

# WHITE PAPER

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## Attn: Immediate Action Required!

While there are sharp divisions in the U.S. with regard to almost every political, social, and economic question, there is one issue on which there is virtually universal agreement and that is the sorry state of America's infrastructure and the pressing need to do something about it. Both political parties actively discuss the need to modernize our bridges, roads, airports, dams, and so on. And because there is a steady stream of articles in the media warning of the dire consequences of not doing so, the public is at least peripherally aware of this issue. Yet, for a variety of reasons, we seem unable to actually get off the schneid. It's like going to a disaster movie when you know what is about to happen but feel powerless to do anything about it. In this White Paper, I provide some measures of the extent of the problem, cite some of the reasons for our inability to deal with it, and briefly describe some of the solutions that have been proposed by thoughtful experts. My goal is for each of us to become more aware of the dimensions of the problem and to take any steps within our power to get the ball rolling.

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## The State of Infrastructure in the U.S.

Every four years, the American Society of Civil Engineers produces a scorecard on the state of America's infrastructure and the latest report, which was published in 2017, assigned a grade of D+ which was also the grade the U.S. received in 2013. A small note of consolation for those of us who live in Tennessee is that our state received a C; hardly exciting but at least a little better than the national average. The ASCE report divides infrastructure into a number of underlying categories, and for the nation as a whole, the only categories receiving a grade of C or above were:

**Bridges C+**

**Solid Waste C+**

**Ports C+**

**Rail B**

All of the other categories received either a D or D+.

These grades, while sobering, are somewhat opaque, so let's focus on just a couple of statistics that should bring the problem closer to home:

- **24 of the top 30 U.S. airports** experience peak Thanksgiving traffic volume at least once every week.
- There are 614,000 bridges in the U.S of which more than 200,000 are **at least 50 years old**.
- There are **15,500 high hazard dams** in the U.S.
- 32% of urban and 14% of rural roads are described as being **in poor condition**.

Some of these issues pose a risk to life and limb. For example, Americans take 200 million trips daily over bridges deemed deficient and one estimate suggests that poor roads led to an increase in fatalities of 7% from 2014 to 2015, the last year for which this data is available. But I don't want to be accused of overemphasis on the sensational, so let's focus on economic impacts:

- Traffic congestion wastes 6.9 billion cumulative hours of motorists' time and 3.1 billion gallons of fuel annually. The estimated cost of all of this is more than \$120 billion per year.
- Poor roads lead to approximately \$112 billion in extra auto repair and operating costs annually.
- The World Economic Forum publishes Competitiveness Rankings that are based on each country's Institutions, Infrastructure, Macroeconomic Environment, Health, and Primary Education. With respect to the Infrastructure category, the U.S only ranks 9th as compared to 5th in 2002.
- Airport and road congestion are estimated to cost the U.S more than \$35 billion per year in lost tourism.

And, we should also focus on the positive economic impact of infrastructure investment. A 2014 study by the University of Maryland found that infrastructure spending adds \$3 to GDP growth for every \$1 spent, and the consulting firm McKinsey & Co. estimates that increasing infrastructure spending by 1% of GDP would generate 1.5 million jobs. And, by the way, 11% of the U.S. labor force is already engaged in sectors related to infrastructure. In summary, the fact that we haven't dealt with our infrastructure problems is dampening potential economic growth and is likely impacting our emotional well-being and possibly our physical safety as well.

## Why is Our Infrastructure So Poor?

As usual, people tend to gravitate toward simplistic answers whereas this is actually a very complex set of problems with many root causes:

- **Disjointed ownership.** I was surprised to learn that over 90% of all non-defense related infrastructure assets are owned by states and localities which also provide approximately 75% of the funding. In fact, the Federal Gov't only owns 3.7% of all U.S roads whereas states own 20% including the Interstate Highway System and local governments own the remaining 77%.
- **Politics.** Governments at all levels are plagued by pork barrel politics, poor planning, prioritization and execution, and financial difficulties. Remember Alaska's infamous "bridge to nowhere?"
- **Bureaucracy.** At every level of government, permitting processes tend to be very slow and inefficient. For major projects, the time frame from planning to ribbon-cutting can be as much as ten years.
- **Inadequate spending.** The U.S spends roughly 2.4% of GDP annually on infrastructure while many European countries spend at the 5% level. After adjustment for inflation, U.S. public spending on infrastructure declined about 2% from 2007 to 2017.
- **Inconsistent funding.** The U.S. does not have a unified, sustainable source of funding for infrastructure investments. While there are a large number of smaller programs of one sort or another, the primary sources of funding have been the Highway Trust Fund which is supported by the Federal gasoline tax, the issuance of tax exempt bonds by state and local governments, and state gasoline taxes.
- **Unbalanced expenditures.** Because of budget pressures, expenditures have often been directed to operations and maintenance of existing infrastructure rather than construction of newer, more modern facilities and programs.

It seems clear that there is no "silver bullet" that deals with all of these realities. So, the solution will have to be multifaceted, complex, and long term in nature.

## How Much Will It Cost To Fix This?

Not surprisingly, estimates of the cost of upgrading our infrastructure vary considerably. But, given that caveat, the American Society of Civil Engineers calculates that \$4.5 trillion needs to be spent over the next five to eight years which represents roughly a \$2.5 trillion gap versus our current spending level. The largest component is for highways, roads, and bridges which the Department of Transportation estimates will require \$800 billion to \$1 trillion to shore up. The Environmental Protection Agency estimates that \$632 billion is necessary to upgrade drinking and waste water systems. Dams might require another \$64 billion and there are other categories included in the ASCE report including airports, energy, hazardous waste, inland waterways, parks, ports, and schools. Obviously, these are large numbers for the U.S. Economy which currently measures about \$20.5 trillion in size. But, to provide one data point for perspective, a newly published study by the Watson Institute of International and Public Affairs at Brown University estimates that the U.S. has spent \$6.4 trillion on the wars in the Middle East since 2001.

## Solutions

I'm going to divide proposed solutions into two broad categories: operations and financing. You won't be surprised that figuring out how to pay for all of this is the more daunting issue.

### **Operations/Execution-Recommendations**

- Develop data driven, nationally coordinated approaches to project selection and prioritization to replace politically motivated processes. For transportation-related projects, this would entail what is called “modal coordination” which requires that a potential project be evaluated as a component of a national transportation system rather than in an isolated, local context.
- Invest in technologies such as the infrastructure required to support driverless vehicles, “smart” roads and signage, managed traffic lanes and intelligent transportation systems, new construction materials, etc.
- Streamline regulatory processes at all levels.
- Consider public/private partnerships such as outsourcing the operation and maintenance of various types of infrastructure.

While not necessarily easy to implement, all of these are relatively straightforward. Now for the hard part!

## Finances

The next couple of paragraphs deal with some of the technical aspects of funding infrastructure investment. But, the overriding issue is the necessity for a national decision that this is critical to the future success and safety of our country. In other words, we need a national mandate akin to The Marshall Plan which was largely responsible for the reconstruction of Europe following the Second War.

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- **Sources of funding** - As previously mentioned, a large source of funding for roads and other transportation projects has been the Highway Trust Fund which is supported by a Federal tax on gasoline. The Highway Trust Fund supports Federal projects and also makes block grants to states and localities. But, there are a number of problems with this financing model. First, the Federal gasoline tax has been fixed at 18.4 cents per gallon for more than twenty five years. By way of comparison, gasoline taxes in Europe range from \$1.61 to \$3.53 per gallon depending upon the country. So, one proposal is to simply raise the tax as many states have already done with their own gasoline levy. But, there is a fundamental problem with the gasoline tax as the principal funding source. As cars have gradually become more fuel efficient and electric vehicles proliferate, this tax produces less revenue. There are a number of proposals to more directly tie raising revenue to the usage of roads, bridges, tunnels, and so on. For example, the gasoline tax could be eliminated in favor of a tax on actual miles driven. Several states have experimented with a program of this nature. Similarly, user fees such as tolls could be more widely employed.
- **Private Infrastructure Investment and Execution** - In the previous section, I briefly referred to the potential use of public/private partnerships to operate and maintain infrastructure. A much more sophisticated approach is also now available since there is a well-developed segment of the capital markets focused on infrastructure investment as well as a large number of private companies that have the capability to enter into contracts with governments to design, build, finance, operate, and maintain a wide variety of projects.

**The bottom line is that we need to:**

- Develop a national mandate to deal with this issue.
- Construct a sustainable and predictable source of funding that could represent a blend of private and public capital.
- Optimize the process of prioritizing, building, and maintaining infrastructure.

In the next section, I provide brief information on the global infrastructure investment industry.

## Global Infrastructure Investing

This paper has focused on the U.S., but the need for infrastructure investment is obviously a global problem. Oxford Economics forecasts that global investment in infrastructure of \$94 trillion will be required between now and 2040 which is some \$15 trillion above the current rate of spending. At the same time, many governments are already saddled with too much debt, and institutional investors such as pension funds, insurance companies, and sovereign wealth funds are actively searching for new investment opportunities with stable returns in which they can place large amounts of capital. The combination of these forces has resulted in the development of a large and growing infrastructure investment industry. PWC estimates that more than \$1.7 trillion of private funds has been invested in infrastructure assets over the past decade. The UK provides an interesting case study in that 56% of water assets, all of the major airports, most of the ports, and all of the passenger rail rolling stock are held in specialized infrastructure investment funds. Of course, there are always potential problems in public/private partnerships and there are those who question the insertion of the for-profit sector into what have hitherto been public assets. But, these investment funds potentially offer one component of a multi-faceted solution to the infrastructure challenge.

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### IMPORTANT NOTES AND DISCLOSURES

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## What are we waiting for?

After doing this research, I was initially discouraged by the magnitude of the problem, the difficulty in overcoming inertia, and all of the political problems associated with this issue. But, then I remembered that we have done this before. We built the railroads in the 1800's, electrified the country in the 1920's and 30's, and built the Interstate Highway system in the 1950's. More recently, we built out the cell phone infrastructure and the backbone of the Internet. We have all of the necessary skills including engineering, construction, financing, and project management. Moreover, there are new sources of capital that could fill a portion of the gap between current and necessary spending levels. What we need now is simply resolve!

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