REPAIR AMERICA

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REPAIR MICHIGAN:

CREATING GOOD JOBS WHILE PREPARING OUR INFRASTRUCTURE FOR CLIMATE CHANGE

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MICHIGAN INFRASTRUCTURE JOBS REPORT

EXECUTIVE SUMMARY

Michigan's infrastructure systems are in urgent need of significant repair. Our state's roads and bridges, water, waste water, transit, energy, and communication systems need increased investment to become efficient, safe, and productive for Michigan residents. Repairing Michigan will create good jobs, make our systems more efficient and less polluting, and safeguard communities from the impact of climate change, like severe weather such as floods and droughts.

In this report, the BlueGreen Alliance identified needed investment – some of which is already in the planning stages – in roads, bridges, transit, waste water, drinking water, electricity, natural gas and smart grid. After identifying these needs, we estimated the number of jobs that would be created by making these essential investments in repairing and modernizing our basic infrastructure systems.

More than an estimated 119,300 jobs could be created across the Michigan economy by making much-needed investments in our basic infrastructure systems. This includes the number of direct jobs from impacted sectors like construction laborers, equipment operators, and maintenance workers; as well as the number of indirect jobs from industries that service those sectors and supply chains, including the manufacturing of materials, components, and equipment. In addition, we estimated the number of induced jobs supported as the workers buy goods and services, including increased demand for retail, housing, and financial services.

Repairing Michigan: A Job Creation Opportunity	
Roads and Bridges	Investing $2 billion per year over the next 24 years would create or sustain an estimated **65,140 jobs** each year
Rail	Investing $260 million a year to fully fund freight rail over the next 20 years would create or sustain an estimated **5,200 jobs** each year
Transit	Investing $733 million a year in transit preservation and expansion over the next 25 years would create or sustain an estimated **26,460 jobs** each year
Waste Water	Investing $185 million a year in waste water infrastructure over the next 20 years would create or sustain **3,700 jobs** each year
Drinking Water	Investing $690 million a year in rehabilitating and replacing drinking water infrastructure over the next 20 years would create or sustain an estimated **13,800 jobs** each year
Electricity	Investing $128 million a year on the Thumb Loop Expansion project over four years is creating or sustaining an estimated **1,650 jobs** throughout the economy each year
Natural Gas	Replacing the 3,100 miles of old cast and wrought iron natural gas pipelines would create or sustain an estimated **13,740 jobs**
Smart Grid	Investing $140 million per year in a smart grid advanced metering infrastructure build out for 5 ½ years would create or sustain an estimated **3,370 jobs** each year

INTRODUCTION

Infrastructure is the backbone of America. Communities across the country rely on these systems every day to move goods, transmit power, deliver drinkable water, and provide the means to communicate. These systems seem invisible when they function properly, but the impacts of infrastructure failure are immediately and devastatingly clear. More and more systems are failing as they age and suffer from chronic underinvestment. At the same time, impacts of climate change such as severe weather like floods, droughts, and super storms are putting increasing strain on communities and their vulnerable infrastructure systems.

Economic Impact of Failing Infrastructure

The American Society of Civil Engineers (ASCE) publishes a Report Card for America's Infrastructure every four years, and in 2013, the nation earned a "D+" average (ASCE 2013b, p. 2). In 2011, ASCE conducted a series of economic reports titled *Failure to Act* that determined the impact of low grades for infrastructure systems on America's economic future. They then produced a report that discussed the effects of multiple infrastructure systems deteriorating. This report, titled *Failure to Act: The Impact of Current Infrastructure Investment on America's Economic Future,* found that "deteriorating infrastructure, long known to be a public safety issue, has a cascading impact on the nation's economy, negatively affecting business productivity, gross domestic product (GDP), employment, personal income, and international competitiveness" (ASCE 2013a, p. 4). This means that underinvestment in infrastructure ultimately leads to higher costs being paid by businesses and households (ASCE 2013a, p.6). They also found that weakening of multiple infrastructure systems will have a greater effect than the sum of individual infrastructure failures (ASCE 2013a, p. 23).

Environmental Impact of Failing Infrastructure

Failing and inefficient infrastructure systems use more natural resources than robust and efficient systems do. They also produce more emissions, both pollutants and greenhouse gases. Reroutes due to damaged roads and bridge closings can increase congestion of vehicle traffic, generating more emissions. Out of date or absent traffic control systems in cities can lead to increased congestion in high density areas, particularly during peak commuting times. Rail systems are an efficient way to move goods, but these benefits are unobtainable when the rail system is chronically operating over capacity or without multimodal connections to other transportation systems for the "last mile" of distribution networks. A lack of good transit options increase personal vehicle miles traveled and contributes to congestion and emissions. Aging electrical grids and transmission congestion can lead to unreliable power; outages can cause environmental problems at water treatment plants, refineries, or other emergency systems that require electricity. Additionally, these electrical grids may not allow for timely connection of renewable electricity sources. Our drinking water and waste water systems average over 800 breaks per day, leaking more than 15 percent of our drinking water before it ever reaches the kitchen sink; such waste also unnecessarily consumes significant amounts of electricity (Uni-Bell PVC Pipe Association 2011).

As noted in the *Failure to Act: The Impact of Current Infrastructure Investment on America's Economic Future* report, the negative impacts of failing infrastructure on the economy worsen over time if nothing is done (ASCE 2013a, p. 5). The same is true for damage to the environment, whether it is air or water pollution or greenhouse gases. Improvements to infrastructure systems reduce energy use, lower emissions, and improve resilience.

Opportunities

Rebuilding transportation, water, energy, and communication systems can help communities to increase public safety and withstand increasingly frequent severe weather events and super storms. Resilient and well-maintained infrastructure is also more efficient—saving energy, money, and natural resources as well as reducing greenhouse gas emissions that lead to climate change. In addition, repairing America's infrastructure creates good jobs and other economic benefits such as higher productivity and increased competitiveness.

On a national level, ASCE estimates it would require $3.6 trillion of investment to return America's overall infrastructure to a grade of "B" (ASCE 2013b). Such investments would create significant job benefits while restoring efficiency to the American economy.

This Michigan Infrastructure Jobs Report first highlights infrastructure needs that have been identified across the state and then illustrates the economic and job creation opportunity of repairing Michigan.

The latest state level infrastructure report card conducted by the American Society of Civil Engineers Michigan Section (ASCEMI) in 2009 graded Michigan's infrastructure a "D". Michigan's infrastructure is in dire need of repair, costing the state resources such as time and money, polluting the environment, and causing job losses.

The *Michigan Infrastructure Report Card: Not Making the Grade* found the following:

- 38 percent of Michigan's roads are in poor or mediocre condition and 25 percent of its bridges are structurally deficient or functionally obsolete (p. 34).
- Over half of the sanitary sewer system mileage was built before 1970 (p. 48).
- The primary electric generating stations in Michigan are older, with many fossil-based generating plants operating beyond their original design lives (p. 24).
- Transit use in Michigan has grown faster over the last two decades than any other mode of transportation. The rise in demand is outstripping capacity (p.44).

(ASCEMI 2009)

Addressing these problems now will save money, increase efficiency, create jobs, make businesses more competitive, and protect the environment.

SURFACE TRANSPORTATION

According to the ASCE report *Failure to Act: The Economic Impact of Current Investment Trends in Surface Transportation*, failure to repair surface transportation systems costs consumers and businesses money, reduces productivity and competitiveness of American firms, and costs jobs in the American economy (ASCE 2011b, p. 5). In 2010, it was estimated that deficiencies in America's surface transportation systems cost households and businesses nearly $130 billion, including $97 billion in vehicle operating costs, $32 billion in travel time delays, $1.2 billion in safety costs and $590 million in environmental costs (ASCE 2011b, p. 3).

ROADS & BRIDGES: D, C

According to the *2009 Michigan Report Card*:

- 38 percent of Michigan's roads are in poor or mediocre condition.
- Congestion on Michigan's roads is 8th worst in the country; in 2000 23 percent of urban highways were congested (p. 34).
- 12.3 percent of Michigan's bridges are structurally deficient, 15.2 percent are functionally obsolete
- A region's ability or failure to minimize traffic congestion and provide reliable freight movement has a significant impact on job creation or relocation. The report states "workplaces and residences will move away from congestion within metropolitan areas and from more congested to less congested regions within the United States" (p. 34).
- Driving on crumbling roads costs each Michigan motorist approximately $400 to $500 annually, depending on location, for a statewide total of $2.6 billion per year (p.36).
- Driving on congested roads costs the average urban Michigan motorists an annual amount varying from $300 in Grand Rapids to nearly $1,000 in Detroit, for a total of $2.3 billion per year (p.36).
- "Traffic crashes and fatalities in which roadway design is an important factor cost Michigan motorists $2.1 billion annually, approximately $250 per motorist."(p.36).

(ASCEMI 2009)

Michigan Department of Transportation's (MDOT) 2035 State Long-Range Transportation Plan published in 2012 projected more than $56 billion dollars' worth of statewide long-term investment needs for highway preservation and expansion combined over 24 years—$39 billion of which is not currently covered by revenue (MDOT 2012, p. 10).

Investing $2 billion per year over the next 24 years would create or sustain an estimated 65,145 jobs throughout the economy each year.[1]

RAIL: NOT GRADED

Freight rail in Michigan plays a vital role in the state's economy, connecting companies to the global marketplace. The *Michigan State Rail Plan* developed by the Michigan Department of Transportation (MDOT) is "based on the understanding that maintenance and expansion of rail service is critical to the economic well-being of the citizens and businesses of Michigan" (MDOT 2011, p. 1). The report notes that in 2010, the Federal Highway Administration's Freight Analysis Framework (FAF3) estimated an increase of over 23 million tons of additional rail exports from the state of Michigan by 2040 (MDOT 2011, p. 30).

Maintaining and expanding Michigan's rail system to meet the current and future needs requires continued investment in freight rail infrastructure, however rail system funding has faced significant cuts in the past ten years (MDOT 2011, p. 42). The *Michigan State Rail Plan* projects more than five billion dollars in freight rail

[1] Calculated using jobs number from the Federal Highway Administration 27,800 jobs per $1 billion in highway investment (Levine 2009, p. 7) and investment number $56.24 billion as cited above.

[2] Calculated using jobs number from Gauging Growth 20,000 jobs per $1 billion invested in rail (McCulloch, Pollack, & Van

capital costs over the next 20 years to fund the Best Investment Package scenario, which includes all projects identified in the public outreach process (MDOT 2011, p. 82).

Investing $260 million a year in freight rail over the next 20 years would create or sustain an estimated 5,200 jobs throughout the economy each year.[2]

TRANSIT: D+

The 2009 Report Card found that transit use in Michigan has grown faster than any other mode of transportation over the past two years and that while ridership is increasing, service is inadequate and not growing with demand (ASCEMI 2009, p.45). MDOT's *2035 State Long-Range Transportation Plan* published in 2012 found that transit ridership increased about 15.5 percent from 2005 to 2010 (MDOT 2012, p. 10). The Plan also reports that Michigan is expected to undergo a population shift over the next 25 years; increases in aging and retired people (p. 7) as well as immigrants (p. 9) may increase transit ridership further. The Plan projected $17.6 billion dollars' worth of statewide long-term investment needs for multi-modal preservation and expansion combined over 24 years- almost $11.9 billion of which is not currently covered by revenue (MDOT 2012, p. 10).

Investing $733 million a year in transit preservation and expansion over the next 24-year would create or sustain an estimated 26,464 jobs throughout the economy each year.[3]

Investment in surface transportation infrastructure creates direct jobs through the installation, maintenance, and renovation of roads, bridges, rail, and transit systems. Jobs created or maintained by this investment include the following: construction laborers, equipment operators, pipelayers, plumbers, sheet metal workers, electricians, brickmasons, maintenance and repair workers welders, mechanics, and others (U.S. BLS 2012). These projects drive demand for equipment and materials, creating indirect jobs in manufacturing, transportation, and logistics.

WATER

The ASCE report *Failure to Act: The Economic Impact of Current Investment Trends in Water & Wastewater Treatment Infrastructure* found that failure to repair or maintain drinking water and waste water treatment will likely result in unreliable water service and inadequate waste water treatment; pipes will leak, the construction of the new facilities required to meet stringent environmental standards will be delayed, addressing the gap will become increasingly more expensive, and waters will be polluted (ASCE 2011c). Water shortages will lead to higher rates for businesses and households and increased costs due to unreliable delivery and waste water

[2] Calculated using jobs number from Gauging Growth 20,000 jobs per $1 billion invested in rail (McCulloch, Pollack, & Van Gilder 2011, p. 7) and the investment number $5.197 billion as cited above annualized over 20 years.

[3] Calculated using jobs number from American Public Transportation Association: 36,108 jobs per $1 billion investment in public transportation (Weisbrod & Reno 2009, p. 28) and the investment number $17.59 billion, as cited above, annualized over 25 years.

treatment services (ASCE 2011c , p. v). The report found that nationally, aging pipes and inadequate capacity leads to discharge of an estimated 900 billion gallons of untreated sewage each year (ASCE 2011c, p. iv).

WASTE WATER: C

The 2009 Report Card found that Michigan has aging waste water infrastructure and that investments are needed to replace, rehabilitate, and expand waste water treatment and collection systems: over half of the sanitary sewer system mileage was built before 1970, several treatment plants are 30-40 years old, and many of the sewage systems are 50 to 100 years old (ASCEMI 2009, p.48). According to the U.S. Environmental Protection Agency (EPA) 2008 Clean Watersheds Needs Survey,[4] Michigan has reported $3.7 billion in needs for waste water infrastructure over the next 20 years (U.S. EPA 2013b).

Investing $185 million a year in waste water infrastructure over the next 20 years would create or sustain an estimated 3,700 jobs throughout the economy each year.[5]

DRINKING WATER: D

Every four years, the U.S. Environmental Protection Agency (EPA) produces a *Drinking Water Infrastructure Needs Survey and Assessment*. In their most recent Fifth Report to Congress in 2011, the survey identified $13.8 billion in needs over the next 20 years for the state (U. S. EPA 2013a, p. 18).

According to the Report[6]:

- 69 percent of Michigan's needs are in transmission and distribution projects, which are critical to the delivery of safe drinking water and can help ensure compliance with many regulatory requirements (p. 6).
- 18 percent of Michigan's needs are in treatment projects, which remove or inactivate disease-causing organisms or remove or prevent the formation of harmful chemicals in order to meet regulatory requirements (p. 7).
- 8 percent of Michigan's needs are in storage projects, which are critical to ensure adequate supplies of treated water to the public, particularly during periods of peak demand (p. 8).
- 5 percent of Michigan's needs are in source projects, which ensure an adequate supply of high quality water (p. 8).
  (U.S. EPA 2013a)

Investing $690 million a year in rehabilitating and replacing drinking water infrastructure over the next 20 years would create or sustain an estimated 13,800 jobs throughout the economy each year.[7]

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[4] The survey cited was conducted in 2008; a newer survey was conducted in 2012 and the report and data are expected to be available on the U.S. EPA website in early 2014.

[5] Calculated using jobs number from Clean Water Council: 20,000 jobs per $1B (Clean Water Council 2009, p. 1:6) and investment number $3.7 billion as cited above annualized over 20 years.

[6] Percentages calculated from Exhibit 2.1: State 20-year Need Reported by Project Type (in millions of January 2011 dollars) on p. 18 (U.S. EPA 2013a).

Investment in water infrastructure creates direct jobs through the replacement and upgrade of pipelines, treatment plants, storage tanks; and the installation of new green infrastructure projects and the new and retrofitted grey water systems used for water reuse and recycling, hot water circulation, and rain water catchment (BGA 2012, p. 2). These projects drive demand for equipment and materials, creating indirect jobs in manufacturing, transportation, and logistics.

Jobs created and maintained include the following: construction, steel and iron inputs, pipe fabrication, manufacturing equipment and machinery, heavy equipment operations and truck transport, architecture and engineering services, landscaping design and installation, technical equipment and instrumentation (BGA 2012, p. 3).

ENERGY: C-

The ASCE report *Failure to Act: The Economic Impact of Current Investment Trends in Electricity Infrastructure* notes that America's current electricity infrastructure is a complex patchwork system of power plants and transmission lines of varying ages, capacities, conditions, and capabilities (ASCE 2011a, p. 4). The report found that aging equipment can lead to intermittent failures in power quality and availability, and that capacity of equipment explains bottlenecks in the grid that can lead to brownouts and blackouts (ASCE 2011a, p. 4). Deficiencies in generation, transmission, or distribution can affect economic growth and our standard of living (ASCE 2011a, p. 10). Electricity demand is expected to increase over the long term, and increased investments will be required in order to have reliable electricity in the future (ASCE 2011a, p. 4).

Similarly, investments to modernize the natural gas distribution system will increase efficiency; these efficiency improvements will keep methane in the system, create jobs throughout the economy, and save rate payers money.

ELECTRICITY

A 2011 report titled *Michigan Unplugged? The Case for Shared Investment in Regional Transmission Projects* found that "despite improvements in recent years, the Michigan electric grid remains insufficient to meet projected demands for reliable, economical, and cleaner energy" (Anderson, Watkins, & Rosean 2011, p.2). They also note that electricity costs are higher in Michigan than other midwest states (p. 12). Similarly, the Michigan Report Card found that:

- Michigan's fossil fuel-based generating fleet is the second oldest in the country, with an average age of 49 years (p.22).
- A recent report from ITC cited many challenges with the existing integrated Michigan transmission system including capacity limits on Ontario grid interfaces and presence of many points of congestion (p. 23).

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[7] Calculated using jobs number from Clean Water Council: 20,000 jobs per $1 b illion (Clean Water Council 2009, p. 1:6) and investment number $13.8 billion as cited above annualized over 20 years.

- New baseload or removal of congestion and energy efficiency measures will be needed over next 5 to 10 years (p. 27).

(ASCEMI 2009)

The Michigan Unplugged report describes a four-year, $510 million Thumb Loop Expansion Project, which is currently under construction and is expected to be completed in 2014 (Anderson, Watkins, & Rosean 2011, p.5; ITC Holdings 2011). The Wind Energy Resource Zone Board identified a region in the thumb with high wind energy potential and in response to the *2008 Clean, Renewable and Efficient Energy Act* (Public Act 295) legislation in Michigan. The Thumb Loop project adds additional transmission that will accommodate future wind capacity from this region (ITC Holdings 2011, p. 1).

Investing $128 million a year on the Thumb Loop Expansion project over four years is creating or sustaining an estimated 1,650 jobs throughout the economy each year [8].

Investment in electrical grid infrastructure creates jobs in construction, design and engineering, and project management to build transmission lines, towers, and substation structures, transformers and switch gear. These projects drive production of materials like steel, aluminum, and other building materials like concrete and gravel (Pfeifenberger & Hou 2011, p. 19).

NATURAL GAS

The U.S. Department of Transportation's Pipeline & Hazardous Materials Safety Administration (PHMSA) is the federal agency that sets and enforces standards for hazardous material transportation, including natural gas pipelines. In 2011, Department of Transportation Secretary Ray LaHood and PHMSA issued a Call to Action to accelerate the repair, rehabilitation, and replacement of the highest-risk pipelines. Cast and wrought iron pipelines are considered high-risk because of their age, joint design, and material (PHMSA 2013a). In January 2012, the *Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011* provided the regulatory certainty necessary for pipeline owners and operators to plan infrastructure investments and create jobs (PHMSA 2013a). These two actions were aimed at addressing the high risks of aging cast and wrought iron pipelines. PHMSA data from the *Cast and Wrought Iron Pipeline Inventory* showed that, in March of 2012, Michigan had the fifth most mileage of high-risk pipelines, with 3,101 miles (PHMSA 2013b).

Replacing the 3,100 miles of old cast and wrought iron natural gas pipelines would create or sustain an estimated 13,774 jobs throughout the economy each year.[9]

Investment in repairing pipeline infrastructure creates and maintains construction jobs for pipefitters, welders, equipment operators, truck drivers, laborers, inspectors, iron workers, electricians, and others (Black & Veatch

[8] Calculated using Working group for Investment in Reliable and Economic electric Systems (WIRES) jobs number 13,000 full-time-equivalent ("FTE") years of employment per $1 billion of U.S. transmission investment (Pfeifenberger & Hou 2011, p. ii) and investment number $510 million Thumb Loop Expansion project cost as cited above.

[9] Jobs number calculated based on old pipeline mileage 3,100 using Market Sizing- Natural Gas Distribution Excel spreadsheet (McCulloch 2013).

2012, p. 2-7). These projects drive demand for materials and equipment like pipe and valves as well as surveying services, legal services, financing, catering, and others (Black & Veatch 2012, p. 3-1).

COMMUNICATION

Smart Grid

According to a 2009 report from the Information Technology & Innovation Foundation (ITIF) titled *The Digital Road to Recovery*, Smart Grid technology utilizes sensors and advanced information technology (IT) to create two-way communication between electrical power producers and consumers, allowing producers to better understand and respond to supply and demand using real-time data. Not only does smart grid technology increase the efficiency and reliability of the electrical grid, it also generates many societal benefits, including lowering peak demand, allowing for more distributed generation and renewable power sources, and enabling the use of new technologies like electric vehicles (Atkinson et al. 2009, p. 12).

In 2009, the American Recovery & Reinvestment Act (ARRA) provided funding for several Smart Grid Investment Grants (SGIGs) offered through the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability. A project of Michigan's Detroit-based DTE was funded to install smart meters to about one-third of their customers—a total of 725,000 customers—as well as distribution automation devices at 11 substations and on 55 circuits, leading to better service and increased reliability (U.S. DOE 2012, p. 1).

Currently, projections from the Edison Foundation's Innovation, Electricity, Efficiency Institute (IEE) indicate that, by 2015, more than 50 percent of Michigan end-users are expected to have smart meters (IEE 2013, p.2). The ITIF report mentioned above cites a 2007 study that found the average advanced metering project cost was $775 million and took slightly longer than 5 ½ years to install roughly 2.2 million meters (Atkinson et al. 2009, p. 13). If a utility in Michigan were to do one of these average projects to increase smart grid infrastructure build out in the state, more than 18,500 jobs could be created or maintained.

Investing $140 million in smart grid advanced metering infrastructure build out per year for 5 ½ years would create or sustain an estimated 3,368 jobs throughout the economy each year.[10]

Investment in expanding smart grid infrastructure creates grid design and construction jobs including laying new pipes and wires, equipment operation, and labor as well as creating jobs for upgrades and repairs to transmission and distribution lines. These direct jobs drive creation of indirect jobs to supply materials and components for hardware such as sensors, smart meters, substation automation equipment, and information technology equipment like networking equipment and servers as well as related software (Atkinson et al. 2009, p. 14).

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[10] Calculated using the jobs number from (Atkinson et al. 2009, p. 2) and assuming numbers for an average project as reported in Atkinson et al.: investment number $775 million (Atkinson et al. 2009, p. 13) over 5 ½ years.

SUMMARY

Michigan's infrastructure systems are in urgent need of repair- as this report shows, roads and bridges, water, waste water, transit, energy, and communication systems need increased investment to become efficient, safe, and productive for Michigan residents.

Failure to repair, maintain, and bolster infrastructure systems has serious consequences for Michigan:

- Insufficient surface transportation systems cost consumers and businesses money, reduce productivity and competitiveness of Michigan businesses, and cost jobs in the economy.
- Failure to repair and maintain water infrastructure can result in unreliable water service, inadequate waste water treatment, inadequate capacity, and pollution—leading to higher rates, increased medical costs, and environmental damage.
- Insufficient electricity infrastructure leads to bottlenecks, intermittent failures in power quality and availability, brownouts, and blackouts- putting Michigan's quality of life and economic vitality at risk. Additionally, fewer renewable electricity sources can be incorporated into an aging system without investment in modernization.
- Insufficient natural gas pipeline infrastructure can lead to damaged pipelines, adding to monetary, environmental, and climate costs.

Repairing Michigan's infrastructure creates good jobs and positively affects business productivity, competiveness, and efficiency—saving money, energy, and other resources as well as reducing greenhouse gas emissions that lead to climate change. Additionally, resilient transportation, water, energy, and communication systems can help communities to increase public safety and withstand increasingly occurring severe weather events and super storms.

Repairing Michigan can reverse the worst impacts of climate change, prepare communities state-wide, and strengthen the state's economy. More than an estimated 119,300 jobs could be created across the Michigan economy by making much-needed investments in our basic infrastructure systems; jobs installing, maintaining, and renovating infrastructure systems as well as jobs manufacturing and transporting components, equipment, and materials.

SOLUTIONS: FINANCING AT THE LOCAL, STATE AND FEDERAL LEVELS

Public funding alone is unlikely to be sufficient to address infrastructure concerns. Innovative funding mechanisms must leverage consistent government support with the capabilities of private investment. This section provides some examples of financing mechanisms to support the necessary infrastructure repair and investment for Michigan as illustrated by this report.

Infrastructure Banks and Energy

Modernizing American infrastructure will require new levels of strategic funding across a broad range of sectors. Infrastructure banks utilize public resources to unlock private investment and are new approach to drive capital into 21st century infrastructure projects. The National Infrastructure Development Bank Act of 2013 introduced by Congresswoman Rosa DeLauro (D-CT) is a federal example of this model. According to a press release from

the BlueGreen Alliance, the National Infrastructure Development Bank would provide financial products such as loan guarantees to attract private funding for projects in energy, transportation, water and telecommunications that increase the efficiency of these systems and create good jobs (BGA 2013). State examples of development banks include New York's recent "Green Bank", aimed at reducing market barriers to clean and efficient energy projects. As reported in a press release from Governor Cuomo's office, it is estimated the New York Green Bank will double the capital available in five years, and increase by 10-fold after 20 years (Governor Cuomo's Press Office 2013).

Transportation

Infrastructure banks can be utilized for sector-specific projects, as well. One example outlined in the Apollo Alliance report *Make it in America: The Apollo Clean Transportation Manufacturing Action Plan* is the Transportation Infrastructure Finance and Innovation Act, or TIFIA, program, which provides federal credit assistance to surface transportation projects of national and regional significance (Apollo Alliance 2010, p. 6). Additional potential exists to rebuild the domestic manufacturing sector while simultaneously repairing or building new infrastructure if preferences or incentives for projects utilizing vehicles and equipment with higher domestic content are put in place (Apollo Alliance 2010, p. 7).

Water

Federal infrastructure programs, such as the state revolving funds (SRFs), help close the funding gap for infrastructure. According to the BlueGreen Alliance *Joint Policy on Water Issues*, the Clean Water State Revolving Fund has leveraged more than $74 billion in water infrastructure investment, creating 1.4 to 2 million jobs through the U.S. economy (BGA 2012, p. 3). The policy also notes that attaching domestic sourcing provisions to these taxpayer-sourced investments would promote technology and innovation in the U.S., create quality jobs, and deliver the highest benefit to the taxpayers and the economy (p. 3).

Utilities

Modern infrastructure facilitates the efficient, reliable and dynamic use of energy. Due to the regulated nature of gas and electric utilities, rates are charged to the customer to support both the cost of energy and the infrastructure built to deliver it. These rates are set in advance, and are adjusted in a rate case before a public service commission. Often, this element makes it difficult to implement and finance infrastructure investments. According to a recent report from the Conservation Law Foundation, tools such as Targeted Infrastructure Replacement Factors (TIRFs) allow a utility to track capital investments and recover the costs more quickly than through a traditional rate case. These mechanisms are approved by a public service commission and shorten the timeline for repairs (Cleveland 2012, p. 11).

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