



I BLUEPRINT FOR TOMORROW

Strengthening American Infrastructure for Healthier and More Sustainable Communities



FRONTIER GROUP

U.S. PIRG | Education Fund

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EXECUTIVE SUMMARY

INFRASTRUCTURE IS AT THE HEART of America's greatest challenges. The infrastructure investments made by generations past have contributed to improved health and welfare, and to the nation's unparalleled economic prosperity. But the infrastructure decisions of the past have also cast a long shadow, leaving America to deal with the burden of lead water pipes that jeopardize our children's health, fossil fuel pipelines that contribute to global warming, and transportation and solid waste infrastructure that no longer serve today's needs.

It is time for a bold, new vision for federal infrastructure policy – one that focuses attention on the 21st century's toughest challenges, from ensuring safe drinking water for all Americans to addressing global warming, which threatens to change American life as we know it. The nation's infrastructure policy is an opportunity to undertake the challenge of building a better world.

It is also time for a new approach to federal investment in infrastructure – one that's less focused on creating ribbon-cutting opportunities and maximizing the number of jobs and is more attentive to getting the most benefit out of every dollar spent.

By focusing federal policy on unleashing high-value investments in critical areas – and resisting the temptation to spend re-

sources on counterproductive boondoggle projects – the Trump administration and Congress can leave a lasting infrastructure legacy that will be remembered by future generations.

A new approach to federal infrastructure investment policy would follow four common-sense principles.

Principle 1: Focus infrastructure investment on what matters.

The infrastructure we build today will shape American life for generations to come – creating opportunities and obligations for our children and grandchildren. By prioritizing infrastructure investment to achieve important goals in five main areas – clean energy, clean water, solid waste and recycling, natural infrastructure and transportation – decision-makers can lay a solid foundation for the health and prosperity of the nation.

Principle 2: Fix it first.

Americans have spent trillions of dollars to build infrastructure that we subsequently allowed to fall into disrepair for lack of attention to maintenance. To maximize the value of the taxpayer dollars that went towards the initial construction of infrastructure, the nation's infrastructure vision should prioritize repair and rehabilitation of useful infrastructure that already exists over the creation of new infrastructure, where cost-effective and appropriate.

Principle 3: Don't invest in infrastructure that will need to be abandoned before the end of its useful life.

Global warming is the most important challenge of our time and no infrastructure investment should be made without considering its implications. We should not invest or allow the construction of fossil fuel infrastructure that will need to be abandoned as the nation transitions to cleaner forms of energy to address climate change, and all new infrastructure should be built with the climate of the future in mind. The same principles apply for other foreseeable changes (such as emerging technologies) that threaten to make infrastructure investments obsolete.

Principle 4: Get the most out of our infrastructure.

Building the biggest, most expensive infrastructure is not always the best approach available to meeting a community's needs. Using our existing infrastructure more efficiently can often reduce the amount we need to spend, with similar benefits.

A bold, visionary infrastructure plan would prioritize investment in five key areas essential to public health, the preservation of a livable climate, and the quality of life in our communities. These crucial areas are energy, water, natural infrastructure, solid waste and transportation.

Much of America's current energy infrastructure is focused on the extraction and transportation of fossil fuels, deepening U.S. dependence on dirty energy sources that threaten the nation's health and exacerbate the threat of global warming. Fossil fuel consumption is responsible for over three-quarters of U.S. greenhouse gas emissions.¹

To improve our energy infrastructure, the Trump administration and Congress should:

- Increase funding for clean, renewable energy infrastructure and grid modernization that will facilitate the transition to 100 percent renewable energy.
- Incentivize retrofits of existing buildings to improve energy efficiency.
- Invest in energy efficiency and clean, renewable energy at all federal and federally funded facilities.

Aging water infrastructure in the form of leaking water pipes and older water service lines containing lead threatens public health and wastes valuable drinking water. Underinvestment in the maintenance of these lines results in leaks that lose 6 billion gallons of treated drinking water every day.²

To improve our water infrastructure, the nation should:

- Get the lead out of drinking water by funding the replacement of lead service lines, as well as fountains, faucets and other lead-bearing parts in the water delivery systems of schools and pre-schools.
- Prevent sewage overflows and runoff pollution by dramatically increasing funding for natural and green infrastructure projects.
- Stop water waste by funding the replacement of aging water pipes and investments in water efficiency.

America's natural infrastructure – including our wetlands, forests and rivers – needs stronger protections. Because some of our most incredible natural spaces are also resource-rich, they are prone to the wrong kinds of infrastructure investment. Currently, 90 percent of U.S. public lands under Bureau of Land Management control are open to oil and gas leases, while only 10 percent are fully protected for conservation and recreation.³

To improve our conservation infrastructure, federal policy makers should:

- Invest more federal funding in protecting our wild and natural lands.
- Limit or otherwise ban the construction of infrastructure that threatens our natural infrastructure and wild places.
- Fully fund the National Park Service maintenance backlog.

The country's solid waste infrastructure has failed to keep up with 21st century needs. Many U.S. recycling facilities, for example, have the capacity to process large quantities of newsprint but are not able to handle the current quantities of waste that have become commonplace in today's world, such as plastic.⁴ The amount of bottles and jars made of PET in the recycling stream by weight, for example, has increased nearly seven times over in just 15 years.⁵

To improve our solid waste infrastructure, the federal government should:

- Increase federal funding for cities and states to improve existing recycling infrastructure and increase participation in recycling programs.

- Increase incentives for private sector companies providing solid waste services to develop new technologies and improve waste infrastructure.
- Increase federal funding for composting programs.

America's car-centric transportation system has made the transportation sector the largest contributor to U.S. greenhouse gas emissions, with light-duty vehicles contributing more to the pollution than all other forms of transportation put together.⁶ Investment in highways in particular has also decreased air quality, increasing the risk of asthma and decreased lung function in children living near major roadways.⁷

To improve our transportation infrastructure, federal officials should:

- Focus funding on repairing existing roads and stop funding carbon-intensive highway projects.
- Increase funding for public transportation to make transit a viable option for more Americans.
- Invest more federal funding in modes of travel such as walking and biking, as well as innovative programs to get the most out of our existing transportation infrastructure by managing travel demand.

The renewed federal debate around infrastructure is an opportunity to forge a bold approach that addresses the nation's most important challenges while using taxpayer money wisely. The Trump administration and Congress should take advantage of that opportunity to prioritize projects and approaches that deliver lasting benefits for the American people and future generations.

Introduction

“Those who know the human heart best, know how powerfully distance tends to break the sympathies of our nature...Let us then bind the Republic together with a perfect system of roads and canals. Let us conquer space.”

— JOHN C. CALHOUN IN ADDRESS TO CONGRESS, 1854⁸

IN 1789, THE FIRST U.S. CONGRESS passed the nation’s first infrastructure bill. The Lighthouse Act, which made all existing lighthouses, beacons, buoys and piers public property and the responsibility of the federal government, was the ninth bill considered during that inaugural session. It was passed before Congress got around to creating the U.S. Census, establishing the First Bank of the United States, or devising the nation’s judicial system.⁹

The story of America’s infrastructure is the story of our nation. The 1788 ratification of the Constitution gave Congress the power to build roads to facilitate the new U.S. postal system.¹⁰ In 1806, Thomas Jefferson signed a bill to create the National Road, the first federally funded road, into law.¹¹ Soon after, the federal government allocated funding to improve the navigability of the Ohio and Mississippi rivers for steamships, while federal policy encouraged the construction of railroads designed to link a rapidly expanding nation.

As the nation’s needs changed, so too did the infrastructure projects. Cities seeing rapid population growth during the Industrial Revolution built public transportation systems.¹² In response to the Great Depression, President Franklin D. Roosevelt passed

the New Deal to build thousands of infrastructure projects from sewer systems to airports.¹³ The 1950s brought President Dwight Eisenhower’s Interstate Highway system, the ecology movement of the 1970s brought new investment in recycling and infrastructure to address environmental challenges, and the internet age was built on a network of lines and cables enabling homes and businesses across the country to get online.

Much of that infrastructure remains in use today. Thomas Jefferson’s National Road, for example, is now in use as U.S. Route 40. But in other cases, the infrastructure we built decades ago no longer best serves our purposes. Recycling facilities from the end of the 20th century, for example, have the capacity to process large quantities of newsprint, but are unable to handle the current quantities of trash that have become commonplace in today’s world, such as plastic and e-waste.¹⁴

In other cases, infrastructure investments we made generations ago keep us locked into polluting energy sources, keep us stuck in gridlocked rush hour traffic, or deliver drinking water to our homes that isn’t clean. And in still other cases, we’ve allowed useful infrastructure to slide into decay and disrepair.

Infrastructure policy is critical for our nation's wellbeing. America has both benefited from and been scarred by past infrastructure decisions. The newfound attention to the direction of the country's infrastructure is welcome. We must use that opportunity, however, not just to debate how much to build and where, but also what to build and why.

Throughout our nation's history, we have used infrastructure to address our biggest problems. As our nation continues to debate what comes next, we must remember that the decisions we make today will be a record of how boldly we faced unprecedented challenges, how carefully we considered the consequences of our actions, and how well we anticipated the needs of future generations.

| Infrastructure Shapes American Life

INFRASTRUCTURE SHAPES MUCH OF how Americans experience daily life. Infrastructure is the 1.2 million miles of water pipes and more than half a million miles of power transmission lines that bring water and electricity to our homes. It enables Americans get to work and to school and to get online. It's also the means by which the country conducts commerce and keeps its citizens connected across a vast geographic space. Infrastructure defines much of American life – for good and ill.

It's little wonder, then, that infrastructure has been a critical political issue since the nation's founding – and that infrastructure is re-emerging as an important issue today. President Trump, while on the 2016 campaign trail, initially promised an infrastructure investment of \$550 billion, later increasing that figure to \$1.5 trillion.¹⁵ In his first year in office, President Trump's infrastructure team fielded more than 500 project requests from states, consultants and other groups that sought road and tunnel construction and the rebuilding of dams, with 12 states requesting rural broadband investment.¹⁶ Rollout of a specific plan was delayed multiple times in 2017, and in February of the following year, the Trump administration released an infrastructure blueprint that proposed to establish a new incentive program for infrastructure construction in which state and local governments would use just \$200 billion in federal funds to generate \$1 trillion in investment.¹⁷ The targeted areas in the blueprint included repairing roads and bridges and modernizing airports and water systems.

The Trump administration has not been the only one talking about infrastructure. Senate Democrats released an infrastructure

plan in March 2018 that focused on many of the same investments as the Trump administration blueprint, but aimed to invest \$1 trillion of federal funds.¹⁸ That year, other groups – such as the National Governors Association and the American Society of Civil Engineers – also put forward infrastructure priority lists. In 2019, the newly-elected House of Representatives has prioritized infrastructure with members of the Democratic caucus introducing a Green New Deal resolution calling for massive investment in low-carbon infrastructure.

Decision-makers are returning to the question of infrastructure, and the conversation comes not a moment too soon. Poor infrastructure decisions threaten public health and safety on a daily basis.

- The decision to build heavily traveled freeways through crowded cities harms air quality. Studies have shown proximity to major roadways increases the risk of asthma and decreased lung function in children.¹⁹
- In Flint, Michigan, the decision to switch water sources to save the city money accelerated the corrosion of aging water service lines made of steel and lead that had yet to be replaced, putting nearly 8,000 households at risk of lead contamination.²⁰ In 2015, in South Carolina, heavy rains led to the collapse of 36 dams – some more than 100 years old and many with known structural problems the state had yet to address – killing 19 people.²¹

America's infrastructure decisions also contribute to another significant crisis with the power to reshape every aspect of American life: global warming.

- Drought driven by rising temperatures and decreasing snowfalls threatens water supplies in much of the nation. For example, the largest U.S. freshwater aquifer – the High Plains Aquifer – provides irrigation for a crucial agricultural region and is currently being depleted almost 10 times faster than it is able to naturally refill, a challenge that is likely to become more difficult with climate change.²²
- More intense extreme weather events such as hurricanes and large-scale rainstorms can overwhelm current infrastructure and cause dangerous levels of flooding. For example, in 2017 in California, heavy rains that flooded Lake Oroville led to the disintegration of the Oroville Dam Emergency Spillway, forcing the evacuation of nearly 200,000 people as water spilled out of the dam onto the surrounding hillsides.²³
- The increasing intensity of wildfires puts public health at extreme risk. The 2012 High Park Fire in Colorado, for example, made the city of Fort Collins' air quality seven times worse, while subsequent storms carried ash and other debris into the Cache la Poudre River, polluting the city's drinking water source.²⁴

It may have been difficult for the decision-makers who built the nation's infrastructure to know that the Interstate Highway

System and the nation's centralized, fossil fuel-powered electricity grid would exacerbate today's climate crisis, or that highway pollution and lead pipes would harm children's health. Today, we should know better.

And so, any federal infrastructure plan must seek to increase safety, improve public health, build stronger, more sustainable communities and tackle global warming head on.

Unfortunately, the current infrastructure debate often revolves around how much a plan should cost, who should pay for it, and how many jobs it will create. These are the wrong things to consider top-line priorities.

The infrastructure debate we need to have is one that identifies the nation's key challenges and devises an infrastructure plan that contributes to solving those problems as quickly as possible.

We not only need to focus on building the right things, but we need to do it in ways that make sense for Americans today and the future generations who will inherit the infrastructure we build. The following principles provide a framework for how best to move our national infrastructure debate forward, and ensure we are asking the right questions, building the right things, and solving the most pressing problems our country faces in the 21st century.

Infrastructure Rules: Four Guidelines for a Bold New Vision

AMERICA NEEDS A BOLD VISION for infrastructure that meets the biggest challenges of the 21st century. That vision includes aggressive investment in the infrastructure that can help the nation tackle global warming, safeguard our health, and build communities worthy of our children and grandchildren. But it will also require taking a hard look at how we have built infrastructure in the past, to avoid repeating mistakes.

When it comes to infrastructure, more is not always better. Building new is not always better than fixing the old. Fixing old infrastructure that no longer serves our needs is not necessarily better than simply letting it go.

If America is to take a smart approach to infrastructure, we need a new set of rules to guide the way. Here are four basic principles that should guide any infrastructure plan:

Principle 1: Only build infrastructure that accomplishes the goal of creating safer, healthier and more sustainable communities.

Infrastructure projects can be used to accomplish a number of outcomes. Often, discussions of why we should build infrastructure hinge on temporary job creation, the potential to attract investment, or spurring economic growth.

The main purpose of infrastructure, however, should not be the realization of these types of short-term impacts. Infrastructure investments last 20, 50, even 100 years. **Responsible infrastructure serves long-term purposes, and solves our most pressing**

problems so as to position future generations to be better off.

America has neither the money nor the time to waste on infrastructure investments that do not advance public interest goals, or worse, run counter to them. The obligation to protect public health, enhance safety and ensure sustainability is not only a commitment to today's communities, but also the future wellbeing of the nation as a whole.

Principle 2: Fix it first.

America has spent trillions of dollars building infrastructure that we have allowed to fall into disrepair. Almost a third of all U.S. bridges are more than 50 years old and have not received any major reconstruction.²⁵ Many of the nation's water pipes are nearing 100 years old and have leaks that result in the loss of 6 billion gallons of clean drinking water each day.²⁶ The Federal Transit Administration has identified a \$90 billion backlog of public transportation maintenance projects.²⁷

Government investment has long favored new construction over maintenance projects. For example, between 2009 and 2011, states spent nearly \$4 billion more on the construction of new roadway capacity than they did repairing and maintaining the nation's existing roads, which make up 99 percent of the nation's road system.²⁸ These decisions not only put the safety of the citizens who use this infrastructure at risk, but they also waste taxpayer dollars. A recent study found that when it comes to the nation's roads, preventative maintenance – that is, investing in maintenance when a road's condition drops from “satis-

factory” to “fair” – can save money down the line. For every \$1 spent on preventative road maintenance, as much as \$10 is saved on rehabilitation once the road’s condition becomes serious.²⁹

Deferred maintenance has resulted in significant waste of resources and maintenance backlogs across all categories of infrastructure. **Repairing existing, useful infrastructure should be the first step in addressing the nation’s infrastructure needs.** Decision-makers should prioritize repair, rehabilitation and maintenance of current infrastructure. This policy is referred to “fix-it-first.”

Adopting a “fix-it-first” policy not only helps to ensure the safety of the citizens that utilize the infrastructure that’s already present in their communities, but it also ensures that we get the most value out of what we have already built.

Principle 3: Avoid building infrastructure that will need to be abandoned before the end of its useful life.

The United States is undergoing rapid change – in technology, public opinion and even the climate itself. While some changes are unpredictable, others can be easily foreseen.

Failing to foresee upcoming changes leads to the creation of stranded assets – those that become worthless or counterproductive before the end of their useful lives. **A bold vision for infrastructure policy will identify classes of assets that are likely to become stranded and minimize investment in those areas.**

The most pressing change shaping how government needs to shift its infrastructure investments is the threat of global warming. Stranding already existing assets such as coal and gas-fired power plants, fracking wells, and oil and gas

pipelines is a responsible and necessary decision, one that requires policy attention. Continuing to invest in maintenance and upgrades to these facilities could divert resources from needed investments in clean, renewable energy.

Investing in new fossil fuel infrastructure that will soon be made irrelevant by the urgent need to respond to the threats of global warming is also unjustifiable.

While some important changes cannot be anticipated, decision-makers must do what they can to ensure that all infrastructure investments will be as useful as possible for as long as possible.

Principle 4: Get the most out of our existing infrastructure.

New infrastructure investment is often exciting. From sweeping promises of job creation and economic revitalization to ribbon-cutting ceremonies, building something new is often attractive for politicians and compelling to the public. However, new construction is not always the best, most efficient answer to solving critical problems.

For example, too often our approach to highway construction has been to widen, expand and build new in order to lessen congestion for the few hours of rush hour traffic a day, leaving the road to sit near empty all other hours. We’ve built sprawling developments, constructed miles of highways, water pipes and power lines to service the suburbs while we fail to reinvest in our existing cities and towns.

Building the biggest, most expensive infrastructure is rarely the most deliberate approach available to meeting a community’s needs. **Using our existing infrastructure more efficiently can often reduce the amount we need to spend to build more with the same results.**

Since the early 1990s, New York City has invested \$1.7 billion in preserving the “natural infrastructure” of forested land in the Catskill Mountains. The lakes and reservoirs provide 90 percent of drinking water to the nation’s largest city, entirely unfiltered, saving the city over \$10 billion on the construction of a water filtration plant, and additional maintenance and operational costs each year.³⁰

Policies that alter the public’s use of infrastructure can also help avoid unnecessary construction. Highway widening has long been known to be an ineffective solution to

congestion, as the additional lanes simply draw new cars to the road that cause traffic to reemerge.³¹ Variable pricing of travel on busy highways, on the other hand, can address congestion by encouraging people to share rides or to shift travel to less congested periods of the day when congestion fees are lower.

It is time for a new approach to federal investment in infrastructure – one that doesn’t build more than we have to and actively seeks for ways to get the most out every dollar spent.

| Infrastructure Priorities in America

INFRASTRUCTURE PROJECTS have many impacts. Infrastructure investment can stoke temporary job creation and economic growth, often a primary reason cited by politicians for increasing investment. Infrastructure can add to national, state or local debt and become a long-term responsibility for the future generations who will live with the consequences of projects. Infrastructure, when pursued irresponsibly, can quickly become a burden.

When done right, however, infrastructure becomes the building block of a

functioning, connected and healthy society. Energy, water, transportation, communications, the preservation of our “natural infrastructure” – all of them have been the focus of investment and public attention for centuries, and remain among America’s most critical 21st century challenges.

In the following section, this white paper outlines some of the biggest challenges we face for each of these sectors, and the top actions federal decision makers can take to make smart investments in infrastructure.

| Energy

America's Energy System Puts our Climate and Health at Risk

America's energy infrastructure includes more than 2.4 million miles of pipelines, over 8,000 power plants, and an electric grid with more than 5.5 million miles of power distribution lines, making our grid the world's largest interconnected machine.³²

Much of this existing infrastructure, however, is focused on the extraction and transmission of fossil fuels. **One of the most significant challenges the U.S. faces today is a dependence on fossil fuels that threatens the nation's health and exacerbates the threat of global warming.** The extraction, combustion and transportation of fossil fuels threaten the health of communities with fossil fuel infrastructure. Burning fossil fuels such as coal and gas creates air pollution that causes respiratory problems such as asthma, as well as cardiovascular problems and in some cases premature death.³³



The shift to renewable energy sources will require new infrastructure, including transmission lines to carry clean energy from the places where it is abundant to the places where it is needed. Credit: TebNad/Bigstock

Even for Americans who don't live next to fracking wells or refineries, the contribution of fossil fuels to global warming presents a significant threat for the entire nation. Fossil fuel consumption is responsible for over three-quarters of U.S. greenhouse gas emissions.³⁴

While most of the oil and gas infrastructure in the country is privately owned, federal government policy further increases the nation's reliance on dirty energy sources. In 2017, for example, President Trump signed a set of executive orders enabling the previously stayed construction of the Keystone XL and Dakota Access pipelines.³⁵ That same day he signed another executive order expediting environmental reviews for "high priority infrastructure projects."³⁶ Other policies help create economic conditions that encourage fossil fuel investment. For instance, the federal government awards almost \$15 billion in subsidies to the oil, gas and coal industries each year.³⁷ These policies jeopardize a sustainable future for generations to come.

Fossil fuels are the past. New investments in fossil fuel infrastructure will only set us back in the effort to address global warming and will eventually need to be prematurely abandoned if that effort is to succeed.

Renewable energy is growing quickly, but we need to do far more to enable the transition to 100 percent clean and renewable energy. America produces nearly six times as much renewable electricity from the sun and wind as it did in 2008, and in March 2017, for the first time ever, wind and solar produced 10 percent of America's electricity.³⁸ However, to continue this progress, and make the transition to clean energy

even more quickly, government investment will need to increase.

America's electricity grid was built to carry electricity from large, central power stations – most of them operated on fossil fuels – to customers across a wide area. The grid that will be needed to facilitate a clean energy future is different. Energy storage technology will be needed. Investments will need to be made in building a smarter grid and in bringing renewable energy from the places where it is generated to the places it is used.

In addition, new technology can help to accelerate the transition to clean energy. Government investment in nascent industries in the past has helped spur the development of life-changing technologies from telecommunications to pharmaceuticals to the computer mouse.³⁹ Crucial energy technology such as energy storage and the modernization of the energy grid would benefit from similar government support.

However, just implementing policies to encourage the growth of wind and solar power is not the only necessary step to a healthier, more sustainable America. The best way to avoid greenhouse gas emissions, many of which come from the energy sector, is to not use so much energy in the first place. **Investment in reducing energy consumption needs to be as big a priority as switching to clean energy.** Cutting energy use is important, and investment in making buildings and the equipment that powers them more efficient will play an important role in reaching a goal of 100 percent renewable energy. Speeding the transition to efficient buildings has the added benefit of saving consumers money on their energy bills.

Steps toward a 21st Century Energy Plan

The first step in moving the United States towards a sustainable future powered by clean, renewable energy sources is to invest in the technologies and programs that will get us there. The federal government should:

1. **Increase funding for renewable energy infrastructure, research and development of clean energy technology, and modernizing the energy grid to facilitate the transition to clean, renewable energy sources.**

The nation needs a visionary and well-funded effort to move the nation toward a future powered by clean and renewable energy. For instance, Congress should create a competitive grants program to incentivize states, cities and rural communities to become leaders in clean energy, along the lines of the Department of Transportation's Smart City Challenge, which provides funding for mid-sized cities to innovate solutions and improve their transportation systems.⁴⁰

Investments in modernizing the energy grid will be crucial for ensuring a transition to renewable energy sources. Investments that will facilitate balancing energy loads, such as energy storage technology, will need to be a priority. Transmission infrastructure is another important line of investment; providing loan guarantees to jump-start construction of high voltage transmission lines needed to connect renewable resources to markets could boost the construction of transmission infrastructure and increase the flexibility of the grid. At the same time, the growing potential of distributed energy also merits investment. Technology that facilitates onsite power generation, such as

rooftop solar installations, will help speed the transition to a renewable energy-powered economy, and should be prioritized.

Some visionary programs already exist and simply need more investment. For example, Congress should increase funding for the Office of Electricity's grid modernization and research development program. Past investment in the program has been \$4.5 billion, but more is needed to increase the speed with which renewable energy can be deployed.⁴¹ Congress should also increase funding to the Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) program to facilitate clean energy research and development.

Another avenue for investment in clean energy is through the tax code. The Solar Investment Tax Credit, which provides a 30 percent tax credit for solar systems on both residential and commercial properties, has helped spur the growth in solar power.⁴² Establishing a similar 30 percent investment tax credit for grid storage investments

could encourage private development in key sectors of energy infrastructure.

Starting in 2020, however, the Solar Investment Tax Credit begins to fall annually. By 2021, the residential tax credit will expire entirely, while the commercial credit will drop to a 10 percent tax credit.⁴³ Congress should extend this valuable tax credit, in addition to the Production Tax Credit that has helped spur the American wind energy boom.⁴⁴

2. Establish and fund a federal program to retrofit existing buildings to reduce energy consumption.

Of the 75 million homeowners surveyed in the 2013 U.S. Census, only 7.1 million had completed at least one home improvement project in the previous two years with the purpose of improving their home's energy efficiency.⁴⁵ With the U.S.'s 127.5 million households and 5.6 million commercial buildings accounting for nearly 40 percent of the nation's energy consumption, making buildings more energy efficient as quickly as possible must be a priority.⁴⁶

A federal program to encourage cities and states to undertake retrofitting both public and private buildings will help speed efficiency projects and cut overall energy use. In one example, the city of Chicago created a rebate program to encourage commercial building owners to undergo retrofits. In the program's first six years, the city estimates the program has saved an annual 90 million kilowatt hours of energy – the same amount of energy it takes to power almost 8,000 homes for an entire year.⁴⁷ Heating and cooling accounts for over 40 percent of an average home's energy usage, and retrofitting can help reduce energy expended for those purposes.⁴⁸ Federal investment to encourage other cities to start such programs could have a significant impact on the country's energy use – and greenhouse gas emissions.



The federal government is a major consumer of energy. "Lead by example" measures, such as the solar power installation at Dover Air Force Base in Delaware (above), can reduce emissions and speed the transition to 100 percent renewable energy. Credit: U.S. Air Force photo by Roland Balik.

3. Lead by example by adopting energy-saving measures and installing clean energy at all federal facilities.

With over 350,000 buildings and more than 600,000 vehicles, the federal government is the nation's largest consumer of energy.⁴⁹ In 2017, the federal government's buildings alone used 347 trillion Btu of energy – the equivalent of powering the lights of 72 Times Squares for a year.⁵⁰

This process should begin with setting a national goal of retrofitting 100 percent of public sector buildings, including municipal buildings, universities, schools, hospitals and HUD housing. In addition, all new government buildings should be constructed as zero net energy from the beginning.

Federal officials should also encourage renewable energy procurement policies that extend to contractors. The contracts and procurement process should include a

requirement that the government only be using clean, renewable energy sources.

For the federal government to be a true leader in energy, the federal government should also shift all government investments such as research and development expenditures and loan guarantees from gas, oil and coal to renewable energy sources. This includes ensuring that new investments only enable America's transition to a fossil fuel free future, and avoiding investments that increase the nation's reliance on pollution and dangerous energy sources from oil and gas to nuclear power.

The federal government has a unique opportunity to shape America's energy future by investing in renewable energy and grid modernization, focusing on energy efficiency programs to lessen the nation's energy consumption, and ensuring the government leads the way by making only the right investments and policies that will not further U.S. dependence on dirty and dangerous fossil fuels.

| Natural Infrastructure

America's Natural Infrastructure Needs Stronger Protections

The term “infrastructure” may conjure images of concrete and steel, but America’s open, wild and green spaces are a form of infrastructure, too. **We should invest more in protecting our natural infrastructure – our wetlands, forests and rivers – which serves some of the purposes we often build new infrastructure to accomplish.**

These natural places provide incredible benefits. Forests improve air quality and serve as valuable carbon sinks, mitigating over 11 percent of the U.S.’s total carbon emissions in 2017.⁵¹ Wetlands can help mitigate flooding and remove excessive nutrients from water before it ever enters a treatment plant. In one example, the EPA found that one wetland in South Carolina removed the same amount of pollutants from the watershed naturally as would a \$5 million treatment plant.⁵²

Natural infrastructure can help accomplish some of the same goals as significantly more costly investments. Investing in the protection of these places can save taxpayer dollars both in the short-run and in needed costly upkeep of more resource-intensive infrastructure projects.

In another example, since the early 1990s, New York City has invested \$1.7 billion in preserving the natural water infrastructure in the Catskill Mountains. The lakes and reservoirs provide 90 percent of the drinking water used by the nation’s largest city, entirely unfiltered, saving the city over \$10 billion on the construction of a water filtration plant.⁵³ Preserving green spaces in urban areas, too, can have significant benefits, such as reducing storm-

water runoff that can lead to the pollution of streams, rivers and lakes with common contaminants found on our sidewalks, streets and parking lots. Studies have shown that green stormwater systems, for example, can trap between 45 and 99 percent of solid pollutants in stormwater before reaching waterways.⁵⁴

Our natural infrastructure is often threatened by the construction of physical infrastructure to support resource extraction. **Because some of our most incredible natural spaces are also resource-rich, they are prone to the wrong kinds of infrastructure investment.**

Over the last decade, oil production on publicly owned lands has increased by 60 percent.⁵⁵ An analysis done by the U.S. Geological Survey found that almost a quarter of U.S. greenhouse gas emissions from 2005 to 2014 came from fossil fuels produced on public lands.⁵⁶ Currently, 90 percent of U.S. public lands under Bureau of Land Management control are open to oil and gas leases, while only 10 percent are fully protected for conservation and recreation.⁵⁷

A recent example of misguided infrastructure development on public lands is the Arctic National Wildlife Refuge. Home to more than 250 species of fish, mammals and birds across five ecological regions, the wildlife refuge has also been believed to be the home of the largest onshore oil trove in North America that is yet untapped, making it a prime target for oil exploration and development.⁵⁸ In 2017, Congress opened 1.5 million acres of the previously protected wilderness area for oil and gas exploration along the coast of the Arctic Ocean.⁵⁹

In addition to wilderness areas across the country, the nation's most accessible public lands, the National Parks, are experiencing an infrastructure crisis of their own. **There is currently a maintenance backlog in the National Parks System of more than \$11 billion.**⁶⁰ Encompassing over 400 sites, the National Parks System allows millions of Americans to easily access the kind of close-to-pristine wilderness it would otherwise be very difficult to reach, see and enjoy.⁶¹ The maintenance backlog includes needed upgrades to visitor's centers, hiking trails, roads, campsites and water systems.⁶²

Steps toward a 21st Century Conservation Infrastructure Plan

The first priority for the federal government when considering the future of conservation infrastructure must be to best preserve the wilderness and ecosystems we have for future generations to enjoy. The federal government should:

1. Invest in protecting our natural infrastructure.

Some current programs exist to protect and enhance our wild and green places, but require more funding to fully fulfill their missions. Congress should allocate the full \$900 million set aside for the Land and Water Conservation Fund and not divert money away from this important conservation tool. Congress should also continue to fund other conservation programs like the North American Wetlands Conservation Act and the Forest Legacy Program.⁶³

In addition, the federal government should make more significant investments in critical programs that will help mitigate the impacts of climate change, such as United States Forest Service programs dedicated to hazardous fire risk reduction in national forests. Funding for this program should be restricted to ecologically sound forest practices and best

management practices in maintaining our forests as valuable carbon sinks.

2. Limit or otherwise ban the construction of infrastructure that threatens our natural infrastructure and wild places.

Construction such as roads that enables access to America's wilderness for extractive industries such as logging or oil and gas exploration, as well as infrastructure for the transmission of fossil fuels (such as pipelines), should be banned. Some rules exist to help guard against destructive infrastructure, such as the 2001 Roadless Area Conservation Rule, which prohibits road construction and timber harvesting on already roadless National Forest System lands.⁶⁴ The Clean Water Act presents another example of vital protections for wilderness, requiring a permit for any construction of a pipe or other conduit for the transmission of chemical waste and other pollutants through wetlands.⁶⁵ These rules should be maintained and new protections adopted for public lands against harmful infrastructure.

The federal government should end existing detrimental policies, such as the auction of public lands for oil and gas exploration by the Department of Interior.

3. Fully fund the National Park Service maintenance backlog.

In 2017, Americans made over 330 million visits to national parks.⁶⁶ The National Parks System allows access to some of the nation's most treasured historical and natural places. In order to keep up with the millions of Americans visiting each year, the Parks Service needs funding to address the \$11 billion backlog of deferred maintenance.

While many of the needed repairs enhance the visitor experience in the national parks, some of the most pressing infrastructure



More funding is needed to maintain National Park infrastructure, such as cabins and campsites like the one seen here in Saguaro National Park in Arizona.

Credit: National Park Service, Vanessa Gonzalez.

repairs threaten the health of the waterways and wildlife protected in the parks. For example, in California's Yosemite National Park, deferred maintenance of three wastewater treatment plants threatens the Merced and Tuolumne Rivers. Without the \$80 million to repair the facilities, sewage could spill into these waterways.⁶⁷

America's national parks are an important part of the country's heritage, and addressing the maintenance backlog will help to ensure they stay wonderful for future generations.

When it comes to our nation's infrastructure, federal officials must think bigger than just roads, bridges and pipes. Infrastructure includes the green, open and wild spaces that deliver not only health and economic benefits to Americans all across the country, but make our communities better and more beautiful places to call home.

| Solid Waste

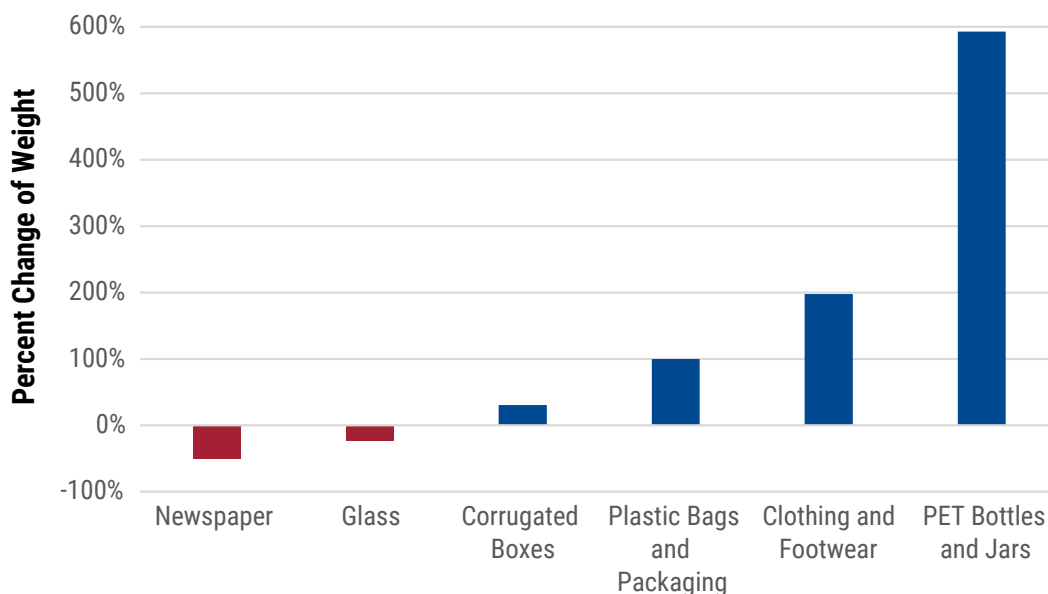
America's Recycling Infrastructure Has Not Kept Up with 21st Century Needs

America has a waste problem. The United States accounts for 30 percent of the world's trash, despite only making up 4 percent of the world's population.⁶⁸ Each year, Americans produce an average of 258 million tons of waste, enough to fill more than 28.6 million garbage trucks. When laid end-to-end, those trucks would run the distance from New York City to Los Angeles and back – more than 25 times.⁶⁹

The nation's economic system fails to minimize waste – and the systems we've designed to manage this large output of waste fail to do so sustainably. **The United States lacks mid- and end-market recycling facilities that are able to process**

even common materials such as glass, cardboard and e-waste. Much of the country's recycling infrastructure was constructed in the 1990s and is not equipped to handle the changes in materials over time. Many American recycling facilities, for example, have the capacity to process large quantities of newsprint, a material which is rapidly falling out of production, but are not able to handle the types of trash that have become commonplace in today's world, such as plastic and e-waste.⁷⁰ From 1990 to 2015, newsprint in the waste stream halved, while plastic bags and packaging doubled. This growth is particularly stark in newer plastics; the weight of bottles and jars made of PET in the waste stream, for example, increased nearly seven times over in the same period.⁷¹

FIGURE 1. PERCENT CHANGE BY WEIGHT IN U.S. MUNICIPAL WASTE STREAM BY MATERIAL TYPE FROM 1990 AND 2015⁷²



Changing technology has contributed to changes in consumption. The rise in corrugated boxes may stem from the rise in Amazon and online shipping, and the rise of “fast fashion” brands such as Forever21 and H&M have contributed to increases in clothing and footwear thrown away. These changes, too, present challenges for current U.S. recycling infrastructure.

As consumer behavior and recycling needs have changed, U.S. waste infrastructure has not. This is in part because the U.S. has relied on exporting recyclables to China, which recently changed its policies to only accept recyclables that are 99.5 percent pure – a level U.S. single-stream recycling facilities are not technologically capable of achieving, especially for plastics.⁷³ Reliance on outside markets for recycled byproducts is no substitute for developing recycling infrastructure that keeps up with changing needs.

The technological limitations of recycling centers, however, are only part of the problem. Only a quarter of U.S. garbage is

recycled, and access to existing recycling services presents another significant challenge to improving the solid waste system.⁷⁴ **Many U.S. communities lack fully functional curbside recycling programs, especially for multi-unit buildings such as apartments and businesses.**

Currently, only 53 percent of all Americans have access to curbside recycling, regardless of the kind of housing they live in, but that number drops particularly quickly in urban areas with higher instances of multi-family homes.⁷⁵ Only 21 percent of Americans live in communities that offer uniform, curbside recycling programs to all single-family and multi-unit buildings.⁷⁶

Curbside collection programs are an important tool for increasing recycling rates. One study in Hamilton County, Ohio, found that residents with access only to a drop-off recycling program – where participants must drive to a designated center – recycled nearly five times less material annually than residents with access to a non-subscription curbside service.⁷⁷ The limited access many Americans have to curbside collection programs for recyclables is a barrier to the higher participation rates we should strive to achieve.

Recyclable materials are only part of the nation’s waste stream. Compostable materials such as food waste and yard trimmings make up nearly 30 percent of all U.S. garbage, while only 9 percent of all U.S. waste is actually composted.⁷⁸ **Access to composting services is also inadequate, with a limited number of communities offering curbside composting programs in urban areas where backyard composting is often unrealistic.** In 2015, only about 200 communities in the United States offered a curbside composting program.⁷⁹ That same year, over 50 million tons of compostable waste ended up in landfills or incinerators.⁸⁰



Composting keeps food waste and yard trimmings out of landfills and combats climate change, but local governments often need to invest in infrastructure to get composting programs off the ground. Credit: Oregon Metro.

Addressing America’s waste problem will have far-reaching benefits. Incinerator emissions from facilities that burn trash include heavy metals and mercury, a neurotoxin that impairs brain function. Landfills can leach toxic chemicals into the environment and threaten drinking water supplies, while litter that ends up in the environment can threaten wildlife, as is the case of the estimated 8 million tons of plastic that ended up in the world’s oceans in 2010 alone.⁸¹ Emissions from landfills and trash combustion in 2017 were over 100 million metric tons of carbon dioxide, the same as is produced by 11.9 million homes’ energy use for one year.⁸² And that doesn’t account for the extraction of resources, production of goods, and transportation of materials at every stage of the process – which, when paired with disposal itself, accounts for about 42 percent of all U.S. greenhouse gas emissions.⁸³

Smart infrastructure investments will not address the high level of U.S. consumption and resource extraction that is at the root of our solid waste problem, but it will help to alleviate some of the worst side-effects of our nation’s production of waste.

Steps toward a 21st Century Solid Waste Infrastructure Plan

As much of the solid waste system is implemented at the local level, the first step in creating a more sustainable system is to enable cities and states to develop their own solutions. The federal government should:

1. **Increase funding for cities and states to improve existing recycling infrastructure and increase participation in recycling programs.**

Some federal programs exist to increase local investment in solid waste infrastructure, such as the USDA’s Water and Waste Disposal Loan and Grant Program, which provides funding to rural communities to

provide sanitary solid waste disposal, and the Tribal Solid Waste Management Assistance Project, which provides grants to help tribes pursue projects such as recycling programs, administered by the EPA.⁸⁴

The federal government should increase funding to existing programs, in addition to creating new funding opportunities for cities and states to improve their solid waste systems. Federal officials should also set an ambitious national recycling rate goal and dedicate funds to help cities develop resource recovery parks, undergo fleet redesign and retrofitting, and implement public education programs.

While funding for cities and states can help improve local solutions, much of the country’s solid waste infrastructure is privately owned, with collection and processing services provided by contracted companies. Increasing opportunities for private investment in infrastructure will play an important role in ensuring a more sustainable solid waste system.



Improving curbside recycling collection services and bin access to multi-unit buildings, such as these for an apartment building in Oregon, can help improve recycling participation rates. Credit: Oregon Metro.

2. Increase incentives for private sector companies providing solid waste services to encourage the development of new technologies and improved waste infrastructure.

America's recycling infrastructure has lagged behind evolving needs as common materials in the waste stream have changed, particularly the increase of plastic packaging and single-use bottles. The lack of infrastructure has been in large part due to the demand for plastics in China, allowing the U.S. to ship its plastic waste across the world. In light of China's recent policy change to stop accepting external recycling, the market for mixed plastics has largely collapsed.

The simplest solution – and the one best for the environment – is to reduce consumer reliance on single-use plastics. Local, state and federal government should take steps to first reduce the production and consumption of these items. As more of these policies to reduce plastic pollution go into effect, they will lessen the need for significant infrastructure investment to recycle plastics. However, to the extent these products will continue to exist in the marketplace, some investment in improved infrastructure will be necessary.

The federal government should take actions to guarantee a market for recycled materials. This includes strengthening existing "buy recycled" mandates that require government procurement at the federal level to purchase recycled materials whenever possible. Federal officials should also implement minimum recycled content levels for government procurement of items that can be made of recycled material and include recycled content in procurement bid specifications.

Congress should also utilize the tax code to further stabilize the recyclables market by

implementing tax credits to encourage companies to purchase recycled materials.

In addition, the federal government should establish grant programs to provide funding to states to disburse to recycling companies seeking to expand operations, invest in equipment to address changing materials in the waste stream, or develop new technologies altogether.

3. Increase federal funding for composting programs.

Composting food scraps, yard trimmings and other compostable waste has numerous benefits for our environment and agricultural system. When landfilled, the decomposition of organic waste produces methane, a greenhouse gas that has the potential to warm the planet 86 times as much as carbon dioxide over 20 years.⁸⁵ With landfills being the third-leading source of U.S. methane emissions, keeping compostable waste out of landfills helps to reduce these harmful emissions.⁸⁶ Using compost can help return important nutrients to soil depleted by intensive farming practices, slow topsoil erosion, and increase the ability of soil to absorb water during heavy rainfalls, mitigating flooding.⁸⁷

Currently, less than a third of total compostable waste each year is composted.⁸⁸ Yard trimming composting rates have risen in past years, in large part thanks to state-level bans on landfilling yard debris coupled with public waste management authorities offering yard trimming collection programs.⁸⁹ While the progress is significant, composting in the U.S. still has a long ways to go. Each year, only 5 percent of all food waste is composted.⁹⁰

Some federal programs for increasing composting currently exist. The 2018 Farm Bill included a \$25 million allotment for

the USDA to develop and test municipal composting programs. However, the funding will only go toward programs in about 10 states, and is only authorized through 2023.⁹¹ Congress should increase USDA funding for the development of such programs, and other solid waste management grant programs that emphasize food waste reduction.

Dedicated funding to increase curbside collection programs for composting in urban areas where backyard composting isn't an option will also be an important component of increasing the national composting rate.

Cities with current curbside composting programs include San Francisco, Seattle and Denver. San Francisco's composting program provides all residents at single-family homes, apartment buildings and businesses with curbside bins and collection services.⁹² The program collects 541 pounds of compostable waste each year per capita, and has helped the city achieve its current 80 percent waste diversion rate.⁹³ In places where backyard composting is difficult for residents to implement, curbside programs will be key to diverting food waste from landfills. Building the infrastructure to support these programs is critical.

| Water

America's Current Infrastructure Threatens Public Health and Wastes Water

Water is a critical resource, but too often our current infrastructure system wastes it, pollutes it, or fails to deliver it to people in ways that keep them safe.

Many of the nation's water lines are nearing 100 years old and still contain lead. **Water service lines containing lead put public health at risk, leaching this contaminant into drinking water supplies.** Once a popular construction material due to its pliability – an especially attractive characteristic for winding pipes – lead remains in many of our nation's water lines. Currently, an estimated 6.1 million lead service lines – pipes that connect buildings to a main water line – are still in use across the country.⁹⁴ While some federal policy, such as the EPA's Lead and Copper Rule, has sought to protect Amer-

icans from this threat, the problem of lead in service lines is still widespread. A 2016 investigation found that more than 5,300 water systems in the country serving more than 18 million Americans were in violation of the EPA's Lead and Copper Rule, putting the health of those Americans at risk.⁹⁵

Ingesting lead can have serious health impacts, especially for children. Even exposure to low levels of lead can lead to slowed growth, learning disabilities, problems with hearing, lower IQ and in severe cases, seizures, coma and even death.⁹⁶ While federal regulations have improved the frequency of testing for drinking water, these rules only require remediation when testing confirms lead concentrations above 15 parts per billion, despite overwhelming agreement from medical and public health experts, such as the Centers for Disease Control and Prevention, that there is no safe level of lead for our children.⁹⁷



Removing lead fixtures from schools, preschools and daycares is important to protect the health of children who face significant risks from lead in drinking water.

Credit: Jeff Turner via Flickr, CC BY 2.0.

Despite the risks posed to children, most public school buildings have at least some lead in their pipes, plumbing or other fixtures.⁹⁸ As more schools test their water, discoveries of lead in drinking water continue to rise, from Montana to Texas to New Jersey.⁹⁹ A 2019 evaluation of 32 states' laws and regulations by Environment America Research and Policy Center and U.S. PIRG Education Fund found most states lack comprehensive policies to get the lead out of drinking water at schools or preschools.¹⁰⁰ Federal investment will be critical to ensure that communities and school districts can halt the widespread lead contamination of drinking water.

Lead is not the only way our current water infrastructure is ailing. Underinvestment in the maintenance of water pipes result in leaks that lose 6 billion gallons of treated

drinking water every day. When coupled with the amount of water lost from the estimated 240,000 water main breaks that occur annually, the amount of treated drinking water wasted by under-maintained water pipes every day could serve 15 million households.¹⁰¹ **Leaking water pipes waste a significant amount of clean, treated drinking water.** Stopping the waste of drinking water once we've spent taxpayer dollars treating it is one of the most straightforward ways to improve our water system.

The EPA has estimated that maintenance and improvement of current drinking water infrastructure needs \$472.6 billion over the next 20 years, with \$312.6 billion needed to refurbish or replace deteriorating pipes.¹⁰²

Pipes laid in the early 20th century have an estimated lifespan of 75 to 100 years, and with many of the nation's water lines already nearing 100 years old, replacing aging, leaky pipes would seem an obvious priority. Progress, however, has been slow. Currently, water utilities are replacing pipes at a rate of 0.5 percent each year, meaning it would take an estimated 200 years to replace all of the nation's water lines.¹⁰³

In addition to repairing leaky pipes that deliver drinking water, other inefficient or unnecessary uses of water contribute to water waste. In 2015, the U.S. withdrew an estimated 322 billion gallons from waterways a day. Much of that water could be used in more efficient ways. For example, over 40 percent of water withdrawals went to electricity generation at traditional fossil fuel power plants.¹⁰⁴ Switching to renewable energy sources for electricity generation would reduce our use of water.

Sewer systems are another critical part of the nation's water infrastructure, helping to protect public health and the environment. These systems, too, often fail, especially

when they must handle increasing rainfall. **The nation's infrastructure is poorly equipped to handle stormwater, causing overflows in combined sewer systems and carrying pollutants into waterways.**

Surfaces such as paved roads, parking lots and rooftops are often made of impervious materials. Unable to absorb water, rain falling on these surfaces has nowhere to go, and mixes with surface chemicals such as oil and grease. Rainwater can then carry these pollutants into rivers and streams, threatening both public health and ecosystems.¹⁰⁵

Rainwater also contributes to flooding and can overwhelm sewage systems. Particularly a problem in cities with older, combined sewer systems that carry both stormwater and sewage in the same pipes to a wastewater treatment plant, overwhelmed sewer systems can have grave impacts. When heavy rains fill older sewer systems past their capacity, this can cause an overflow, spilling contaminated water with dangerous pathogens into lakes, rivers and streams.¹⁰⁶ This pollution can lead to the spread of diseases like hepatitis and gastroenteritis, waterborne illnesses that can be contracted by drinking, swimming, or by eating fish or shellfish from affected waterways.¹⁰⁷ Over 700 communities, primarily in Northeast, Mid-Atlantic and Midwestern states, have combined sewage systems susceptible to overflows.¹⁰⁸ Even sanitary sewer systems – more modern systems than combined sewer systems – can experience overflows and spew raw sewage into homes and into waterways. According to EPA estimates, there are as many as 75,000 sanitary sewer system overflows every year.¹⁰⁹

Over 106,000 miles of U.S. rivers and streams have been impaired by either sewage discharges or urban-related runoff and stormwater.¹¹⁰ Our water should be safe and clean for fishing, swimming and other uses. Too of-

ten America's current infrastructure systems for treating and delivering water to homes, businesses and schools across the country are failing to do so safely and efficiently, and are putting our rivers and streams at risk. Ensuring universal access to clean drinking water and healthy waterways is a must.

Steps toward a 21st Century Water Infrastructure Plan

Addressing the weaknesses of U.S. water infrastructure should first focus on replacing all existing pipes that present an imminent threat to Americans' health, and the waste of valuable resources. The federal government should:

- 1. Set a national goal and provide funding to remove lead from all water delivery systems, including lead service lines, and lead-bearing parts in schools and preschools.**

Congress should work to ensure all Americans have access to safe drinking water that is lead free. With around 6.1 million remaining lead service lines delivering water in communities across the country, removing this threat fully will require significant investment. A recent estimate by the American Water Works Association put a \$30 billion price tag on full removal of all lines.¹¹¹

Increasing funding to the Drinking Water State Revolving Fund and Water Infrastructure Finance and Innovation Act can help provide communities with the resources to remove lead service lines from their water systems. Congress should also increase funding to the Water Infrastructure Improvements for the Nation grant programs, another avenue for funding the removal of lead infrastructure.

Replacing all lead service lines will take time. In the interim, Congress should authorize funding for a program to provide all schools

and communities receiving drinking water through lead service lines with filters certified by the Occupational Safety and Health Administration to remove lead from water.

Given the heightened dangers lead presents our children, Congress should also increase funding dedicated to removing lead fixtures from schools, preschools and daycares. While testing for lead in drinking water is important, Congress should focus increased funding on programs to allow schools to proactively remove lead-bearing parts.

- 2. Provide funding to replace aging infrastructure to eliminate the waste of water.**

According to the EPA, the nation's water pipes need a \$312.6 billion investment over the next 20 years in order to replace or refurbish aging and leaking infrastructure.¹¹² Further delaying necessary investments in water infrastructure would contribute to further deterioration in service and water quality, and increase the likelihood of costly emergency repairs down the line.

One of the most powerful vehicles for providing communities with funding to undertake crucial drinking water infrastructure projects is the Drinking Water State Revolving Fund. Administered by the EPA, this program provides assistance for projects including the replacement of old pipes. Through the revolving fund, states, local governments and utilities can receive grants and loans.¹¹³ Increasing funds in the Drinking Water State Revolving Fund can help solve some of the most pressing problems in our water infrastructure. However, funding must be provided only to the right projects. For example, projects seeking funding to bring more water into a drinking water system by expanding reservoirs or building pipelines to deliver water from a river should instead be diverted towards increasing efficiency of existing water infrastructure by repairing leaking pipes.

Congress should also support and expand alternative financing methods, such as the Water Infrastructure Finance and Innovation Act (WIFIA), which allows for communities to package up loans for larger water projects.¹¹⁴ Establishing other funding sources, such as a clean water trust fund to provide a permanent funding source, can help ensure continued progress in providing safe, clean drinking water for all Americans while minimizing waste. In addition, the federal government should support other means of reducing water waste, such as improved irrigation and transitioning to wind and solar energy for electricity generation.

3. Increase funding for natural and green infrastructure projects that will reduce runoff pollution and curb sewage overflows.

Green stormwater infrastructure such as rain barrels, permeable pavement and green roofs can absorb up to 90 percent of rainfall, helping to mitigate the flow of rainwater off surfaces such as parking lots that often carry surface chemicals such as grease and oil into local waterways.¹¹⁵ Studies have shown that green stormwater systems can trap between 45 and 99 percent of solid pollutants in stormwater.¹¹⁶

Increasing investment in green infrastructure not only can help keep natural waterways healthy, but also bring numerous other benefits for communities. Green infrastructure, for example, can help minimize flooding during heavy rainfalls and remove greenhouse gases from the atmosphere, particularly in the case of green roofs. Increasing the amount of space in cities that is made up of permeable surfaces can also help replenish groundwater, thereby restoring water tables.¹¹⁷

The federal government should increase investments in programs that award grants and loans for cities and states to invest in green infrastructure projects. Like the

Drinking Water State Revolving Fund, the Clean Water State Revolving Fund is a powerful opportunity to provide funding for states and local governments to undertake these kinds of projects.¹¹⁸ Congress should also incorporate a green infrastructure project carve-out of at least 20 percent in the Clean Water State Revolving Fund to ensure dedicated financing is available for local governments looking to invest in green and natural infrastructure projects.

Another important piece of federal policy will be ensuring that the criteria for awarding state revolving funds and other federal funding incentivizes green and natural infrastructure projects.

Funding green infrastructure projects can help avoid aging sewer systems from being overwhelmed during heavy rainfalls and causing dangerous overflows onto public streets and into waterways. In addition, ensuring federal funding for transportation does not encourage the widening or expansion of highways and impermeable surfaces will help curb runoff pollution from impacting our rivers and streams.



Rain gardens – planted areas that absorb rainwater where it falls – filter rainwater and add green spaces to developed areas. Credit: Alisha Goldstein, EPA.

| Transportation

America's Transportation System Is the Leading Contributor to Global Warming

The coming of age of the automobile in postwar America significantly changed the nation's transportation system. Beginning in the 1950s, the United States started to build the Interstate Highway System, the world's most advanced network of highways, at vast public expense.¹¹⁹ Enabling the rise of the suburbs, cars brought a convenience to the American way of life that left public transit systems across the country underfunded and grappling with how to compete. Ridership on the nation's most well-traveled public transit system – New York City's subway – still has not recovered since its peak in 1946.¹²⁰

Now we are realizing the consequences of investing in car-centric infrastructure – pollution, congestion and cost.

America has too much of the wrong kind of transportation infrastructure. Since 1956, nearly 9 out of every 10 capital dollars spent on transportation has gone toward highways or aviation – leaving low-carbon transportation options such as public transit, walking and biking underfunded.¹²¹

Investment in highways and other infrastructure to support cars has made much of the nation car-dependent and brought a host of public health and safety concerns. The transportation sector is the largest contributor to U.S. greenhouse gas emissions, with light-duty vehicles emitting more pollution than all other forms of transportation put together.¹²² The decision to build heavily traveled freeways through crowded cities has harmed air quality; studies have shown proximity to major roadways in-

creases risk of asthma and decreased lung function in children.¹²³ Cars and trucks are also dangerous in and of themselves, killing over 40,000 Americans every year.¹²⁴

The lack of safer, more affordable and lower-carbon ways to get around leaves Americans with few viable options and hinders efforts to address global warming.

Not all of America's transportation infrastructure exacerbates these problems. Some of our past infrastructure investments – in public transit projects such as buses and rail, in safer streets for pedestrians, and in bike lanes and paths – have made communities stronger and Americans healthier.

Too much of the nation's useful existing infrastructure, however, is in bad repair.

The Federal Transit Administration has identified a \$90 billion backlog of public transportation maintenance projects waiting to be completed.¹²⁵ Many of the country's existing roads and bridges are in need of care. Currently, the highway maintenance backlog is an estimated \$420 billion, coupled with an additional \$123 billion worth of maintenance and rehabilitation projects for bridges.¹²⁶

America's transportation infrastructure policies have time and again prioritized expansion and new construction over needed maintenance to ensure the transportation infrastructure we already have is functional and safe. Undertaking projects that expand existing infrastructure or require the construction of new transportation infrastructure designed solely for single-occupancy, fossil fuel-powered vehicles is no longer a priority. **Current policy doesn't take advantage of smart approaches to reduce the need for expensive new transportation in-**

frastructure. For example, traffic congestion can be addressed by pricing travel, by using technology to better manage traffic flow, and through workplace education programs and incentives that discourage people from driving. These measures are often far cheaper and more effective for improving the performance of the transportation system than expanding highway capacity.

Steps toward a 21st Century Transportation Infrastructure Plan

To move the nation toward a more sustainable transportation system better suited to 21st century needs, the federal government should:

1. Focus funding on repairing existing roads and stop funding carbon-intensive projects altogether.

Money spent on new or wider highways further increases America's dependence on high-carbon modes of transportation and the maintenance burden that will be experienced by future generations. Congress should end federal spending on these projects altogether, instead using federal funding for the maintenance and repair of the existing system. In addition, the Department of Transportation should evaluate opportunities to enhance pedestrian and bicyclist safety when doing maintenance on roads and bridges, such as widening sidewalks or adding bike lanes where possible.

Congress should also require that any projects receiving funding from the federal government be evaluated for their life-cycle contribution to climate change to ensure investments serve to make our communities healthier and more sustainable. This could include reinstating the Federal Highway Administration rule that would require state departments of transportation and metropolitan planning organizations to make greenhouse gas emissions reduction commitments and evaluate highway emissions every year.

2. Increase funding for transit projects that make public transportation a viable option for more Americans.

Increasing public transit options for Americans is one of the most effective avenues for reducing greenhouse gas emissions. Improving public transit should begin with ensuring maintenance of existing systems. Congress should increase funding to the Federal Transit Administration's "State of Good Repair" program to address the \$90 billion backlog in needed transit repairs.¹²⁷

Congress should also invest more in other funding mechanisms to allow for the expansion and construction of new public transit. Grants or loan assistance programs, such as competitive programs like Better Utilizing Investments to Leverage Development (BUILD) grants and Capital Investment Grants are another opportunity to fund more low-carbon transportation options.¹²⁸ Other grant programs could include funding programs to convert diesel buses to all-electric fleets, such as the Federal Transit Administration's Low or No Emission Program that provides funding to state or local governmental authorities to buy or lease



Electric buses can help clear the air in our communities and reduce greenhouse gas emissions. But communities need to make major investments in bus equipment and in charging infrastructure. Credit: SounderBruce via Flickr, CC BY-SA 2.0.

low or no emission vehicles.¹²⁹ Congress should also expedite the allocation of federal grant money for transit projects by easing federal red tape for small-scale transit projects with clear environmental benefits.

Expanding transit infrastructure is only one of the steps needed to support a transition to low-carbon transportation. As with highways, there is much the United States can do to increase the efficiency and utilization of our existing transit infrastructure. Federal funding programs that are currently limited to capital expenditures could be expanded to also support operating expenses, encouraging transit agencies to increase service on the bus and rail lines that already exist.

Increasing funding is one tool Congress should use to encourage public transit construction, but reorienting these federal funding formulas to hold state and local governments accountable for greenhouse gas emissions reductions is another key policy tool. Funding programs should include requirements that hold states accountable for setting and meeting goals that reduce per capita miles driven, and the allocation of federal funding should favor direct

financial support to local governments pursuing innovative land-use and demand management transportation programs.

Public transit is one invaluable way to fix the nation's broken transportation system, but so are a number of other multi-modal and active transportation modes.

3. Invest more federal funding in low-carbon modes of travel such as walking and biking, as well as in programs to use our existing transportation network more efficiently.

Congress should encourage the development of more low-carbon transportation infrastructure by establishing and funding grant programs dedicated to expanding multi-modal options, giving cities and states more control over how funds are used. Congress should also initiate a federal challenge grant program, like the federal Smart Cities Challenge, for innovative local or state programs to encourage carpooling, transit use, biking and policy strategies to reduce travel demand.

In addition to increasing investment in pedestrian and biking infrastructure, Congress should also use federal funding programs to encourage policies that make better use of existing infrastructure. To reduce rush hour traffic, the federal government should encourage or require employers to reduce employee commute trips in single-occupancy vehicles. Conditioning federal funding on cities and states meeting climate-oriented goals, such as VMT reduction requirements, could help push cities and states to adopt smart policies such as congestion pricing. Congress should also repeal the commuter tax benefit that encourages employees to drive to work.

Other policies the federal government should pursue include lifting limitations and hurdles to the conversion of street space to transit or bicycle lanes, and required adoption of complete street policies as a condition for receiving federal transportation funding.



Investments in bicycling and pedestrian facilities, such as the Indianapolis Cultural Trail (above), can encourage low-carbon forms of travel and make cities and towns more pleasant places to live. Credit: U.S. Department of Transportation.

| Conclusion

THE CHALLENGES AMERICA FACES IN the 21st century are changing. Years of deferred infrastructure maintenance have accumulated. The short-sighted infrastructure decisions of decades past continue to cast a long shadow and require new investment to fix. Global warming threatens to change every aspect of American life as we know it.

The scale of these problems is large, but smart infrastructure investments can help us meet these challenges and build a stronger, healthier and more sustainable America for generations to come. We must continue

to care for the useful assets we have. We must know when building something new will solve a problem, and when it will make it worse. And we must move forward with bold new ideas and exercise foresight at every turn.

The renewed debate around our nation's infrastructure is an opportunity. If we focus on the right things, and use the right approaches, we can improve the quality of our lives today, assure a better future for coming generations, and act as faithful stewards of taxpayer money.

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