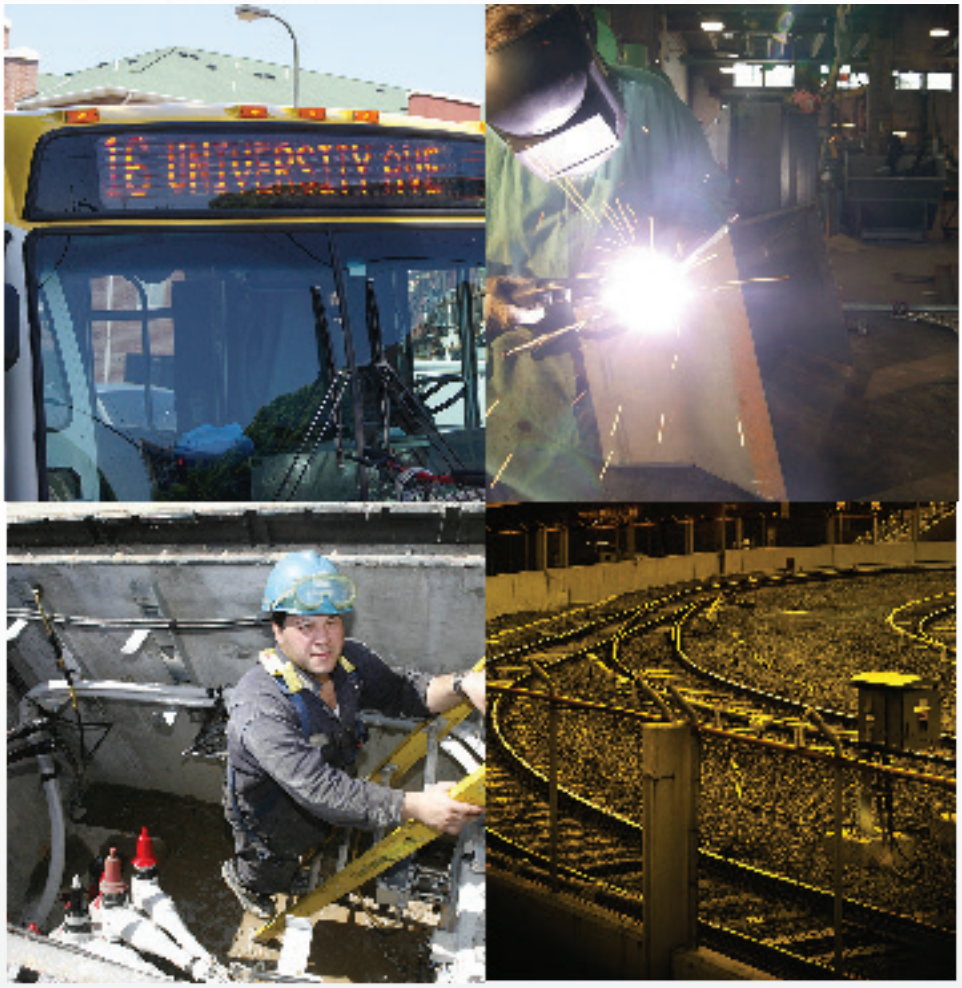
REPAIR AMERICA

PROTECT, PRODUCE & PROSPER

REPAIR OHIO:

CREATING GOOD JOBS WHILE PREPARING OUR INFRASTRUCTURE FOR CLIMATE CHANGE



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REPAIR OHIO: CREATING GOOD JOBS WHILE PREPARING OUR INFRASTRUCTURE FOR CLIMATE CHANGE

EXECUTIVE SUMMARY

Ohio's infrastructure systems are in urgent need of repair. Our state's roads and bridges, water, wastewater, transit, energy, and communication systems need increased investment to be efficient, safe, and productive for Ohio residents. Repairing Ohio will create good jobs, make our economy 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 identifies needed investment—some of which is already in the planning stages—in roads, bridges, transit, wastewater, drinking water, electricity, natural gas and a smarter energy 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.

We estimate that more than 167,700 jobs could be created across the Ohio 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 Ohio: A Job Creation Opportunity	
Roads and Bridges	Investing $3 billion per year over the next 27 years (through 2040) would create or sustain close to an estimated 90,000 jobs throughout the economy each year
Rail	Investing $516 million in freight rail would create or sustain an estimated 10,000 jobs throughout the economy
Transit	Investing $1.1 billion a year in transit preservation and expansion over the next 27 years would create or sustain an estimated 38,000 jobs throughout the economy each year
Wastewater	Investing $711 million a year in wastewater infrastructure over the next 20 years would create or sustain an estimated 14,200 jobs throughout the economy each year
Drinking Water	Investing $610 million a year in rehabilitating and replacing drinking water infrastructure over the next 20 years would create or sustain an estimated 12,200 jobs throughout the economy each year
Electricity	Investing $700 million a year on the FirstEnergy Energizing the Future transmission projects over four years will create or sustain an estimated 9,000 jobs throughout the economy each year
Natural Gas	Replacing the 582 miles of old cast and wrought iron natural gas pipelines would create or sustain an estimated 6,600 jobs throughout the economy
Smart Grid	Investing $140 million in smart grid advanced metering build out per year for 5 ½ years would create or sustain an estimated 3,300 jobs throughout the economy each year

INTRODUCTION

Infrastructure is the backbone of America. Communities across the country need 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 pollutants and greenhouse gases. Reroutes due to damaged roads and bridge closings can increase congestion of vehicle traffic, wasting fuel and 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 good 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 wastewater systems average over 800 water main breaks per day nationwide, leaking more than 15 percent of our drinking water before it ever reaches our homes and businesses; 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 Ohio 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 Ohio.

The latest state level infrastructure report card conducted by the American Society of Civil Engineers Ohio Council of Local Sections (ASCEOH) in 2009 graded 10 categories of Ohio's infrastructure. In the 2009 Ohio Infrastructure Report Card, bridges received the highest grade of B-; six Cs and three Ds make up the rest of the grades (ASCEOH 2009). Ohio's infrastructure is in need of repair, costing the state time and money, polluting the environment, and limiting job growth.

According to the ASCE:

- 42 percent of Ohio's roads are in poor or mediocre condition (ASCE 2013c).
- 9.1 percent of Ohio bridges are considered structurally deficient, and 15.9 percent are considered functionally obsolete (ASCE 2013c).
- Demand for freight rail service was forecasted to increase 71 percent by tonnage and 85 percent by ton-miles between 2005 and 2035 (ASCEOH 2009, p. 42).
- Most of the problems requiring work on drinking water systems occur in medium and small drinking water systems that serve relatively small populations (ASCEOH 2009, p. 24).
- Ohio is ranked 45th in the nation for production of renewable energy each year (ASCE 2013c).

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).

In 2013, the Ohio Department of Transportation (ODOT) published a drafted update of the state of Ohio's long range transportation plan, titled Access Ohio 2040. The plan includes "a comprehensive inventory of transportation services and infrastructure, forecasts of transportation demand, asset condition and performance and an analysis of the trends affecting transportation in Ohio" (ODOT 2013b, p. 1). Much of the information in the following sections of this report comes from this long-range transportation plan.

ROADS & BRIDGES: D, B-

The Access Ohio 2040 long range transportation plan Technical Memorandum on the State of the System reports that more than 9 percent of bridges in Ohio are considered structurally deficient and 14 percent are considered functionally obsolete (ODOT 2013a,. 20). Additionally, a reported 531 miles of road was determined to have "unacceptable" pavement conditions (p. 18). The report projected $75 billion dollars' worth of roadway needs for both state and non-state roads and almost $12.8 billion in needs for state and non-state bridges, totaling almost $88 billion dollars' worth of combined roadway and bridge needs over the next 27 years (p. 74).

Investing $3 billion per year over the next 27 years would create or sustain close to an estimated 90,000 jobs throughout the economy each year.[1]

RAIL: C-

According to the 2010 Ohio Statewide Rail Plan developed by the Ohio Department of Transportation (ODOT), freight rail in Ohio plays a vital role in the state's economy while adding benefits to the environment, energy production and efficiency, land use, and quality of life for the state's citizens (ODOT 2010, p. 1-2). Access Ohio 2040 reports that Ohio has the highest concentration of rail lines in any state and that the freight system is critical to the state's economy, connecting businesses and industry (p. 80). Access Ohio 2040 also reports that aging freight rail systems, overcapacity, and intermodal rail hub development all require future investment (ODOT 2013a p. 55).

The statewide rail plan notes that in 2007, about 28 percent of all freight carried in Ohio was carried by rail (p. 8-1) and that trains per day are expected to increase by as much as 30 percent by 2035 (p. 8-2). A 2007 report identified and quantified 30 of the most severe rail choke points, or bottlenecks, in the rail system; the process to update that list is currently underway (p. 8-5).

The long range investment program outlined in the report (discussed on p. 12-1) includes five projects totaling a cost of more than $516 million: 3C project ($400 million, funded by ARRA), CSX National Gateway project ($98 million, funded by a TIGER Grant), and three Ohio Rail Development Commission (ORDC) projects (funded by

[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 $87.9 billion as cited above annualized over 27 years.
[2] Calculated using jobs number from Gauging Growth 20,000 jobs per $1 billion invested in rail (McCulloch, Pollack, & Van

annual GRF grant appropriation of $1.5 million, loan appropriation of $1.9 million, and safety appropriation of $15 million)(ODOT 2010, Appendix C-1).

Investing $516 million in freight rail would create or sustain an estimated 10,000 jobs throughout the economy.[2]

TRANSIT: NOT GRADED

According to the Access Ohio 2040 Technical Memorandum on the State of the System, 86 out of the 88 counties in Ohio are served by public transit and/or specialized transportation systems (ODOT 2013a p. 24), and that many customers currently have no other transportation options available (p. 25). Costs to maintain the existing system for both the transit-dependent population as well as customers that choose transit represent the bulk of needed investment—over $23 billion—over the next 27 years (p. 29). In addition, the report states that more than a $5 billion investment will be needed to enhance the current system (p. 30), as population growth is expected to increase the demand for public transportation between now and 2040 (p. 76). In total, the long-range transportation plan reports more than $28 billion in transit needs between 2014 and 2040 (p. 76).

Investing $1.1 billion a year in transit preservation and expansion over the next 27 years would create or sustain an estimated 38,000 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 wastewater treatment will likely result in unreliable water service and inadequate wastewater 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 wastewater 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).

WASTEWATER: D+

[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 $516 million as cited above; note that this number is not annualized.
[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 $28.7 billion, as cited above, annualized over 27 years.

The 2009 Report Card reports that wastewater systems are outliving their useful design lives as a consequence of an investment gap in wastewater infrastructure (ASCEOH 2009, p. 58). The Report Card cites an EPA estimate that combined sewer overflows nationwide is 850 billion gallons per year, and as much as 10 billion gallons of raw sewage is released annually due to blocked or broken pipes (p. 58). The paper also notes that there is a general lack of statewide data on wastewater (p. 59). According to the most recent data from the U.S. Environmental Protection Agency (EPA) 2008 Clean Watersheds Needs Survey,4 Ohio has reported $14.2 billion in needs for wastewater infrastructure over the next 20 years (U.S. EPA 2013b).

Investing $711 million a year in wastewater infrastructure over the next 20 years would create or sustain an estimated 14,200 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 $12.2 billion in needs over the next 20 years for the state (U. S. EPA 2013a, p. 18).

According to the Report:[6]

- 66 percent of Ohio'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 Ohio'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).
- 10 percent of Ohio'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).
- 4 percent of Ohio's needs are in source projects, which ensure an adequate supply of high quality water (p. 8). (U.S. EPA 2013a)

Investing $610 million a year in rehabilitating and replacing drinking water infrastructure over the next 20 years would create or sustain an estimated 12,200 jobs throughout the economy each year.[7]

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 gray water systems used for water reuse and recycling, hot water circulation, and rain water

[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 $14.2 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).
[7] Calculated using jobs number from Clean Water Council: 20,000 jobs per $1 billion (Clean Water Council 2009, p. 1:6) and investment number $12.2 billion as cited above annualized over 20 years.

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, and technical equipment and instrumentation (BGA 2012, p. 3).

ENERGY

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 (p. 4). Deficiencies in generation, transmission, or distribution can affect economic growth and our standard of living (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 (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 ratepayers money.

ELECTRICITY: C+

FirstEnergy, an investor owned utility with 10 electric distribution companies serving customers in Ohio, Pennsylvania, New Jersey, West Virginia, Maryland, and New York, began an effort in 2012 called Energizing the Future as part of an "ongoing commitment to enhance its high voltage system (FirstEnergy 2013). The company was recognized in August 2013 for their upgrade efforts since the massive blackout that originated in their territory 10 years ago in 2003 (Lin-Fisher, 2013).

A press release on a 2013 $2.8 billion expansion of FirstEnergy's effort states that enhancing service reliability to communities, businesses, and homes is the focus of the transmission effort and the goal of the work is to replace outdated equipment—much of which has an average age of 40 years—with state of the art "smart technology" (FirstEnergy 2013). Regarding job creation, the press release states that "[w]hile some of the projects will be done by FirstEnergy personnel, certain aspects of the work will be completed by area electrical contractors, which will benefit the local economy by creating additional construction jobs. Over four years, this program is expected to put more than 1,100 contractors to work, with the majority being union workers from northeast Ohio" (FirstEnergy 2013). The projects in the expansion of the effort are expected to take place over four years starting in 2014 and the main focus is on Ohio Edison, Cleveland Electric Illuminating Company, Toledo Edison and Penn Power areas.

Investing $700 million a year on the FirstEnergy Energizing the Future transmission projects over four years will create or sustain an estimated 9,000 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: NOT GRADED

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, Ohio had 582 miles of high-risk pipelines (PHMSA 2013b).

Replacing the 582 miles of old cast and wrought iron natural gas pipelines would create or sustain an estimated 6,600 jobs throughout the economy.[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 2012, p. 2-7). These projects drive demand for materials and equipment like pipe and valves as well as surveying services, legal services, financing, food service, and others (Black & Veatch 2012, p. 3-1).

COMMUNICATION: NOT GRADED

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 (Atkinson et al. 2009). Not only does smart grid technology increase the efficiency and reliability of the electrical grid, it also generates many societal

[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 $2.3 billion *Energizing the Future* project cost as cited above.

[9] Jobs number calculated based on old pipeline mileage 582 using *Market Sizing- Natural Gas Distribution* Excel spreadsheet (McCulloch 2013).

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 types of smart grid projects through the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability. Ten projects received funding in Ohio (SmartGrid.gov 2013). One example is the AEP Ohio gridSMART[SM] Demonstration Project, which was funded to build a secure, interoperable, integrated smart grid that demonstrates the grid's ability to maximize efficiency and reliability as well as consumer use of demand response programs to reduce peak consumption, peak demand costs, and emissions. The project area covered 150 square miles and used approximately 110,000 smart meters (U.S. DOE 2013).

Currently, projections from the Edison Foundation's Innovation, Electricity, Efficiency Institute (IEE) indicate that, by 2015, more than 50 percent of Ohio 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 Ohio 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 3,300 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).

SUMMARY

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

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

- Insufficient surface transportation systems cost consumers and businesses money, reduce productivity and competitiveness of Ohio businesses, and cost jobs in the economy.

[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.

- Failure to repair and maintain water infrastructure can result in unreliable water service, inadequate wastewater 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 Ohio'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 Ohio'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 Ohio can reverse the worst impacts of climate change, prepare communities statewide, and strengthen the state's economy. **More than an estimated 167,700 jobs could be created across the Ohio 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 Ohio 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 a 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 million 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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