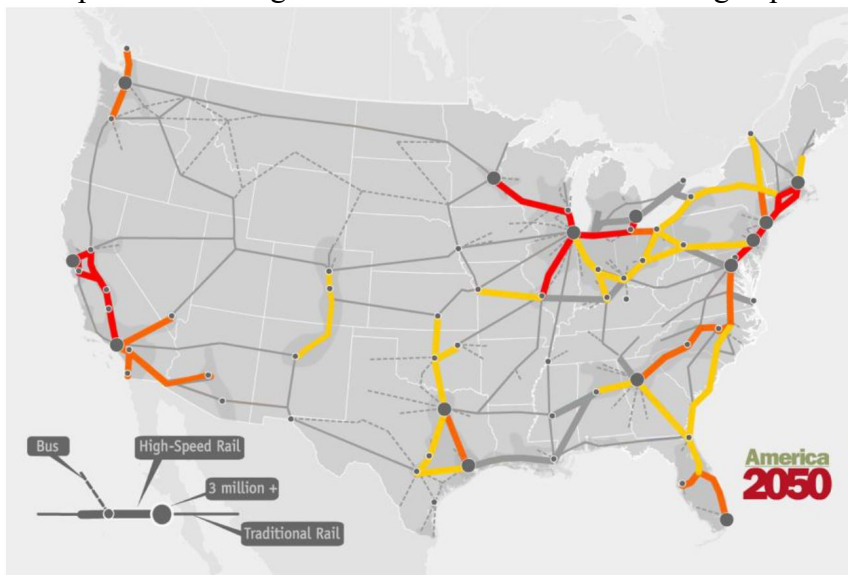


Figure 4 America 2050's proposed national high-speed and inter-city rail network

to start service in some key corridors—including the Los Angeles-Los Vegas, Miami to Orlando and Dallas to Houston corridors—that could bring outside capital to these corridors. Moreover, while the State of California has initiated the construction of a statewide HSR system, the completion of this system has been deferred by the state’s new governor. This system will probably not be completed until there is a renewed federal commitment to HSR.

<sup>3</sup> ASCE, “Transit”, Infrastructure Report Card, 2017.



On its Northeast Corridor route, Amtrak must address an extensive backlog of deferred maintenance on this 100+ year old system. Recently, Amtrak has covered over 94% of its operating costs from revenue and state subsidies alone. Federal funding only accounts for 6% of Amtrak’s yearly budget, but this number is increasingly shrinking despite the need for capital investments to cover growing ridership. In 2017, Amtrak ridership increased by 1.5% to includes over 31.2 million passengers. Even though rail accidents have decreased in number and severity in the last decade, recent accidents have also shown the need to speed up the adoption of positive train control, another capital cost that Amtrak must contend with. Experts estimate that Amtrak will need to spend over \$28 billion to get to a state of excellent repair without expanding capacity.<sup>456</sup>

### 2.5. Freight Rail

America has some of the best freight rail infrastructures of any country. In terms of size, there are more than 140,000 miles of track and 538 railroad companies operating in the country. There are three classifications of freight rail, Class I (revenues of more than \$433.2 million), Class II (regionally sized), and Class III (local). Class I rails account for the majority of rail traffic in the

United States, making up almost 70% of total freight rail mileage. The size of the current rail system is adequate for meeting current demand, and Class I rail can increase capacity on current routes by using double stack containers. However, there are several bottlenecks in the existing freight rail network, many of them in large cities such as

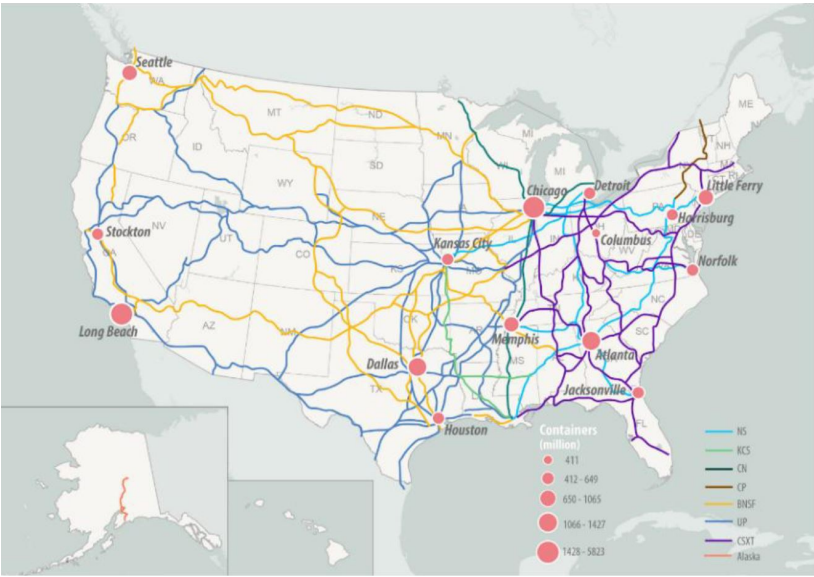


Figure 5 Freight Rail Inventory

Chicago and New York. Further, as traffic has increased, rail companies have and need to invest

<sup>4</sup> ASCE, “Rail”, Infrastructure Report Card, 2017.  
<sup>5</sup> Amtrak National Facts, Amtrak, 2018.  
<sup>6</sup> Railroad At a Glance, Alaska Railroad, 2017.

in intermodal facilities. These include connections to trucks, ships, and dry ports where freight containers can be exchanged and stored. The Federal Railroad Administration expects freight rail traffic to increase by 40% through 2040 and the Class I railroads will need to invest a significant amount of capital in upgrading systems to meet federal affirmative train control requirements.

Funding for Class I freight rail systems in the United States comes from mostly private investment and cash flow from the rail companies. However, Class II and Class III railroads often require state and local funding to support upgrades to tracks and bridges. These railroads often serve more rural and remote communities and provide a vital link for farmers and local manufacturers seeking to enter national and global markets. It is estimated that regional and local railroads will need an additional \$5.3 billion to support their upgrade efforts.<sup>7</sup>

## 2.6. Inland Waterways

The United States' inland waterway system includes over 25,000 miles of navigable waterways and connects 38 states to global markets. Yearly, over \$229 billion of goods and 14% of America's domestic freight are transported across America's heartland to ports near and far. The Army Corp of Engineers directly controls almost half of these navigable waterways. Funded by a \$0.29/gallon tax on barge fuel, the US Army Corp of Engineers is responsible for dredging channels and maintaining 237 lock chambers across 191 lock sites. Notable channels include the Great Lakes, the Hudson River, and the Missouri, Ohio, Tennessee and Mississippi Rivers, as well as dredged shipping routes to coastal ports like Savannah and Philadelphia. Significant inland ports include Memphis, St. Louis, and Chicago, among others. Due to natural geology and landscape, most of the nation's inland waterways are in the eastern half of the country.

However, many of the channels need to be dredged, and most locks are beyond their anticipated 50-year lifecycle. This means that vessels are often delayed, and the 2017 Making the Grade report by the ASCE estimates that the average delay per lock was 121 minutes in 2014. Over 49% of vessels experience delays while navigating the inland waterway. As of 2017, the system is

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<sup>7</sup> Association of American Railroads, Overview of America's Freight Railroads, 2017.; ASCE, "Railroads", Infrastructure Report Card, 2017. FRA, Freight Rail Overview.

estimated to require \$4.9 billion in investment coming almost entirely from the Federal government, as the primary operator.<sup>8</sup>

## 2.7. Ports

The United States' has over 900 commercial ports currently in operation, spread across both the mainland and island territories. These ports are the country's primary logistical connection to the world, and over 99% of the country's global trade passes through them. Yearly, ports contribute \$4.6 trillion in economic activity. However, increases in demand for global businesses have forced ports to expand rapidly in recent years. The American Association of Port Authorities estimates that most major cargo ports in the United States will see double the traffic that they were designed to handle. At the same time, cargo ships are only getting larger, forcing many ports to take up

expensive dredging operations to accommodate the drafts of the post-PANAMAX ships. Typically, this work is supported by the Army Corps of Engineers and paid for from the Harbor Maintenance Trust Fund, which is funded by a 0.125% fee on the value of each imported shipping container.

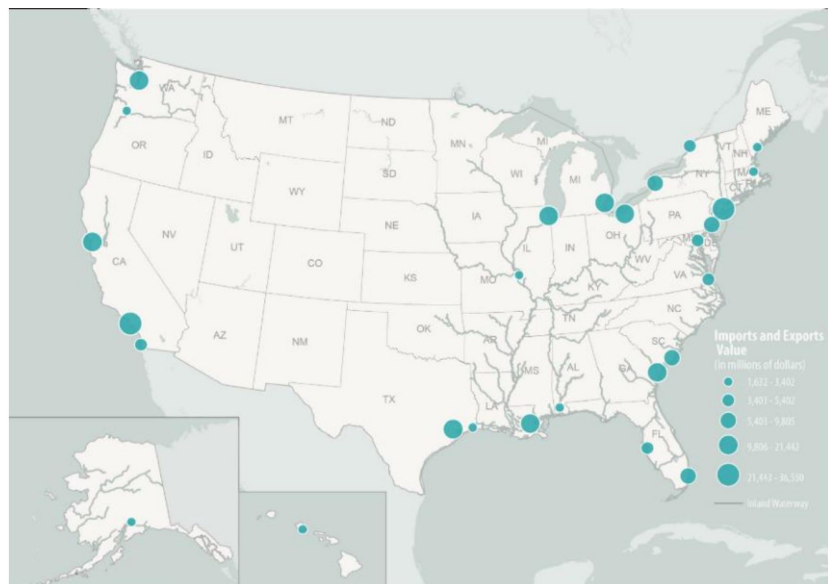


Figure 6 Ports and inland waterways inventory

To remain economically viable in an increasingly competitive global environment, American ports need to invest more than ever in both land and water connections. Congestion at land-side intermodal connections has decreased port productivity by over 25% in recent years, and it is estimated that mitigating this congestion would require almost \$30 billion in investment across the country. Similarly, it is estimated that at a national scale, ports will need to invest over \$150 billion

<sup>8</sup> ASCE, "Inland Waterways", Infrastructure Report Card, 2017.



in modernization and repairs on existing infrastructure. Notably, this number does not account for the costs of mitigating rising sea levels, which could cost an additional \$1.2 billion per port.<sup>9</sup>

## 2.8. Aviation

Airports provide a valuable link for residents in the United States who want to reach foreign countries or even travel across America. Civil aviation has been one of the most reliable drivers of national GDP and has accounted for over 5.4% of GDP growth in the past. In the United States, there are over 3,345 airports, but only 514 have true commercial service. While over 2 million passengers fly every day in the United States, airports also need to accommodate expanding air cargo demand. Air cargo accounts for 27% of the country’s exports by value. Increases in passenger and freight demand have led to delays at many US airports, and the majority of future airport spending needs to be directed to terminal and cargo facilities rather than to runways. Funding for airports typically comes at the local level from general airport revenue, as well as general obligation bonds and grants. Airports can also collect a Passenger Facility Charge for every passenger, but this has been capped at a maximum of \$4.50/passenger since 2000. Additionally, congested airports may charge landing and/or gate fees on landing aircraft.

As air travel in the United States continues to increase, there is also a need to invest in NextGen air traffic control. Numerous proposals have been put forth for how this can be done safely and in a cost-effective manner, including turning over the country’s air traffic control to a proposed newly formed non-profit organization. Yearly, the

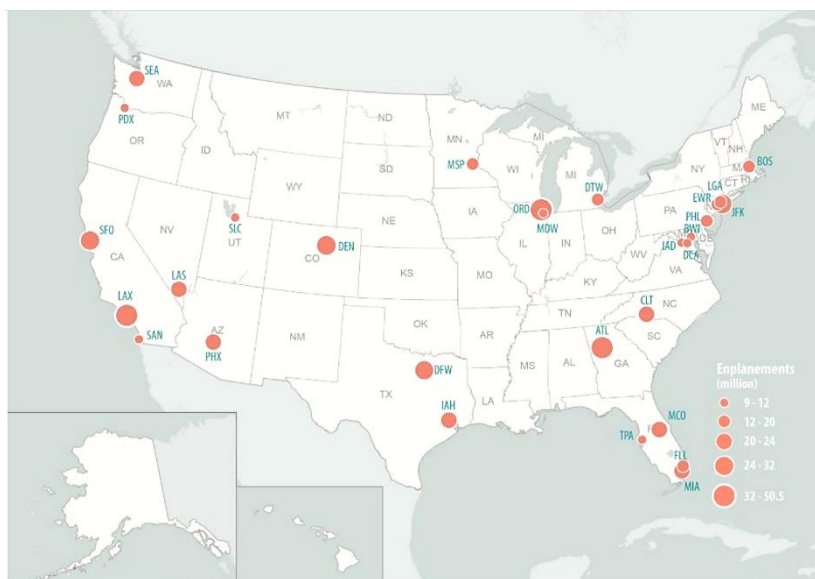


Figure 7 Aviation inventory

<sup>9</sup> A7SCE, “Ports”, Infrastructure Report Card, 2017.; Austin Becker, David Newell, Martin Fischer, and Ben Schwegler, “Will Ports Become Forts?”, Terra et Aqua, 2011.

Federal Aviation Administration spends \$7 billion on air traffic control and over \$1 billion on enforcing safety standards. NextGen would rely on GPS satellite technology, instead of today's radar-based system, easing airspace congestion and increasing safety. Implementing NextGen is expected to cost the public \$13.6 billion and airlines \$15 billion in updates to new cockpit technology, all to be completed by 2025.<sup>10</sup>

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<sup>10</sup> ASCE, "Aviation", Infrastructure Report Card, 2017.; FAA, The Economic Impact of Civil Aviation on the U.S. Economy, 2016.; FAA, Passenger Facility Charge Program, 2017.

## **Chapter 3. The Urgent Need**

America urgently needs to invest in its infrastructure to fix the calamitous state of its rails, roads, bridges, highways, streets, airports, and ports. Decades of disinvestment and increases in population and economic activity have resulted in a system that is already in poor condition and rapidly deteriorating further, creating unsafe conditions for Americans and limiting the capacity for future economic growth. These deteriorated systems exacerbate income inequality and add to already long journeys to work. Despite a series of public and private commission reports on this situation over many years, there has been little progress in Washington to marshal funds for new and increasingly essential investments. Mobilizing to design and implement solutions to this challenge is urgently needed to ensure that America can compete globally and sustain economic opportunity and quality of life for current and future generations.

It has been more than six decades since the United States adopted a long-range, nationwide infrastructure strategy. Since then, federal funding, both in absolute terms and as a share of GDP, has fallen to levels not seen since the 1920s. Americans everywhere are suffering from the effects of inaction, and there is no indication that conditions will improve anytime soon. Our goal is to outline a “game plan” that can break this political gridlock.

Today’s infrastructure quagmire is the result of a broad range of funding, regulatory, risk management, and political challenges. The three greatest failures are:

### 3.1 Shortfalls in finance at all levels

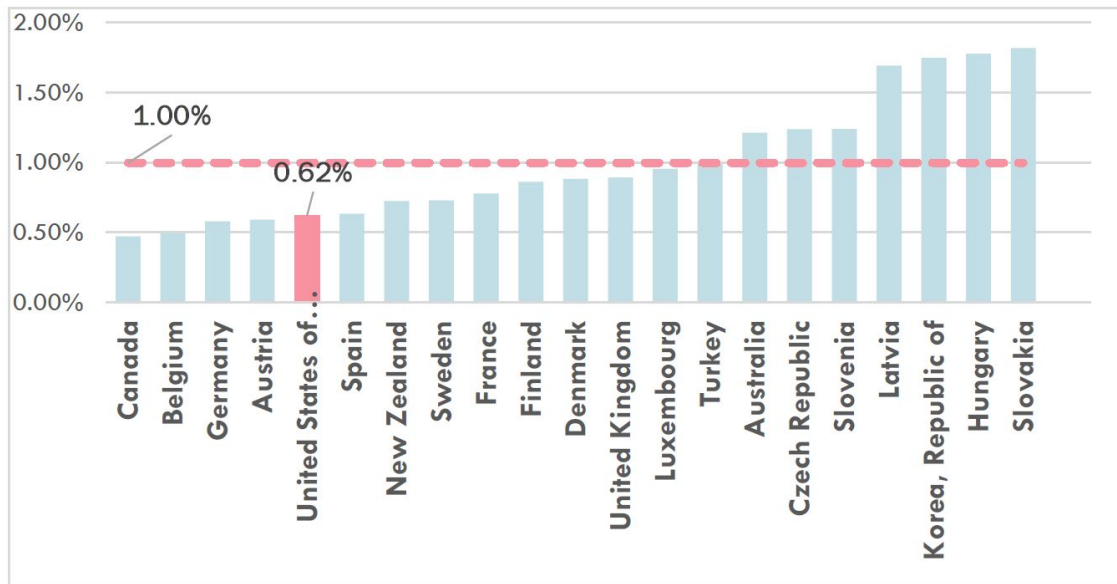


Figure 8 Infrastructure spending as a % of GDP

In 2015, the United States spent 0.6% of its GDP on gross capital investment in inland road, rail, and waterway transportation infrastructure. This paltry share of GDP represents approximately half of the OECD average of 1%, and one tenth of China’s commitment, 5.3%.

According to the ASCE, the United States needs to commit an additional \$2 trillion to achieve a state of good repair throughout its transportation infrastructure and earn a grade of B by 2025. Even though Congress and some states have recently made efforts to increase spending, a funding gap of \$1.2 trillion remains. To minimize further economic consequences facing individuals, families, businesses, and the national economy, Congress must invest an additional \$206 billion each year. This is far in excess of the \$20 billion per year, 10-year investment proposed by the White House in its 2018 infrastructure proposal.

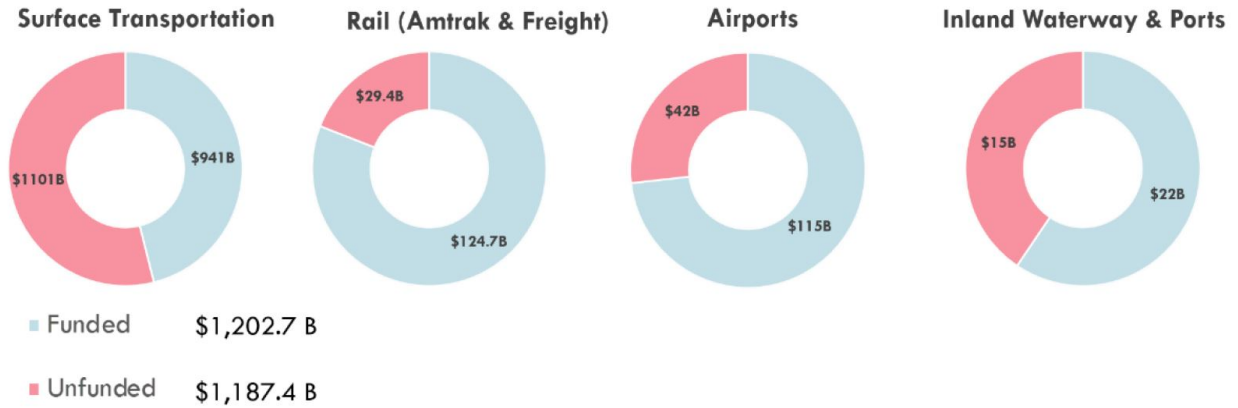


Figure 9 ASCE \$1.2 Trillion 10 Year Investment Gap for State of Good Repair

### 3.2 Outsized project delivery costs

Delivery of major infrastructure projects in the US is costlier than any other major country in the world. The cost of project delivery is tied to multiple factors, including a “start-and-stop” funding process and inefficient permitting and procurement procedures and archaic labor practices and union work rules. Secondly, the National Environmental Protection Act (NEPA), results in a process with an average cost of \$1.4 million and processing time of 4.6 years. Also, American delivery models are overly restrictive. Relatively few states have enabling legislation or provide support for innovative delivery models like DB, DBOM, or P3s (Design-Build, Design-Build-Operate-Maintain, and Public-Private Partnerships, respectively), which have been demonstrated as efficient models when used effectively. And finally, excessive red tape for projects accepting federal or state dollars can create projects where the additional federal funds are accompanied by arduous auditing, labor and other requirements that add considerably to the time and cost required to deliver projects.

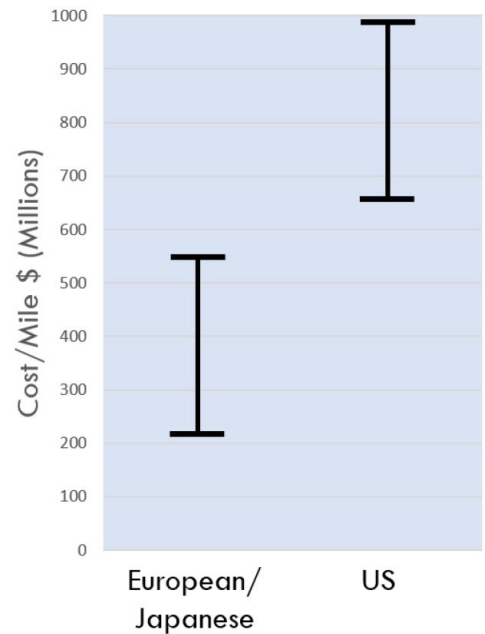


Figure 10 Typical range of subway construction costs

### 3.3 Weak decision making

Two decision-making problems also compromise today's infrastructure: first, the tendency for government to prioritize projects over programs; and second, the reluctance to adopt innovative engineering, procurement, and project delivery procedures. These challenges hinder our ability to make these investments in a timely and cost-effective manner. On America's second most congested road, Houston's Katy Freeway, for example, additional travel lanes have been added to reduce congestion. In 2009, it reached 26 lanes. Travel time decreased right after each additional lane was added. However, because of induced demand, travel using the Katy Freeway now takes even longer than it did before widening projects were completed.

This reactive approach to infrastructure investment is costly, ineffective, and results in poorly-conceived projects. Doing nothing or postponing action results in greater spending over the long term and foregoes many social and economic benefits.

Specifically, several aspects of current decision-making processes add considerably to the cost and time required to deliver major infrastructure investments:

- Failure to fund or finance capital assets at the federal level defers benefits;
- Poorly-conceived and managed environmental and other permitting processes waste money and degrade the environment;
- Conventional forms of project delivery extend construction times for years and add considerably to already high costs;
- Inadequate risk management also contributes to higher prices and schedule slippages;
- In the absence of federal leadership, governments at all levels continue to postpone and defer vital infrastructure investments

In New York City, which benefits from the nation's largest urban transit system, ride-hailing vehicles now outnumber yellow cabs by a factor of five and trips via ride-hailing giant Uber surpass those of taxis. Together with more jobs, reduced bus ridership, and improvements for pedestrians, car sharing services are contributing to the fact that Manhattan traffic moves at half

the speed than it did a decade ago. In 2019, extreme and growing levels of congestion led New York State's legislature to authorize adoption of a new congestion pricing system in the city's Manhattan central business district.

The United States needs new, bold thinking about the future of America's mobility system. Not since the passage of the National Defense Interstate Highway Act in 1956 has there been a long-range vision for the nation's mobility system. Since then, the nation's population and the number of automobiles on the roads have more than doubled, while the economy has increased more than five-fold. In the absence of a vision for the future of the nation's roads, rails, airports, and other systems, we have endured decades of disinvestment in existing infrastructure systems and underinvestment in new capacity, which is desperately needed to accommodate the nation's projected population and economic growth while also increasing equity in access to transit.

To generate support for greater investment in transportation, Americans need to recognize that the per person cost of building and maintaining infrastructure far exceeds the charges users now incur. Looking forward, Americans will need to pay for the investments from which they directly benefit. They will also need to invest in essential transportation systems that can rebuild the economy of bypassed cities, regions and rural areas across the country. Other cross-subsidies will be required to achieve equity and inclusion as well as improved economic and environmental outcomes. Greater mobility for all Americans will result in enhanced access to jobs and affordable housing, benefitting the nation as a whole.

To achieve these ambitious goals, leaders across the United States will need to advance new strategies to guide the design and implementation of infrastructure initiatives. These strategies will need to facilitate intergovernmental actions by stimulating the creation of new financing and delivery agencies. And they will need to recognize that benefits will not be fully realized without an intertwining of transportation funds and land use policies and a focus on achieving greater transit equality and environmental justice.

These strategies must consider the following questions:

- How should the federal role be redefined? How can it best complement local, regional and state initiatives?
- Through what policies and tools will can the federal government provide essential leadership in a system in which most infrastructure investments will continue to be defined, delivered and managed by governments at the local, regional, and megaregional levels?
- What are the incentives, grants, loans, guarantees, credit enhancement that only the federal government can provide?
- What are the tasks that only the federal government can do?



## Chapter 4. The Strategies

We are long overdue for bold thinking about the future of America’s mobility system, and it’s time to get back on track. We propose 10 strategies to mobilize investment in transportation infrastructure:

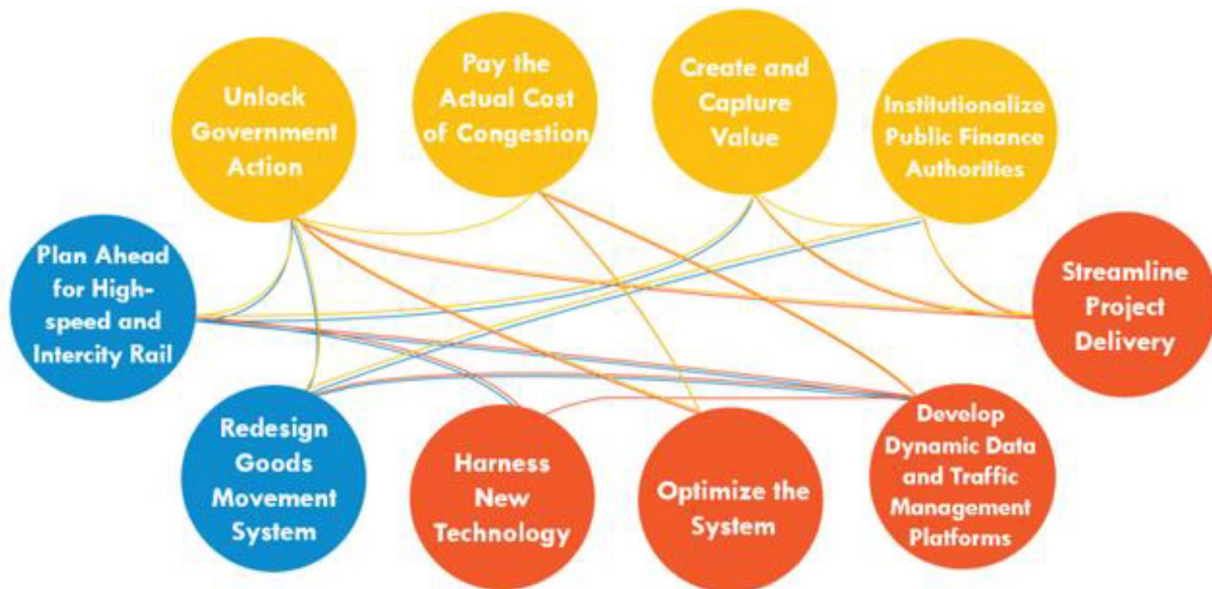


Figure 11 Ten strategies

### The first four strategies address Funding:

1. *Getting Federal Funding Right:* The Federal Government must take bold action to invest in infrastructure and provide powerful policies and incentives to encourage parallel steps by states and local governments. Private capital can be useful, but only under specific conditions; it is not a panacea. Making congressionally designated spending for infrastructure predevelopment and planning could be used as a planning tool to secure long-term funding from multiple sources.
2. *Pay the Actual Cost of Congestion:* Drivers must pay the actual cost of traffic. This strategy calls for the creation of congestion management systems to address ever-worsening traffic jams. Its success lies in its capacity to use taxes, fees, and tolling to reduce extreme

highway congestion and to use the funds generated in the capital and operating subsidies for transit alternatives, setting in motion a virtuous cycle of transportation efficiency.

3. *Create and Capture Value*: After decades of disinvestment in most American cities, a renewed interest in urban centers highlights the economic potential of American cities. By focusing on train stations as a focal point for value creation, cities can propose new transit systems and public realm improvements to be financed through capturing a portion of the value created.
4. *Institutionalize Public Finance Authorities*: Communities across the United States should institutionalize public finance authorities that can finance and deliver infrastructure investments. This will provide a path for the creation of a market with sustained “deal flow” for large-scale private sector funding and direct public funding of infrastructure and economic development.

**The next three address Efficiency:**

5. *Streamline Project Delivery*: Governments must combine multiple project delivery methods to expedite project implementation, streamline costs, and improve outcomes. The use of special purpose project delivery authorities is a proven method for implementing projects on time and budget.
6. *Develop Dynamic Open Data and Traffic Management Platforms*: Real-time transportation data platforms will enable Americans, as individuals, communities, businesses, and enterprises to make empirical decisions and empower transit riders while informing dynamic traffic management.
7. *Harness New Technology*: We must integrate Transportation Network Companies into public transit, incentivize supporting infrastructure for AVs & EVs, and charge TNCs, AVs, and EVs to use public roads. The Federal government should be responsible for developing system guidelines and recommendation.

8. *Optimize the System:* Our studio proposes merging modal silos in transportation agencies at the federal, state and local levels into a single entity through which transportation funding, decisions, and management operations. A one-stop-shop for all transportation business optimizes the public benefits of transportation investment.

**The last two express the need for Vision:**

9. *Redesign America's Goods Movement System:* A robust and reliable freight transport network is critical for the nation's economy. Different freight transportation modes include freight rails, inland waterways, trucking and freight airlines.
10. *Plan Ahead for High-speed and Intercity Rail:* America must develop a long-term framework for high-speed rail in the United States, funded predominantly by the federal government. High-speed rail can connect regions, promote megaregional economies and labor markets, bolster underperforming areas, and provide talent with greater access to jobs and housing. High-performance rail networks can link cities with HSR lines and to each other, rebuilding economic potential in bypassed places across the country.

## Chapter 5. Case Studies

### 5.1. Transforming Mobility in Los Angeles



*Figure 12 Traffic in Los Angeles*

The Los Angeles region provides a template for the transportation issues and opportunities facing regions across the country. With 18.7 million residents as of 2015, LA is America's second largest metropolitan region and is projected to add 3.4 million residents by 2040 in a region that already has the world's most highly congested roadway network.

In response to these challenges, LA has advanced an ambitious program to build an urban and regional rail network virtually from scratch over the past quarter-century, financed mostly by taxes authorized through voter initiatives. It has also created a new national model for infrastructure finance: Enhanced Infrastructure Finance Districts (EIFD) which provide creative and flexible financing for these investments. Despite adopting a \$100 billion transportation investment plan, however, LA still cannot afford to modernize and expand this system sufficiently to meet current and projected transportation demand and reduce highway congestion. This underscores the need

for significant new federal matching funds for these investments and a creative new approach to expand regional funding, attract new transit ridership, and reduce construction and operating costs.

New federal funds and a new approach to the design and use of transit stations can help resolve LA's transportation issues and, more generally, those of America's other large metropolitan regions and megaregions. Specifically, strategic investments in LA Union Station and the Metrolink Regional Rail system, with a focus on the I-5 corridor, have the potential to leverage the 10 strategies described in this report to address the transportation needs of the Los Angeles region. Though each component - high-quality design and high-quality transportation service - should stand on its own merits, the interaction of a new Station and an enhanced Metrolink network will produce the most significant possible impact. The realization of these projects could become a model for well-designed infrastructure investments across America. Other U.S. regions are already facing, or will soon face, similar challenges and could learn from these proposed innovations to meet America's infrastructure needs.

## 5.2. Proposed Project Framework

The studio proposes a redefinition of the categories of project funding to align better decision-making, funding/financing, and governance with the geographies where problems occur, and benefits accrue. Here are the proposed definitions:

- **National projects**, defined as federal systems spanning multiple states;
- **Projects of National Significance**, including specific projects that have significant GDP impact and benefit 25% or more of the national population;
- **Megaregional** consisting of infrastructure connecting large networks of metropolitan regions that share environmental, infrastructure, and economic systems within an identified megaregion;
- **State** projects, including transportation under the jurisdiction of a single state;
- **Multi-state** projects, or those requiring the cooperation of multiple states;
- **Regional** projects, connecting larger metropolitan areas to smaller cities, surrounding suburbs, and exurbs;
- **Local** projects, including transportation infrastructure aimed at site-specific; neighborhood, or district geographies; and

- Projects in **rural and bypassed areas**, including projects addressing economic development goals in underperforming areas.

America's infrastructure urgently needs new strategies targeting funding, efficiency, and vision for the next generation. A complete overhaul of the infrastructure planning and procurement process is required to lower costs and speed delivery of needed projects. The time for investment is now.

### 5.3. Project Profile: Mobilizing Transportation Investment in Los Angeles

To resolve the issues impeding the free-flow of traffic on our major systems, the nation needs a new, comprehensive approach its transportation investments—one that increases funding for system improvements and that provides better solutions for significant transportation nodes. This report proposes ten strategies as part of this comprehensive approach and, in the following section, it profiles two proposed projects that illustrate how these strategies, as well as some fundamental design principles, would combine to achieve our transportation goals. Both projects are in Los Angeles, a city whose transportation issues mirror those of the entire country.

The first project profile—Los Angeles Union Station—shows how this historic but underperforming transit center and its surrounding district can be transformed into a destination and a focal point for the region's future economic development. This his project will promote transit use and enhance the economic vitality of its surrounding neighborhood by spurring new development and providing connections to nearby attractions. The proposed station development plan aims to accommodate expected ridership growth, provide an ennobling and exhilarating experience for passengers and visitors, craft a focal point for the region's future economic development and urban identity, and support a less automobile reliant Los Angeles lifestyle. Aiming to reestablish transit's position in the popular imagination, this vision for Union Station prioritizes and celebrates travel by transit and both regional, intercity and high-speed rail.





Figure 13 Overall site plan featuring extensive green



Figure 14 Master plan of the complete station redesign



Figure 15 Bird's eye view of the complete station redesign

Our second profile at the I-5, Santa Ana Freeway Corridor demonstrates how our strategies could resolve regional congestion by redistributing drivers from roads to This vision would be underpinned by the expansion of the region's rapid transit and light rail networks and improvements to Metrolink, the area's regional rail network. This profile focuses on the highly congested I-5 corridor where it runs through LA and Orange counties but is meant to provide an example for how these strategies could be used to reduce congestion across LA.



Figure 16 Los Angeles' Metrolink regional rail map

Through this proposal, Union Station would not only become a hub for the Los Angeles transportation system, but also as a cultural hub for Downtown Los Angeles. The design of the



station and the surrounding area serves to connect Union Station to nearby assets, such as the LA River, City Hall, and other institutions, re-connecting the surrounding areas into a unified community. Leveraging this holistic vision for the station and its surroundings, this scheme would generate most of the funds necessary to make it a reality and to further enhance the livability and the economic vitality of the Union Station district. By doing this, Union Station would provide an inspiring experience for those who pass through it but also become an inspiration for mobilizing investment in infrastructure across America.

The redesigned Union Station would fundamentally change the experience of traveling by creating new density around the station, connecting high-speed rail passengers from other regions, and elevating Angelenos perception of transit. This would support Metrolink and transit ridership generally and help pry people out of their cars. Meanwhile, a more connected Metrolink will help to fuel the centrality of Union Station as the network's hub and propel the economic growth of the station district. Both these profiles are intended as models for how these strategies can be used to create similar improvements, not only across LA but across the entire United States as well. Although these profiles vary in scope and depth of vision, we hope to convey how these two projects would build off and support each other.

## Chapter 6. Conclusions

Until recently, for more than a century the United States has had the world's most modern and efficient transportation systems, providing every sector of its economy with a competitive advantage in global markets. The federal government has either financed the creation of the nation's road, rail, aviation, and water-borne transportation systems or provided powerful incentives for state and local governments or private investors to build and operate these systems.

However, today, after decades of under-investment in these systems, America has fallen behind virtually every other industrial nation in building and maintaining these systems, leading to crippling congestion and delays on our highways, rails airports and seaports. Continued disinvestment in these systems will undercut the nation's competitiveness, quality of life, public health, and social equity for decades to come.

This report outlines the impacts that continued disinvestment in the nation's transportation systems would have on the well-being of the nation's major metropolitan regions and megaregions—home to more than three-quarters of America's population and an even larger share of its economy. Further, it identifies categories of investments that will be required to close this funding gap, and creative financing strategies required to meet these needs.

There will be opportunities very shortly to incorporate innovative technologies, such as the algorithms that drive Uber and Lyft and other TNC systems to eliminate “first and last leg” concerns and permit multi-passenger on-demand systems. This will permit reductions in congestion and space devoted to travel lanes on city streets and contribute to congestion relief. The advent of automated vehicles will provide opportunities to limit on- and off-street parking and convert these spaces to expanded public spaces, bike lanes, and other activities. Moreover, the widespread adoption of electric vehicles over the next decade will offer opportunities to reduce carbon production and urban air pollution and transition the nation's transportation infrastructure to a zero-carbon system. This will be an essential step in achieving America's global climate commitments.

Finally, this report's Los Angeles case study provides a case study on how strategic infrastructure investments in the nation's second largest metropolitan area can reduce congestion and greater social equity and promote transit ridership and sustained economic vitality. This case study also provides a detailed look at how the LA Union Station could provide a focal point for additional transit investments and the region's urban development. Also, it describes the role that California's new EIFDs (Enhanced Infrastructure Finance Districts) could play in creating and capturing the economic value that strategic investments in infrastructure can create to help finance these investments. All these innovations could provide a template for similar transportation innovations in large metro regions and megaregions across the country.

LA's political and business leaders have already achieved extraordinary success in recent decades in building the region's Metro, and Metrolink rail networks. And LA's citizens have also demonstrated their willingness to tax themselves to finance these systems. Despite these achievements, however, this case study also underscores why current funding levels fall short of what is needed to meet the region's current and future infrastructure needs. Also, this, in turn, underscores the essential role that the federal government must play in providing political leadership and funding to rebuild America's major infrastructure systems.

Several times in American history, presidents have provided exceptional leadership to promote the construction of nearly all the nation's major infrastructure systems. From Washington and Jefferson, with their advocacy for national canal and road systems, to Lincoln's advocacy for the Trans-continental railroad and other Western Railroads, and both Roosevelts' advocacy for inland navigation, irrigation, and long-distance power generation and transmission systems, and ending with Eisenhower's Interstate Highway system, presidents have led the way in making these investments. The wellbeing of this and future generations of Americans requires that the federal government step up once more to provide this leadership.