

ISSUE PAPER

# TAKING THE HIGH ROAD TO MORE AND BETTER INFRASTRUCTURE IN THE UNITED STATES



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## THE HIGH ROAD INFRASTRUCTURE PROJECT OVERVIEW

Over the past year, NRDC has been commissioned by the Ford Foundation to lead a cross-disciplinary research team to explore the challenges of generating more and better infrastructure investments to build 21st-century communities. Our work included a literature review, interviews with investors and city officials (including a close engagement in the cities of Denver and Los Angeles), and collaboration with national and international stakeholders through the White House’s Build America Initiative and the Clinton Global Initiative America Infrastructure Working Group. We believe that the United States can no longer treat infrastructure like an ongoing crisis, but must approach it as an opportunity not to be missed. We have focused on cities because they often play a critical role in projects’ design, planning, construction, and financing. Our findings and lessons, however, apply to any level of local government.

This new vision, which we call High Road Infrastructure, preferences projects that perform core infrastructure functions (e.g., generating electricity, minimizing waste, decontaminating stormwater, and providing transportation) while also delivering social and environmental benefits (e.g., jobs, improved mobility, and climate resiliency). A holistic approach—in which infrastructure projects are expected to deliver multiple benefits—is a potential national rallying point and is gaining credence nationwide as jurisdictions confront harsher climate change effects, shifting demographics, and transportation trends, as well as lifestyles built around urban density.<sup>1,2</sup> The High Road approach is unique in that it connects comprehensive standards that define high-performance infrastructure, innovative financing, and refashioned government processes to enhance outcomes.

This is the first in a series of papers examining the concept of High Road Infrastructure. While this paper provides an introduction, following papers will cover the necessary steps for defining and creating High Road projects, the role of intermediaries in building community capacity, how to implement innovative forms of financing and investment, and the federal role in enabling public and private investors and local governments to achieve these goals. The series will demonstrate that the High Road approach more easily and reliably creates consensus among government, citizens, and investors around what infrastructure should be built by ensuring responsiveness to the long- and short-term needs of the communities that it is meant to serve.

### WHY IS HIGH ROAD INFRASTRUCTURE NEEDED?

The nation’s infrastructure is in trouble.

America’s cities and towns often await the next major infrastructure failure before beginning important projects. This reactive approach is often more expensive than proactive upgrades. It also potentially threatens health and lives. Even then, projects are selected with little consideration of infrastructure as a foundation for a better future for communities.

Chronic underinvestment in infrastructure is a root cause of human-made disasters like the water crisis in Flint, the dangerous transit breakdowns burdening Washington’s Metro system, and collapsing bridges like the one Minneapolis saw in 2007. The [American Society of Civil Engineers’ most recent report card](#) gives a D+ to the nation’s overall infrastructure. The cost of bringing roads, bridges, dams, railways, drinking water, solid waste, and wastewater up to minimum standards by 2020 is estimated at \$3.6 trillion.<sup>3</sup> Yet, according to the nonpartisan Congressional Budget Office, the amount of money available from federal and local sources for transportation and water infrastructure, for example, [is declining](#), and these bare minimum investments don’t include projects that could help stimulate economic development or make communities more resilient to climate change.<sup>4</sup> Furthermore, funds often do not go toward communities with the greatest need or to projects with the greatest public demand, such as [quality public transit](#), which is key to equitable access to mobility, affordable housing, and quality of life.<sup>5</sup>

In short, much of the United States’ infrastructure is antiquated, based on design principles that reflect an era with fewer people and cars and scarce data and technology, and before devastating environmental repercussions such as carbon pollution were understood. Some have compared the scope of necessary upgrades to the [building of the Interstate Highway System](#) in the mid-1950s. Yet, while high-functioning infrastructure is fundamental to America’s ongoing growth, competitiveness, health, and resilience, the recognition that our cobbled-together systems are breaking down is not catalyzing the necessary action in the public or the private sectors quickly or broadly enough.

States, cities, and communities nationwide need new ways to improve and build overdue infrastructure projects, but they are hampered by budgetary and political constraints. Internal governing and funding structures are burdened by a lack of information and by agencies that work in silos despite interrelated objectives.

New financial vehicles such as green bonds and public-private partnerships are being developed to tackle these challenges. At the same time, institutional investors (e.g., pension funds, sovereign wealth funds, insurance companies, endowments) increasingly seek infrastructure projects that fit their long-term risk-return profile while meeting the economic, environmental, and social challenges of the future.<sup>6</sup> This desire for new approaches goes beyond our fixation on infrastructure “patches” and antiquated solutions.<sup>7</sup> We need to take the High Road.

## BETTER AND MORE COMPLETE STANDARDS: ROAD MAP TO THE HIGH ROAD

Basic infrastructure standards require that projects be built on time and within budget, and that the minimum legal and technical performance benchmarks be upheld during operation and maintenance. But too often, these conventional standards fail to account for all the economic, environmental, and social costs and opportunities. Even when infrastructure investments are promoted as providing social benefits, the delivery of these benefits is rarely measured.

Traditionally, developers think of their bottom line in one dimension: economic. However, to move infrastructure onto the High Road, the bottom line must expand to include four dimensions: economic, environmental, climate change resilience, and social. High Road projects must be transparently measured against specific, realistic, and enforceable standards that adequately address all four dimensions while ensuring that High Road elements are core and not superfluous features quickly jettisoned to reduce costs or increase near-term profits. High Road standards, implemented properly at the project level, can transform stakeholders’ expectations and demands.

## ENVIRONMENTAL STANDARDS

Environmental standards measuring infrastructure’s impact on land, water, air, biodiversity, and climate have transformed energy infrastructure, providing a road map for implementing standards in other kinds of infrastructure development. Since the 1970s, for example, power plants have had to comply with laws such as the federal [Clean Air Act](#) to lower emissions of air pollutants. Until 2014, carbon dioxide wasn’t classified as a pollutant under the Act, but well prior to this, as the effects of carbon pollution became evident, states began to adopt voluntary or mandatory standards to incorporate low- or zero-carbon power plants. These “renewable portfolio standards” required increased energy production from renewable resources like wind and solar. Since 2000, about [60 percent](#) of deployed renewable energy has been due to the renewable portfolio standards, sending a clear signal to investors about available opportunities.<sup>8</sup> According to Bloomberg New Energy Finance, total annual domestic clean energy investment rose from about \$10.3 billion in 2004 to \$51.8 billion in 2014.<sup>9</sup>

Indeed, the rise of renewable energy has underscored the effectiveness of looking beyond immediate costs to account for long-term consequences and benefits. Also, when the health costs of fossil fuel air pollution are tallied, renewable generation becomes even more competitive. And as more clean energy becomes available, its costs decrease, creating a virtuous cycle.<sup>10</sup>

All in all, as evidenced by the success of renewable portfolio standards, clear standards, coupled with targeted incentives, can drive the demand for better infrastructure. While not every renewable energy project meets all High Road criteria, overall, renewable energy generates multiple benefits. A 2016 report by the National Renewable Energy Laboratory (NREL) revealed that renewable portfolio standards have created stable jobs, reduced electricity and natural gas prices, saved water, and prevented illness and death.<sup>11</sup>

Going beyond energy infrastructure, independent entities like the Climate Bonds Initiative are convening groups of experts to develop a series of environmental standards for buildings, transportation, land use, waste, and water projects.<sup>12</sup> Transparency efforts like the Sustainability Accounting Standards Board<sup>13</sup> integrate environmental standards into the conventional evaluation framework. Many of these standards home in on the key environmental impacts of each type of infrastructure, including location, efficiency, pollution, and waste management. The standards are designed to serve as a bridge between cities that want best-in-class environmental infrastructure assets and investors who want projects with high environmental and economic performance.

## RESILIENCE STANDARDS


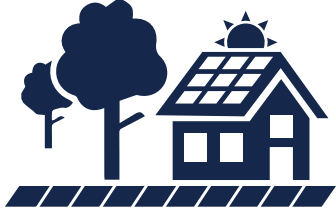



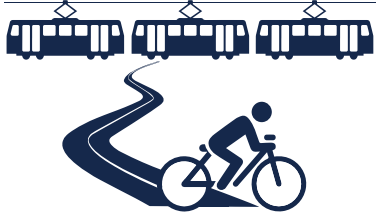

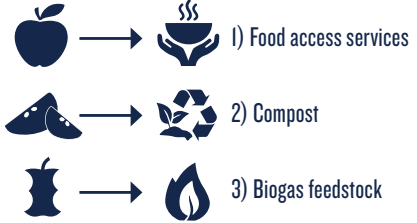
Powerful storms like Hurricanes Andrew, Katrina, and Sandy have unmasked the vulnerability of our power, water, transportation, and communications networks as well as our buildings and coastal protections. As a result, “climate resilience” has emerged as a pressing High Road standard. Climate resilience standards pertain to infrastructure’s ability to withstand and recover from chronic stresses, including overuse, and acute shocks such as extreme weather events.<sup>14</sup> As with renewable energy, climate resilience investments often require higher up-front costs but enhance safety, security, and productivity.

Innovative partnerships across the philanthropic, public, and private sectors are developing and applying resilience standards. In early 2016, the U.S. Department of Housing and Urban Development (HUD) awarded \$1 billion to 13 states and communities for infrastructure and housing projects under the National Disaster Resilience Competition. The winners received technical assistance for developing climate resilience proposals from the Rockefeller Foundation.<sup>15</sup> The insurance industry is leading other efforts to quantify the savings from reduced insurance claims that would come from early resilience investments.<sup>16</sup>



# HIGH ROAD INFRASTRUCTURE FRAMEWORK

When it comes to infrastructure, the status quo is limiting our potential. By taking the High Road approach, we build a foundation for a better future for communities. Here's how the High Road can lead to different and better outcomes.

INFRASTRUCTURE NEED	High Road Standards	High Road Finance	High Road Infrastructure
<b>ENERGY</b>			
<p><b>Problem:</b> Growing demand &amp; severe storms</p>  <p><b>Status quo:</b> Centralized power plants</p>	<p><b>Environment:</b> Reduction of carbon and other pollutants, decrease in water use, shrinking of landscape impacts</p> <p><b>Resilience:</b> Creation of hardened and distributed assets that can survive acute or chronic stresses</p> <p><b>Social and Economic:</b> Lower energy bills, investments that support small businesses, homeowners, renters and critical facilities like municipalities, universities, schools and hospitals</p>	<p>Factor in savings from locational efficiency, reduction of peak energy demand and avoided fossil fuel costs</p>	<p><b>Solution:</b> Distributed solar and energy efficiency</p>  <p><b>Additional benefits:</b> Jobs, increased property values, reduced health impacts and costs</p>
<b>WATER</b>			
<p><b>Problem:</b> Stormwater runoff pollution</p>  <p><b>Status quo:</b> Pipes only</p>	<p><b>Environment:</b> Reduction of discharges of runoff and sewage into waterways</p> <p><b>Resilience:</b> Greater capacity to reduce flooding and store water in case of drought with green and gray solution</p> <p><b>Social and Economic:</b> More green space, fewer heat islands, quality jobs, prioritized siting in low and moderate income communities</p>	<p>Bundle small projects for economies of scale for institutional investors, stormwater credit trading schemes and tax rebates to spur green infrastructure on private parcels, community development tax credits to reach disadvantaged communities</p>	<p><b>Solution:</b> Green infrastructure component</p>  <p><b>Additional benefits:</b> Increased recreational activities, habitat restoration, increased rents and property values</p>
<b>TRANSPORT</b>			
<p><b>Problem:</b> Urban congestion</p>  <p><b>Status quo:</b> More highways</p>	<p><b>Environment:</b> Reduction of carbon and other pollutants, increase in urban density through transit-oriented development</p> <p><b>Resilience:</b> Storm-hardened design; increased transport options</p> <p><b>Social and Economic:</b> Lower transportation costs, decreased car use, promotion of exercise, creation of quality jobs through project labor agreements</p>	<p>With fee revenue and well established environmental and economic benefits, low-carbon transport is a good candidate for either a green bond or a public-private partnership</p>	<p><b>Solution:</b> Light rail, bike share and bike path</p>  <p><b>Additional benefits:</b> Improved health, increased access to jobs and amenities, economic development</p>
<b>WASTE</b>			
<p><b>Problem:</b> Methane emissions from landfill</p>  <p><b>Status quo:</b> More landfills</p>	<p><b>Environment:</b> Reduction in methane emissions and water pollution</p> <p><b>Resilience:</b> Use of reclaimed land for green space, stormwater capture and renewable energy</p> <p><b>Social and Economic:</b> Reduction in food waste reduces household and business costs</p>	<ol style="list-style-type: none"> <li>1) Restaurants get tax credit for donating food</li> <li>2) Organic collection fee pays for aggregation</li> <li>3) Remaining organic matter waste used for compost or energy</li> </ol>	<p><b>Solution:</b> Diversion and re-use</p>  <p><b>Additional benefits:</b> Improved nutrition, less hunger, engaged community, new businesses supported</p>

In another promising development, New Jersey has established and capitalized the Energy Resilience Bank, which finances infrastructure that meets climate change resilience standards designed to avoid or mitigate some of the worst effects of extreme weather events.<sup>17</sup>

### **SOCIAL AND ECONOMIC STANDARDS (EMPLOYMENT)**

Infrastructure projects are often cited as job creators, but such jobs should be subject to High Road criteria.<sup>18</sup> For example, they should ensure that job creation gains target populations and communities with under-employment. They should also provide a living wage or better, health insurance, sick leave, family leave, and skill-building and advancement opportunities.<sup>19</sup> Employers should also consider diversity when making hiring decisions. The issue of employment standards is particularly acute for infrastructure delivered via public-private partnerships (P3), in which a governmental agency hires a private company to manage infrastructure, and that company is then responsible for hiring and managing workers. P3s have been criticized for circumventing stricter public-sector laws and regulations.<sup>20</sup> Current applications of project labor agreements (PLAs) and community work agreements (CWAs) ensure that projects create quality jobs, avoid reliance on reduced labor costs to boost investor returns, and engender a diverse workforce with expanded training and pathways for worker advancement.<sup>21</sup> Supply chains for infrastructure development can adopt policies for diverse workforces and support businesses owned by women and people of color.

Infrastructure investments play a vital role in laying the groundwork for economic activity and social interaction. They are therefore fundamental to creating a more equitable society. High Road Infrastructure can follow the path laid by community investing, in which community development banks, credit unions, microfinance institutions, and others make direct investments in businesses, nonprofit groups, and affordable housing in disadvantaged communities.<sup>22</sup> Infrastructure investments can target economic development in low- to moderate-income areas. They can link those communities to economic opportunities via investments in transit, internet access, and so on. The impact of infrastructure investments on health and well-being, especially in marginalized communities, also helps mark the High Road.

### **SOCIAL STANDARDS (GOVERNANCE AND STAKEHOLDER ENGAGEMENT)**

According to the Institute on Governance, “Governance determines who has power, who makes decisions, how other players make their voice[s] heard and how account is rendered.”<sup>23</sup> Governance ensures that infrastructure projects contribute to broadly shared community goals and deliver on their public purpose—all while remaining under public oversight and control. Governance standards ensure accountability and transparency as projects comply with environmental, climate change resilience, economic,

and social standards. This includes ensuring a voice for the community.

Global Infrastructure Basel developed a comprehensive sustainable infrastructure standard drawing on a range of indicators of sound governance management that apply in the United States and internationally, including:<sup>24</sup>

- **Management and oversight:** sound organizational structure design, efficient decision making, a focus on results, comprehensive risk management, and financial sustainability.
- **Sustainability and resilience management:** an environmental and social management system, a life-cycle approach to financing, climate resilience planning, innovative approaches, and attention to the community’s preexisting grievances.
- **Stakeholder engagement:** identification of stakeholders and solicitation of input prior to planning, fair and nondiscriminatory participation opportunities, regular communication of relevant information in clearly understandable formats, efficient public grievance redress mechanisms, and establishment of broad political buy-in.
- **Anticorruption and transparency:** ensuring the integrity of the tender process and disclosure of all political contributions and potential conflicts.

In sum, High Road standards reinforce how infrastructure investments—from community-scale and geographically targeted initiatives to large, regionally transformative projects—can help create outsize, long-term economic, environmental, and social benefits. Standards help hold stakeholders together, create accountability for outcomes, and ensure that benefits are shared and that projects are green and resilient. The right set of standards identifies where to concentrate time, resources, and attention.

## **BARRIERS TO THE HIGH ROAD**

Interviews with various stakeholders identified the following barriers to taking the high road, most of which can be mitigated by the commitments and solutions discussed in this paper.

### **I. Cities have little experience using standards to implement infrastructure that reflects community values while achieving multiple positive outcomes.**

Many cities do not know how to systematically translate their sustainability plans into actionable policies and standards. These plans are too often at odds with established ways of doing things, which favor minimizing up-front costs and accelerating project delivery based on fiscal responsibility. This may unintentionally increase long-term costs and work against community values. Current infrastructure approaches also have a narrow view of project impacts, which discourages incorporating multiple benefits into project design and undervalues long-term risks and opportunities.

## **2. Cities lack a clear, reliable process for creating High Road Infrastructure.**

The predevelopment process, during which infrastructure is conceived and defined, faces many challenges. These include the lack of mechanisms to break down silos in city departments and partner agencies, like utilities. The High Road is also blocked by a lack of models for evaluating life-cycle costs, avoided costs, indirect monetary returns, and nonmonetary benefits. The process too often lacks meaningful engagement with and accountability to communities as well as procurement procedures to deliver innovative and integrated outcomes. These challenges are due not only to scarce funding for predevelopment activities, but also to a lack of understanding of High Road standards and how to use an iterative process to combine funding sources, financing mechanisms, and procurement strategies that embed such standards.

## **3. Cities lack crucial technical support to implement the High Road predevelopment process.**

To design and implement High Road infrastructure, cities need to deepen their technical expertise on how to best approach each step in the predevelopment process (discussed in the next section). Cities need either to expand internal capacity to address the elements of more robust High Road project development or to secure assistance from a neutral, trusted entity that shares the commitment to High Road values and understands how to address technology options, governance agreements, procurement structures, funding options, and financing opportunities.

## **4. Cities have difficulty interacting with traditional and nontraditional investors to develop High Road financing structures.**

High Road projects will require innovative approaches to financing and investment, including incorporating new technologies and focusing on social outcomes that benefit communities with the greatest need. Integrating funding streams to infuse complex projects with multiple social and environmental goals will call for new investment strategies and investment products with variable return and fee structures, extended time horizons, and so on. These new approaches must be built into transaction structures that can be readily understood by investors, including pension funds, municipal bond investors, impact investors, and mission-driven community development finance institutions. Replicable transaction structures and data collection on transaction performance will greatly increase investment in High Road Infrastructure beyond the typical pilot that requires special circumstances or one-time revenue sources.

## **5. Federal policy guidance, standards, and technical assistance are not aligned to drive adoption of High Road standards and predevelopment processes.**

The federal government is not the primary source of infrastructure funding in most cities. It is, however, an important partner, especially for large-scale transportation, water, energy, housing, and community investments. Too often, federal funding criteria are at odds with a city's desire to blend funds or pursue innovative, High Road projects. More work is needed to pursue waivers, streamline provisions, and show communities how to secure funding and predevelopment support from existing programs. Current efforts to create performance measures and standards should focus on promoting High Road projects.

*The overlapping and mutually reinforcing solutions to the aforementioned barriers include (1) working with cities on how to apply High Road standards for the full project life cycle; (2) breaking down public-sector silos and expanding public-sector capacity through new intermediaries; (3) matching High Road projects with innovative funders and financiers; and (4) "hard coding" community benefits into the DNA of infrastructure projects through robust forms of accountability, transparency, and governance during predevelopment.*

*While it would often require a change in culture, we believe that many cities could put in place the solutions we set out in this paper that apply to them fairly quickly, which could result in early wins in implementing High Road projects.*

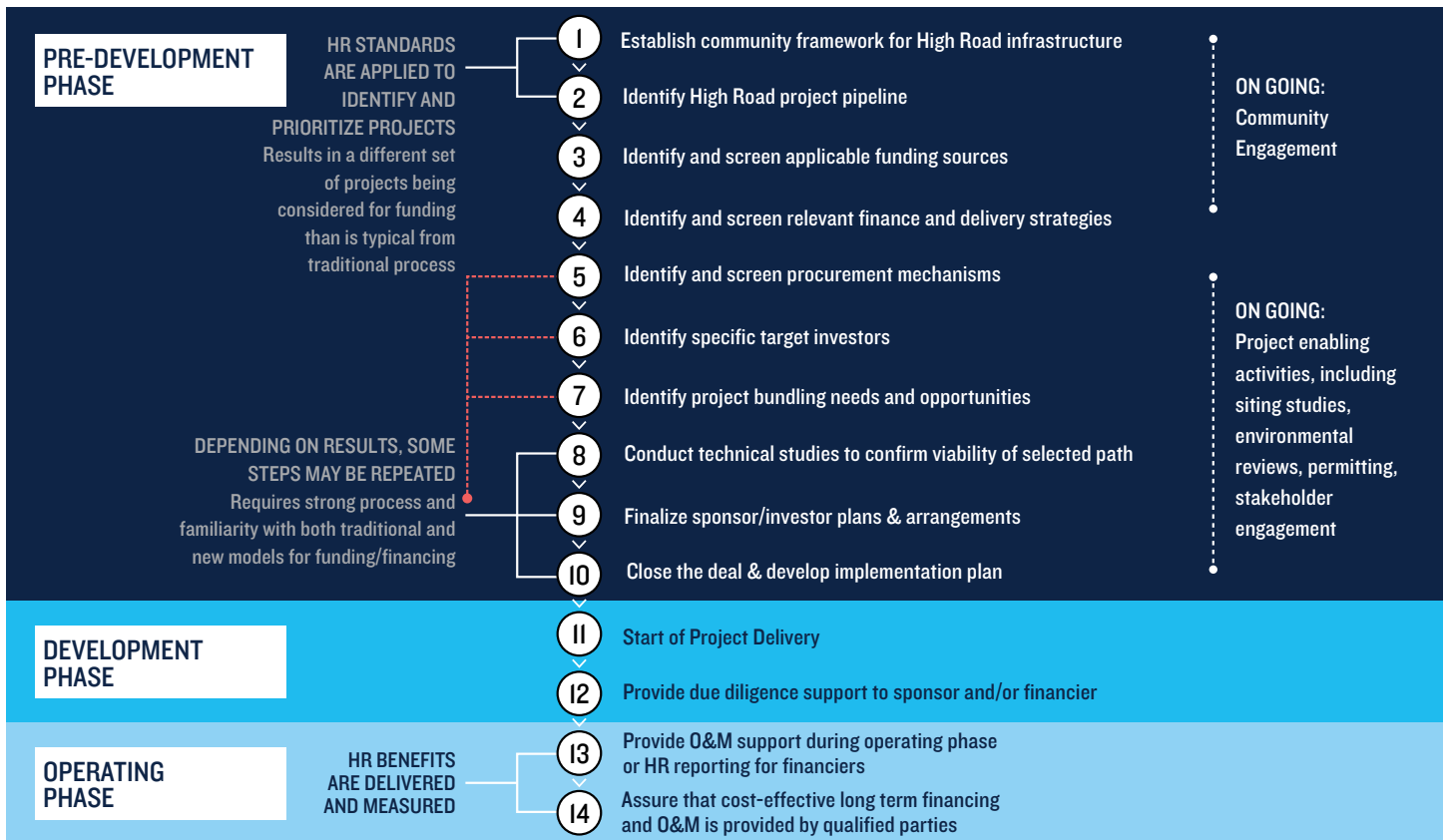
## **GETTING ONTO THE HIGH ROAD: BETTER PREDEVELOPMENT**

Design, construction, and financing are the outcomes of an infrastructure predevelopment process. If that process is flawed or deficient, the infrastructure will likely be similarly flawed. Figure 1 sets out a 10-step predevelopment process (within the larger 14-step project implementation cycle) designed to achieve High Road outcomes. If successful, the predevelopment process will lead to project development (steps 11 and 12 in Figure 1) and verified High Road outcomes during the operating phases (steps 13 and 14 in Figure 1). Below is a description of the process, followed by a simplified, hypothetical example to illustrate the main aspects. The full 10-step process will be examined in detail in the next paper in this series, together with real world examples.

### **ESTABLISH A COMMUNITY FRAMEWORK FOR HIGH ROAD INFRASTRUCTURE (STEP 1)**

This initial step is necessary to ensure that cities direct resources to projects that reflect the overall community vision and incorporate explicit High Road objectives. This step must be taken by the decision-making authority of the project sponsor, such as a mayor's office, state environmental agency, etc. The framework should be

# FIGURE 1: HIGH ROAD IMPLEMENTATION PROCESS



established in an accessible document that explains how High Road objectives will be measured for specific projects and clearly delineates how the city’s capital improvement plan will prioritize High Road projects. From the outset, the city should define High Road standards as specifically as possible (e.g., quality and quantity of jobs created, use of local contractors, reduced vehicle miles) to create benchmarks and guidance.

*Example: The mayor of Metropolis is elected on a platform of sustainability and establishes a vision and framework called Sustainable Metropolis 2020. The new director of infrastructure implementation develops a cost-effective plan that requires integrated, long-term High Road planning and reporting across city agencies. The Metropolis City Council adopts the plan, including requirements to consider life-cycle costs in project evaluation; thresholds for climate resilience, job quality, and pollution reduction; and community participation protocols.*

## IDENTIFY THE HIGH ROAD PROJECT PIPELINE (STEP 2)

Because no single entity is likely to deliver all outcomes, bear all costs, or reap all benefits, High Road projects require partnerships between public entities that typically work independently. As a first step, the project partners must come together to agree on the expectations of a High Road outcome and establish each partner’s role from

inception to completion. The city must identify its lead sponsor and the projects that provide significant High Road opportunities, embedding High Road standards into the capital program development and prioritization process.

*Example: Metropolis Electric identifies a need to meet increasing demand for electricity in a certain area, due to its growing population. Under Metropolis’s sustainability policy, Metropolis Electric is required to consider energy efficiency first, and all new generation must have a low carbon output. Metropolis Electric coordinates with the director of infrastructure implementation, who arranges a consultation with Metropolis Wastewater, which has a nearby wastewater treatment facility that could be retrofit to produce clean, low-cost energy. The director of infrastructure implementation also arranges a consultation between Metropolis Electric and local housing advocates to determine whether cost-effective investments in solar and energy efficiency in low-income housing could lower electricity demand while creating local jobs. Metropolis Electric, Metropolis Wastewater, and local developer Metropolis Community Housing Partners sign a memorandum of understanding with the City of Metropolis, in which the project is defined as an upgrade of an existing facility at the wastewater treatment plant. At the same time, the investments in solar and energy-efficiency retrofits reduce demand, as well as costs, while improving the quality of life of for residents in low- and moderate-income housing.*



## IDENTIFY AND DEPLOY FUNDING, FINANCING, AND PROCUREMENT STRATEGIES (STEPS 3-10)

There are many ways to fund and finance capital projects that serve important community functions, like water, waste management, transportation, energy, and public facility projects. Cities can use traditional sources, such as municipal bonds or revenues from property taxes or user fee programs. However, the options for funding and financing infrastructure are expanding.

Environmentally efficient projects can tap the green bond market, and emerging public-private partnerships can provide additional flexibility in terms of risk-sharing, financing, and technical expertise (discussed below).<sup>25,26,27</sup> Cities also have new flexibility to combine funding sources that have not previously been used together.<sup>28</sup> Cities need to develop and engage new types of service providers to help navigate and evaluate High Road opportunities, separating tangible opportunities from unrealistic proposals. New forms of public or nonprofit intermediaries that have no financial stake can advise cities, boosting capacity to drive and manage an unfamiliar process.

Once funding strategies are identified, a city must decide how to procure the infrastructure before targeting specific investors and service providers. The city may ask for proposals from the private sector or issue a request for qualifications with broadly defined technologies and approaches, allowing responding teams to define the project or program. At this stage, smaller projects like distributed stormwater management and solar energy may be folded into a single project to generate economies of scale. Amenities that do not generate revenue, such as parks, may be combined with revenue-generating projects to accelerate the delivery of community benefits.

*Example: Metropolis Electric and Metropolis Water determine that the biogas facility would be best built and managed by an expert third party and that the facility's revenue will attract private investors. A request for proposals is issued to private-sector entities to design, build, own, and operate the assets. At the same time, Metropolis Electric works with a local community development financial institution (CDFI) to create solar and retrofit financing programs for low- and moderate-income residents. Metropolis Electric and the CDFI issue a request for proposals to implement the retrofits, with an emphasis on demonstrated ability to train the local workforce and create jobs.*

## ECONOMIC STANDARDS AND HIGH ROAD FINANCING

Cities are reaching out to private investors in an effort to expand their resources. Without High Road standards, however, the additional investment may yield the same results, or investors who care about High Road outcomes may decline to participate. Fortunately, a wide range of public, private, and philanthropic stakeholders see infrastructure investment with robust social value as an increasingly important goal, as evidenced by the following:

- Large institutional investors—such as pension funds California State Teacher Retirement System and APG Asset Management in the Netherlands—have announced new infrastructure initiatives that align their economic objectives with their environmental, social, and governance (ESG) commitments.<sup>29</sup>
- The U.S. Department of Labor's recently revised guidance for pension funds clarified that targeting environmental and social benefits in investor decision making is allowed. In doing so, it reinforced ESG analysis as an important tool for long-term investors.<sup>30</sup>
- Impact investors are exploring ways to channel their capital toward measurable public benefit.<sup>31</sup>
- Infrastructure sponsors are structuring deals to emphasize social value. For instance, cities are increasingly issuing green bonds (which require environmental consideration) and exploring environmentally and socially beneficial infrastructure projects.<sup>32</sup>
- Innovative technology companies are generating new infrastructure evaluation tools to assess triple-bottom-line (economic, environmental, and social) returns.<sup>33</sup>

*The High Road approach to financing does not favor one type of financing over any other as long as the High Road process and standards are applied. The financing opportunities for High Road Infrastructure come from both infusing High Road standards into the traditional financing markets and carefully designing innovative public-private partnerships so that projects maintain their public purpose.*

## GREEN BONDS

The U.S. municipal bond market has funded large-scale, long-term, capital-intensive projects since the early 1900s. Bond investors today hold \$3.7 trillion of U.S. municipal debt. Until recently, however, the municipal bond market did not incorporate environmental or social standards. That is changing with green bonds.<sup>34</sup>

Green bonds segregate proceeds for environmentally beneficial purposes. Investors receive reports detailing how the proceeds are ultimately used and, ideally, the measured environmental benefits (e.g., metric tons of greenhouse gas emissions avoided by renewable energy power plants, or reduction of vehicle miles traveled from mass transit projects).

The green bond market has grown rapidly, building strong and consistent demand. According to the Climate Bonds Initiative and Bloomberg New Energy Finance, after a single, \$100 million issuance in 2013, \$2.5 billion in green bonds was issued nationally in 2014 and \$3.8 billion in 2015.<sup>35</sup> The market can potentially help U.S. cities connect new investors and competitively priced capital to low-carbon and climate-resilient infrastructure investments. Notable issuances include a Washington, D.C., bond for stormwater infrastructure and New York City's Metropolitan Transportation Authority bond for rail electrification.

The current green bond market does not fully incorporate all High Road standards—particularly labor standards and community benefits. However, the direction of the green bond market can be influenced by collaboration among investors, government, and other stakeholders such as nongovernmental organizations. Many green bond investors are also interested in social impacts, as reflected by a parallel effort of investors and philanthropists to launch the social impact bond (SIB) market, in which return on investment depends on social outcomes.<sup>36</sup>

As the green bond market expands and the SIB market matures, the two may further overlap to align High Road cities and socially responsible investors.

## PUBLIC-PRIVATE PARTNERSHIPS

There is a common misperception that some innovative approaches to financing infrastructure, such as public-private partnerships (P3s), provide additional revenue streams to pay for the infrastructure. In fact, they provide financing—the structure for borrowing the money to pay for projects. In short, P3s do not create more revenue but can perform critical functions. Traditionally new or “greenfield” P3 projects allow public agencies to transfer responsibility for building, operating, and maintaining infrastructure to private investors in exchange for an ownership-like stake, including the right to receive profits and a return on investment over time. An important, though imperfect, tool for evaluating the appropriateness of a P3 is Value for Money Analysis (see Box I below). Some observers have criticized traditional P3s as not being in the public interest insofar as the public often pays more while losing some public oversight. Advocates for quality jobs are also critical of P3s that effectively strip away labor protections to save money.<sup>37</sup> However, P3s are not inherently structured this way.

Some emerging P3 models embed High Road standards and focus on appropriate risk-sharing between the public and private sectors. Prince George’s County, Maryland, for example, is using an innovative P3 to design, build, operate,

and maintain distributed green stormwater infrastructure, (see Box II on page 11).<sup>38</sup>

## GOVERNMENT SUPPORT FOR INNOVATIVE P3S IS GROWING

The federal government is supporting and sharing information about these P3 models, as exemplified by pilots supported by the U.S. Environmental Protection Agency (EPA) and EPA Region 3’s recent publication, “Community-Based Public-Private Partnerships (CBP3) and Alternative Market-Based Tools for Integrated Green Stormwater Infrastructure.”<sup>39</sup> The U.S. Treasury Department also recently published a paper on the topic titled “Expanding the Market for Infrastructure Public-Private Partnerships: Alternative Risk and Profit Sharing Approaches to Align Sponsor and Investor Interests.”<sup>40</sup> These papers outline new approaches to P3s that incorporate High Road approaches, paving the way to more and better infrastructure.

## HIGH ROAD INTERMEDIARIES: INCREASED CAPACITY

High Road projects require collaboration because no single entity is likely to deliver all expected outcomes. Project partners must agree on project definition and expectations and establish a clear path of action from inception to delivery. Roles must be defined, and all parties must commit to High Road standards.

*Our work in the field reveals that crucial intermediary functions are not being performed in cities, and without them High Road infrastructure is difficult to achieve. These functions fall in the broad category of “intermediation.” This means connecting (1) departments of government to prepare projects, (2) cities and investors to transform infrastructure markets, and (3) cities and peer cities to create learning networks and economies of scale for distributed projects.*

For more than a decade, intermediaries have been used to prepare projects in other countries, including Canada’s Partnerships British Columbia (PBC), which has supported project development since 2002.<sup>41</sup> The European PPP Expertise Centre has done the same in a

## BOX I: VALUE FOR MONEY ANALYSIS

The first step in understanding how to pay for infrastructure in a P3 is determining whether there are sufficient long-term revenue streams to pay back private investors. P3s are not always the right approach and should undergo rigorous analysis before implementation. Value for money (VFM) analysis is the key tool public agencies use to evaluate whether a P3 is a good deal. When applied correctly, VFM analysis compares the relative expected value over the life of an infrastructure investment under public and private project delivery scenarios. VFM assessments can protect cities from failing to make apples-to-apples comparisons among infrastructure procurement options. For example, such assessments can reduce the tendency to fixate on minimizing up-front costs while failing to consider risk transfers to the private sector (such as the cost of construction delays and change orders as well as cost increases during the operating and maintenance phase). VFM assessments can also avoid a failure to value private-sector delivery advantages, such as better access to technological advances. Poorly executed VFM analysis, however, may understate or overstate risks or make rosy assumptions to justify a particular financing model.

Also, VFM analyses do not incorporate standards on governance, environmental protection, resilience, or social value (e.g., jobs). As a consequence, when used in isolation, the VFM tool cannot produce holistic High Road outcomes and should not be the only tool used to evaluate the appropriateness of P3s. Embedding High Road standards in tools that supplement VFM analysis—such as resilience valuation methods being developed by the federal government and the Rockefeller Foundation as part of the National Disaster Resilience Competition—paints a more complete picture, and such tools should be deployed alongside (or incorporated into) VFM to ensure High Road outcomes.

## BOX II: ELEMENTS OF PRINCE GEORGE'S COUNTY'S HIGH ROAD P3

- Instead of issuing a request for proposals (RFP), the County began with a request for qualifications (RFQ), allowing it to determine who could deliver on both the technical and socioeconomic plans.
- The RFQ contained a detailed section in which the developer was asked to describe the approach to P3s and to provide examples of the successes and challenges of previous P3 engagements.
- Two contracts were drawn up to cover the planning, building, operation, and maintenance of 2,000 “greened” acres, with an option for an additional 2,000 acres if the first tranche is successful. This ensures that the County is not locked into a failed long-term project.
- The County centralized all permitting for various project sites in its Office of the Environment, thus minimizing the risk of intergovernmental conflicts.
- The County created green infrastructure job training programs in collaboration with high schools and the University of Maryland, and it is collecting detailed information on the project’s social impact. It also created opportunities for small businesses to provide services to the developer.
- A full 50 percent of the developer’s fee structure is contingent on the developer achieving the social goals stipulated under its socioeconomic plan.
- The County mostly controls site prioritization and can direct the developer to complete projects in low-income neighborhoods first.
- The County and the developer have established a partnership structure that ensures a constant and consistent flow of information and sound decision making.

number of countries since 2008.<sup>42</sup> In the United States, however, intermediaries are a recent development. In 2012, California, Oregon, Washington State, and British Columbia launched the West Coast Infrastructure Exchange (WCX) to serve as a “translation point” between the public and the private sectors and to provide unbiased information about what amounts to High Road Road infrastructure.<sup>43</sup> The WCX is now spawning other statewide or regional intermediaries from the Rocky Mountains to New England. And municipal and regional entities are working to establish intermediary capabilities in cities like Chicago.<sup>44</sup>

Because their High Road track record is limited, it’s useful to identify the attributes of sound intermediaries and their uses. Depending on local agency needs, intermediaries can provide valuable assistance in the predevelopment process, including:

- Building appropriate financial models,
- Identifying and screening funding sources and strategies as well as procurement mechanisms,
- Identifying project bundling opportunities,
- Conducting technical studies to confirm the validity of the selected finance and delivery path, or helping local agencies identify other neutral parties to conduct these studies if the local agency does not have the internal resources to conduct them,
- Facilitating dialogue between project sponsors and financiers, and
- Supporting competitions and negotiating deals with project developers and financiers.

Attributes of a sound intermediary that helps to accelerate High Road infrastructure include:

- Support for integration of High Road standards into the predevelopment process,
- Familiarity with the range of traditional and emerging financing mechanisms,
- Credibility in conducting objective technical studies (e.g., VFM analysis and municipal bond feasibility studies) that will be recognized as useful by both project sponsors and potential project funders,
- Good working relationships with both sponsoring agencies and funding sources,
- Ability to provide cost-effective support (i.e., at reasonable hourly rates or flat rates for services to local agencies), and
- Ability to identify and secure funding support for the planning processes from government, foundations, and other sources.

Intermediaries also serve to accelerate the growth and maturation of infrastructure markets. While there is a relatively long-standing market for social infrastructure (e.g., affordable housing) as well as environmental infrastructure (e.g., wind and solar generation projects), no functioning market combines social, environmental, and climate resilience attributes in its investments. Green banks represent one example of a market transformation intermediary focused on developing the clean energy sector, and the model is demonstrating success (see Box III on page 12).<sup>45</sup>

## BOX III: GREEN BANKS BRING PRIVATE CAPITAL INTO INFRASTRUCTURE

Green banks are market transformation intermediaries focused on developing the clean energy sector (a High Road market) by building bridges between different sources of public and private capital and by promoting robust standards, metrics, and monitoring of investments.

In total, there are now five state green banks in the United States: in Connecticut, New York, Hawaii, California, and Rhode Island. Some of California's clean energy financing programs, such as the Clean and Alternative Energy and Transportation Finance Authority and the California Infrastructure Bank, fulfill some green bank functions. New Jersey has formed the New Jersey Energy Resilience Bank, which supports clean energy investments that meet a resilience screen. The oldest institution, the Connecticut Green Bank, has nearly quadrupled annual clean energy investment in the state in only three years. Extrapolating from Connecticut's market size, growth rate, and public-private leverage ratio, a green bank in every state in America would yield \$200 billion in national annual investment within five years, with 90 percent of the funds coming from private sources and all taxpayer contributions returned over 10 to 20 years.

### THE IMPORTANCE OF FEDERAL ENGAGEMENT

The federal government is an important partner in designing and delivering High Road projects. Congress and both major political parties have shown a growing interest in more innovative financing, more comprehensive cost-benefit analysis, and performance measures.<sup>46</sup> Federal programs also participate through the imposition of formal and informal standards that can translate into investor interest, allow project bundling, and improve public transparency.

In sectors like transportation, where the federal government is a critical investor, conditioning receipt of funds on embedding High Road standards transforms how cities design projects. For example, the U.S. Department of Transportation's Investment Generating Economic Recovery (TIGER) competitive grant program awards grants to pay part of the capital costs of projects that have demonstrated medium- and long-range High Road-type impacts either nationally or on a metropolitan area or region. Since 2009, TIGER has provided nearly \$4.6 billion to 381 projects in all 50 states, the District of Columbia, and Puerto Rico. Overall, DOT has received more than 6,700 applications requesting more than \$134 billion for transportation projects across the country, indicating large-scale impact.<sup>47</sup>

How projects are identified and implemented can ensure that federal funding is aligned with High Road infrastructure projects and that the federal platform disseminates best practices. Our research highlighted a series of actions the federal government can take to promote High Road outcomes, detailed below.

### COORDINATE CENTERS OF EXCELLENCE

The Centers of Excellence coordinate among the U.S. Department of Transportation, EPA, Department of Agriculture, and Department of the Interior. They offer a platform to support interagency integration, specifically on infrastructure projects, while identifying barriers to cross-sector coordination of federal resources. This effort could support, for instance, High Road infrastructure projects

that have both transportation and stormwater management elements and connect to community and economic development and place-making (a term used by planners to describe the full use of community assets to improve public spaces for well-being). These sorts of High Road outcomes may require rethinking the support systems for investing in infrastructure, including a predevelopment process yielding projects that can be financed by emerging private green capital markets.

### CONVENE REGIONAL ACTORS AROUND HIGH ROAD OUTCOMES

Many federal agencies have recently introduced new tools, regulations, and rules that theoretically alter how communities approach integrated predevelopment. Capacity-building and outreach to highlight areas of integration across related issues could provide a powerful opportunity for cross-agency collaboration. Federal planning processes also allow for regional multistakeholder engagement to explore the potential of High Road project identification and development.

### ADVANCE HIGH ROAD STANDARDS BY IDENTIFYING AND SUPPORTING BEST PLANNING, DESIGN, PROCUREMENT, CONSTRUCTION, AND INVESTMENT PRACTICES

Currently, standards are scattered across agencies, and communities are unclear about how to be innovative in the predevelopment process. Too often, standards from different federal programs work against one another or are narrowly defined. The federal government can link standards to programs that fund across sectors, or that support place-based initiatives where infrastructure investment plays a role. It is especially important to share best practices on innovative approaches to RFPs, requests for information (RFIs), and RFQs. This builds on approaches like those implemented by the Rebuild by Design process, which came out of a design competition in the aftermath of Hurricane Sandy, and the Natural Disaster Recovery Competition.<sup>48</sup>



## CONCLUSION

Decades of budget-cutting and neglect as well as growing fissures in the fabric of the built environment have made infrastructure an urgent concern—with the country’s safety and status in the global economy at risk. Solving this problem can create new best practices that reap multiple benefits across geographies and income levels, including jobs, economic opportunity, financial innovation, and improved community health and well-being. If we embed

multifaceted standards in project DNA, use intermediaries to break down silos, marshal federal tools to support High Road outcomes, and open profitable channels for investment in infrastructure with high social value, the conversation about infrastructure can change as dramatically as the conditions that infrastructure creates on the ground, leading to more and better infrastructure that meets our economic, environmental, and social needs.

## ENDNOTES

- 1 John C. Parker, “Striving for Standards in Sustainability,” Impact Infrastructure, March 28, 2016, [www.impactinfrastructure.com/blog/ISSST2016/](http://www.impactinfrastructure.com/blog/ISSST2016/) (accessed May 2, 2016); Judith Rodin, “Rethinking Infrastructure: A Philanthropist’s View,” McKinsey & Company, February 2013, [www.mckinsey.com/industries/infrastructure/our-insights/judith-rodin](http://www.mckinsey.com/industries/infrastructure/our-insights/judith-rodin) (accessed May 2, 2016); California State Teachers’ Retirement System, Investment Branch, “Infrastructure Investment Policy,” February 2015, [www.calstrs.com/sites/main/files/file-attachments/m\\_-\\_infrastructure\\_investment\\_policy.pdf](http://www.calstrs.com/sites/main/files/file-attachments/m_-_infrastructure_investment_policy.pdf) (accessed May 2, 2016).
- 2 Rhys Roth, *Infrastructure Crisis, Sustainable Solutions: Rethinking Our Infrastructure Investment Strategies*, The Evergreen State College, Center for Sustainable Infrastructure, November 2014, [evergreen.edu/sustainableinfrastructure/docs/CSI-Infrastructure-Crisis-Report.pdf](http://evergreen.edu/sustainableinfrastructure/docs/CSI-Infrastructure-Crisis-Report.pdf) (accessed May 2, 2016); Refocus Partners et al., *A Roadmap for Resilience: Investing in Resilience, Reinvesting in Communities*, RE.invest Initiative, 2015, [www.reinvestinitiative.org/reports/RE.invest\\_Roadmap-For-Resilience.pdf](http://www.reinvestinitiative.org/reports/RE.invest_Roadmap-For-Resilience.pdf) (accessed May 2, 2016).
- 3 American Society of Civil Engineers, “2013 Report Card for America’s Infrastructure,” 2013, [www.infrastructurereportcard.org/a/#p/home](http://www.infrastructurereportcard.org/a/#p/home) (accessed June 9, 2016).
- 4 Nathan Musick and Amy Petz, “Public Spending on Transportation and Water Infrastructure, 1956 to 2014,” Congress of the United States, Congressional Budget Office, March 2015, [www.cbo.gov/publication/49910](http://www.cbo.gov/publication/49910) (accessed May 2, 2016).
- 5 American Public Transportation Association, “Americans’ Support for Public Transportation,” 2013, [www.apta.com/resources/reportsandpublications/Documents/APTA-Survey-Americas-Support-Public-Transportation.pdf](http://www.apta.com/resources/reportsandpublications/Documents/APTA-Survey-Americas-Support-Public-Transportation.pdf) (accessed May 2, 2016).
- 6 Raffaele Della Croce, *Pension Funds Investment in Infrastructure: A Survey*, OECD, International Futures Programme, September 2011, [www.oecd.org/futures/infrastructureto2030/48634596.pdf](http://www.oecd.org/futures/infrastructureto2030/48634596.pdf) (accessed May 2, 2016).
- 7 Mark Wiseman, “Rethinking Infrastructure: An Investor’s View,” McKinsey & Company, March 2013, [www.mckinsey.com/industries/infrastructure/our-insights/mark-wiseman](http://www.mckinsey.com/industries/infrastructure/our-insights/mark-wiseman) (accessed May 2, 2016).
- 8 Galen Barbose, “U.S. Renewable Portfolio Standards: Overview of Status and Key Trends,” Lawrence Berkeley National Laboratory, November 5, 2015, [emp.lbl.gov/sites/all/files/2015%20National%20RPS%20Summit%20Barbose.pdf](http://emp.lbl.gov/sites/all/files/2015%20National%20RPS%20Summit%20Barbose.pdf) (accessed May 2, 2016).
- 9 Luke Mills, “Global Trends in Clean Energy Investment: Rebound in Clean Energy Investment in 2014 Beats Expectation,” Bloomberg New Energy Finance, January 9, 2015, [about.bnef.com/presentations/clean-energy-investment-q4-2014-fact-pack/content/uploads/sites/4/2015/01/Q4-investment-fact-pack.pdf](http://about.bnef.com/presentations/clean-energy-investment-q4-2014-fact-pack/content/uploads/sites/4/2015/01/Q4-investment-fact-pack.pdf) (Accessed June 13, 2016).
- 10 Lazard, “Lazard’s Levelized Cost of Energy Analysis—Version 9.0,” November 17, 2015, [www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf](http://www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf) (accessed May 2, 2016).
- 11 Nathanael Greene, “State Renewable Energy Standards Cut Carbon, Save Consumers Billions, New Report Shows,” Natural Resources Defense Council, January 7, 2016, [switchboard.nrdc.org/blogs/ngreene/across\\_the\\_country\\_29\\_states.html](http://switchboard.nrdc.org/blogs/ngreene/across_the_country_29_states.html) (accessed May 2, 2016); Ryan Wiser et al., *A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards*, Lawrence Berkeley National Laboratory and National Renewable Energy Laboratory, January 2016, [lusa.gov/ISL8qUP](http://lusa.gov/ISL8qUP) (accessed May 2, 2016).
- 12 The Climate Bonds Initiative, 2016, [www.climatebonds.net/standards/taxonomy](http://www.climatebonds.net/standards/taxonomy) (accessed May 2, 2016).
- 13 Sustainability Accounting Standards Board, 2016, [www.sasb.org/sectors/infrastructure](http://www.sasb.org/sectors/infrastructure) (accessed May 2, 2016).
- 14 100 Resilient Cities, “What Is Urban Resilience?” [www.100resilientcities.org/resilience#/\\_Yz5jJmg%2FMSdIPWI%3D/](http://www.100resilientcities.org/resilience#/_Yz5jJmg%2FMSdIPWI%3D/) (accessed May 2, 2016).
- 15 U.S. Department of Housing and Urban Development, “HUD Awards \$1 Billion Through National Disaster Resilience Competition,” press release, January 21, 2016, [portal.hud.gov/hudportal/HUD?src=/press/press\\_releases\\_media\\_advisories/2016/HUDNo\\_16-006](http://portal.hud.gov/hudportal/HUD?src=/press/press_releases_media_advisories/2016/HUDNo_16-006) (accessed May 2, 2016).
- 16 Shalini Vajjhala and James Rhodes, “Leveraging Catastrophe Bonds: As a Mechanism for Resilient Infrastructure Project Finance,” Refocus Partners, REbound Program, [www.refocuspartners.com/reports/REbound-Program-Report-December-2015.pdf](http://www.refocuspartners.com/reports/REbound-Program-Report-December-2015.pdf) (accessed May 2, 2016).
- 17 New Jersey Economic Development Authority, “Energy Resilience Bank,” April 27, 2016, [www.njeda.com/erb/erb-\(1\)](http://www.njeda.com/erb/erb-(1)) (accessed May 2, 2016).
- 18 Josh Bivens, *The Short- and Long-Term Impact of Infrastructure Investments on Employment and Economic Activity in the U.S. Economy*, Economic Policy Institute, July 1, 2014, [www.epi.org/publication/impact-of-infrastructure-investments/](http://www.epi.org/publication/impact-of-infrastructure-investments/) (accessed May 2, 2016).
- 19 Noelle S. Baldini, “Measuring the Quality, Not Quantity, of Job Creation,” *Cascade*, no. 90 (Winter 2016), [www.philadelphiafed.org/community-development/publications/cascade/90/04\\_measuring-the-quality](http://www.philadelphiafed.org/community-development/publications/cascade/90/04_measuring-the-quality) (accessed June 13, 2016).

- 20 In the Public Interest and Partnership for Working Families, “Building America While Building Our Middle Class: Best Practices for P3 Infrastructure Projects,” March 2016, [www.inthepublicinterest.org/wp-content/uploads/ITPI\\_PWF\\_P3BestPractices\\_March2016.pdf](http://www.inthepublicinterest.org/wp-content/uploads/ITPI_PWF_P3BestPractices_March2016.pdf) (accessed May 2, 2016).
- 21 Ibid.
- 22 Frank Vanclay et al., *Social Impact Assessment: Guidance for Assessment Managing the Social Impacts of Projects*, International Association for Impacts Assessment, April 2015, [www.iaia.org/uploads/pdf/SIA\\_Guidance\\_Document\\_IAIA.pdf](http://www.iaia.org/uploads/pdf/SIA_Guidance_Document_IAIA.pdf) (accessed June 13, 2016); Low Income Investment Fund, “Social Impact Calculator,” 2014, [www.liifund.org/calculator/](http://www.liifund.org/calculator/) (accessed June 13, 2016).
- 23 Institute on Governance, “Defining Governance,” 2016, [iog.ca/defining-governance/](http://iog.ca/defining-governance/) (accessed May 2, 2016).
- 24 Global Infrastructure Basel and Natixis, “SuRe®: The Standard for Sustainable and Resilient Infrastructure v 0.2,” December 9, 2015, [www.gib-foundation.org/content/uploads/2015/12/SuRe-v-0.2\\_091215.pdf](http://www.gib-foundation.org/content/uploads/2015/12/SuRe-v-0.2_091215.pdf).
- 25 U.S. Environmental Protection Agency (hereinafter EPA), Region 3, Water Protection Division, *Community Based Public-Private Partnerships (CBP3) and Alternative Market-Based Tools for Integrated Green Stormwater Infrastructure*, April 2015, [www.epa.gov/sites/production/files/2015-12/documents/gi\\_cb\\_p3\\_guide\\_epa\\_r3\\_final\\_042115\\_508.pdf](http://www.epa.gov/sites/production/files/2015-12/documents/gi_cb_p3_guide_epa_r3_final_042115_508.pdf) (accessed June 13, 2016).
- 26 U.S. Department of the Treasury, Office of Economic Policy, “Expanding the Market for Infrastructure Public-Private Partnerships: Alternative Risk and Profit Sharing Approaches to Align Sponsor and Investor Interests,” April 2015, [www.treasury.gov/connect/blog/Documents/Treasury%20Infrastructure%20White%20Paper%20042215.pdf](http://www.treasury.gov/connect/blog/Documents/Treasury%20Infrastructure%20White%20Paper%20042215.pdf) (accessed May 2, 2016).
- 27 Danielle Lewinski et al., *Open Space in Detroit: Key Ownership and Funding Considerations to Inform a Comprehensive Open Space Planning Process*, Center for Community Progress, October 2015, [detroitfuturecity.com/2015/11/ccposreport/](http://detroitfuturecity.com/2015/11/ccposreport/) (accessed May 2, 2016).
- 28 U.S. Environmental Protection Agency, Office of Sustainable Communities, *Infrastructure Financing Options for Transit-Oriented Development*, January 2013, [www.epa.gov/sites/production/files/2014-02/documents/infrastructure\\_financing\\_options\\_for\\_transit-oriented\\_development.pdf](http://www.epa.gov/sites/production/files/2014-02/documents/infrastructure_financing_options_for_transit-oriented_development.pdf) (accessed May 2, 2016).
- 29 Thao Hua, “ESG Gains Wider Acceptance: Responsible Investing, Performance Link Luring Institutional Investors,” *Pensions & Investments*, January 24, 2011, [www.pionline.com/article/20110124/PRINT/301249980/esg-gains-wider-acceptance](http://www.pionline.com/article/20110124/PRINT/301249980/esg-gains-wider-acceptance) (accessed May 2, 2016).
- 30 U.S. Department of Labor, “New Guidance on Economically Targeted Investments in Retirement Plans from U.S. Labor Department,” press release, October 22, 2015, [www.dol.gov/opa/media/press/ebsa/ebsa20152045.htm](http://www.dol.gov/opa/media/press/ebsa/ebsa20152045.htm) (accessed May 2, 2016).
- 31 Global Impact Investing Network, “What You Need to Know About Impact Investing,” [thegiin.org/impact-investing/](http://thegiin.org/impact-investing/) (accessed May 2, 2016).
- 32 Debbie Carlson, “What Investors Should Know About Green Bonds,” *U.S. News & World Report*, November 12, 2015, [money.usnews.com/money/personal-finance/mutual-funds/articles/2015/11/12/what-investors-should-know-about-green-bonds](http://money.usnews.com/money/personal-finance/mutual-funds/articles/2015/11/12/what-investors-should-know-about-green-bonds) (accessed May 2, 2016).
- 33 Autocase, “About AutoCASE,” [autocase.com](http://autocase.com) (accessed May 2, 2016).
- 34 Martin Z. Braun, “New York’s Subways Court Millennials with First Green Bonds,” Bloomberg, February 10, 2016, [www.bloomberg.com/news/articles/2016-02-10/new-york-s-subways-add-new-brand-to-its-bonds-environmentalist](http://www.bloomberg.com/news/articles/2016-02-10/new-york-s-subways-add-new-brand-to-its-bonds-environmentalist) (accessed May 2, 2016).
- 35 Luke Mills and Joseph Byrne, “Global Trends in Clean Energy Investment,” Bloomberg New Energy Finance, April 2016, [www.about.bnef.com/content/uploads/sites/4/2016/04/BNEF-Clean-energy-investment-Q1-2016-factpack.pdf](http://www.about.bnef.com/content/uploads/sites/4/2016/04/BNEF-Clean-energy-investment-Q1-2016-factpack.pdf) (accessed June 13, 2016).
- 36 “Social Impact Bond Lab,” Harvard University, Government Performance Lab, [govlab.hks.harvard.edu/social-impact-bond-lab](http://govlab.hks.harvard.edu/social-impact-bond-lab) (accessed May 2, 2016).
- 37 In the Public Interest and Partnership for Working Families, “Building America While Building Our Middle Class.”
- 38 Daniel C. Vock, “A New P3 Model for Building Green Infrastructure,” *Governing*, May 27, 2015, [www.governing.com/topics/transportation-infrastructure/gov-tapping-private-sector-build-green-infrastructure.html](http://www.governing.com/topics/transportation-infrastructure/gov-tapping-private-sector-build-green-infrastructure.html) (accessed May 2, 2016).
- 39 EPA, Region 3, Water Protection Division, *Community Based Public-Private Partnerships (CBP3)*.
- 40 U.S. Department of the Treasury, Office of Economic Policy, “Expanding the Market for Infrastructure Public-Private Partnerships.”
- 41 Partners British Columbia, “Welcome to Partners BC,” 2014, [www.partnershipsbc.ca](http://www.partnershipsbc.ca) (accessed May 2, 2016).
- 42 European Investment Bank, “European PPP Expertise Center,” 2016, [www.eib.org/epec/](http://www.eib.org/epec/) (accessed May 2, 2016).
- 43 West Coast Infrastructure Exchange, [westcoastx.com/home](http://westcoastx.com/home) (accessed May 2, 2016).
- 44 Chicago Infrastructure Trust, “How It Works,” [chicagoinfrastructure.org/about/how-it-works/](http://chicagoinfrastructure.org/about/how-it-works/) (accessed May 2, 2016).
- 45 Green Bank Network, “About the GBN,” 2016, [greenbanknetwork.org/about-us/](http://greenbanknetwork.org/about-us/) (accessed May 2, 2016).
- 46 Karen Dynan, “Building America Investment Initiative: Expanding Opportunities to Invest in America’s Infrastructure,” U.S. Department of the Treasury, Treasury Notes blog, January 16, 2015, [www.treasury.gov/connect/blog/Pages/Build-America-Investment-Initiative---Expanding-Opportunities-to-Invest-in-America%e2%80%99s-Infrastructure.aspx](http://www.treasury.gov/connect/blog/Pages/Build-America-Investment-Initiative---Expanding-Opportunities-to-Invest-in-America%e2%80%99s-Infrastructure.aspx) (accessed May 2, 2016).
- 47 U.S. Department of Transportation, “TIGER Discretionary Grants,” [www.transportation.gov/tiger](http://www.transportation.gov/tiger) (accessed July 12, 2016).
- 48 U.S. Department of Housing and Urban Development, “National Disaster Resilience Competition,” [portal.hud.gov/hudportal/documents/huddoc?id=FactSheet\\_071514.pdf](http://portal.hud.gov/hudportal/documents/huddoc?id=FactSheet_071514.pdf) (accessed May 2, 2016).



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