Resilience, Equity and Innovation

The City Accelerator Guide to Urban Infrastructure Finance

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Executive Summary

Capital financing has always involved a kind of time travel. Resilient and equitable financial strategies simply reach into the future in a different way.
Every week seems to bring another report highlighting the crumbling state of America’s infrastructure, from lead poisonings in Flint, to levee breaches in Houston, and deteriorating transit systems in Washington, DC and New York.

City governments seeking to finance infrastructure projects face a legacy of past underinvestment, which can make improvements or rehabilitation more expensive. They also experience outdated mindsets and siloed and informal project development processes that can increase the challenges involved in solving financial gaps. And if that isn’t enough—cities are also confronted with the need to strengthen infrastructure against extreme weather and sea level rise.

Recognizing these challenges, four cities joined the City Accelerator’s Infrastructure Finance Cohort, an 18-month peer learning experience. It was designed to bring cross-departmental city teams together who are seeking to be at the cutting-edge of financing capital projects but have formidable obstacles to making their initiatives a reality. Cross-disciplinary teams from Pittsburgh, Saint Paul, San Francisco, and Washington, DC learned about innovative revenue sources and creative financial tools, while examining their own project development processes and advancing a selected set of innovative projects.

The cohort learned best practices and delivery strategies that went beyond just financing capital improvements. Delivery strategies such as pay-for-success bonding, public-private partnerships (P3s), and Energy Savings Agreements (ESAs) help ensure that projects deliver long-term performance and services, not just bricks and mortar. They learned about building comprehensive and resilient financial strategies that relied on diverse revenue sources, made use of flexible and innovative financing, and transferred key long-term risks to the private sector.

In the 18-months of the cohort, the City Accelerator teams worked together to explore and test new approaches to their cities’ challenges. The teams came together four times to learn from each other’s experiences, hear from leading infrastructure finance and government innovation experts, and visit major ongoing infrastructure projects across the United States. While each of the four cohort cities is pursuing its own unique process changes and individual capital projects, many common themes have surfaced again and again.
Focus on revenue, not just finance and procurement.

Many cities don’t face a shortage of available capital; they face a shortage of revenue with which to pay it back. Creative financing options and alternative delivery tools can’t make up for revenue shortfalls. Often revenue is the key challenge to solve for, but it’s the least discussed.

Focus on engagement, not just engineering or finance.

Ultimately, delivering an infrastructure project involves engagement as financing or engineering. Bringing diverse stakeholders into the conversation early, clearly communicating the benefits of a proposed project or financing model, and soliciting frequent feedback from community members all greatly enhance a project’s chances for success.

Think about outcomes, not just physical structures.

Capital planning often focuses on construction of the physical facility, not the service provided. That’s like focusing on the skeleton, and not the arteries. Thinking about infrastructure as a service lets cities link their operating and capital budgets in new ways and take advantage of new models like pay-for-success. It also allows agencies to build resiliency into their plans, by identifying multiple ways that a service can be provided. Levees can be backed up by green stormwater infrastructure that reduces the risk of flooding; commuters can use ferries or transportation services like Lyft or Uber instead of a bridge that is damaged in an earthquake.

Consider the long-term (even for traditional projects).

Some alternative capital project delivery models, including P3s, require long-term analysis of costs, operations, and maintenance. Yet in most cities, planning for traditional capital projects managed in-house only goes as far as construction. Cities shouldn’t reserve the best analyses for projects that others will undertake; they need to plan for and get the long-term resources they need to manage a project successfully.

Cast a wide net—including internally.

Financing infrastructure projects is an “open-book test” for cities. By reaching out to other city counterparts with similar situations, project leaders can get a head start on their analysis and learn a lot about what works and what doesn’t. Yet it can actually be harder to meet or pick up the phone and exchange ideas with some in another agency in the same city, who may be competing for priorities, budgets, territory, and mayoral attention.
Cities don’t have to choose between fixing ailing infrastructure, building resilience, or mending inequity; these issues are inherently linked.

Let staff invest their time in innovation.

Staff time is one of city governments’ most limited resources. Yet by investing time upfront in an inclusive, multidisciplinary, interagency project, all of the cohort teams found a new way of working together that will benefit many kinds of projects in the future. Building a process that can engage a wide variety of experts and stakeholders is critical to agency and project success.

The cohort also visited numerous transformational infrastructure projects, with multiple features—transit service, green stormwater infrastructure, economic development, park and recreational amenities—that develop new places and ways of living. These catalytic infrastructure reuse projects increase the value of land and quality of life for residents.

This trend of placemaking projects—often in formerly distressed areas—follows a legacy of neglect. For nearly nine decades, redlining and other inequitable credit policies were reinforced by infrastructure development policies that ignored the needs of already-disadvantaged communities. Redlining kept urban neighborhoods poor; transportation infrastructure isolated them and other infrastructure projects polluted them. These factors were a one-two punch that combined to create persistent patterns of poverty in many urban areas.

Yet the infrastructure projects that used to reinforce inequity can also help reverse it. Equitable financial strategies can help return some of the public equity—the value created by infrastructure development—to the people and communities where it occurs.

Equity-conscious capital investment and equitable development plans can foster workforce development and business mobilization programs, support affordable housing, build community resources such as health clinics and gathering spaces, and create vital transportation links to jobs and schools. Innovative land ownership models such as community land trusts and limited equity housing cooperatives can help residents gain equity while avoiding being priced out of rapidly gentrifying neighborhoods.
Capital financing has always involved a kind of time travel. It brings revenues from the future to pay for the capital projects that communities need now. Resilient and equitable financial strategies simply reach into the future in a different way.

Many strategies to finance resilience focus on avoiding future costs or losses. Energy efficiency can be financed with cost savings from upgraded equipment; flood control and seawall improvements can be financed with premium reductions because of the reduced risk of catastrophic flooding. Instead of revenue, resilient financial strategies can bring these avoided costs back from the future, to pay for the infrastructure or other capital improvements that prevented them.

Instead of tapping future revenue or cost savings, equitable financing strategies can bring the future value associated with infrastructure development into the present—for the benefit of the people and communities who already live there.

Cities don’t have to choose between fixing ailing infrastructure, building resilience, or mending inequity; these issues are inherently linked. The most common reason cited for not achieving any of them is lack of funding. Others include lack of political will, siloed departments, and/or processes that aren’t well aligned with the long-term needs of capital projects.

Many of the tools and processes in this guide have been explored and tested by the City Accelerator sites. Their experience can help other cities reach into the future to finance the projects that their communities need now.
City Accelerator’s third cohort learned about building comprehensive and resilient financial strategies that relied on diverse revenue sources, made use of flexible and innovative financing, and transferred key long-term risks to the private sector.
This section reviews some basic elements of infrastructure finance and common terminology used by practitioners.
Equity-conscious capital investment and equitable development plans can foster workforce development and business mobilization programs, support affordable housing, build community resources such as health clinics and gathering spaces, and create vital transportation links to jobs and schools.

**Definition and Examples of Capital Projects**

Capital projects are generally defined as tangible assets or physical improvements to assets that are expected to provide a long-term benefit. Most cities also impose a dollar threshold on capital assets (e.g., the City of Pittsburgh requires capital projects to involve at least a $50,000 investment).

A city’s capital asset portfolio can include a variety of projects, such as streets, transit vehicles, tracks, and tunnels, city offices, wastewater treatment plants, drinking water plants, electric utility infrastructure, street lights, bike paths, city vehicle fleets, and fire and police stations.

**Capital Plans**

Because capital projects involve a greater commitment of funds and staff time, most cities have adopted capital planning processes that allow them to prioritize funding for projects and make long-term plans to deliver them. City capital plans usually include planned spending on infrastructure projects for at least five years, and sometimes for longer periods.

**Distinction Between “Funding,” “Financing” and “Revenue”**

In this guide, the term “financing” refers to debt, or borrowing in anticipation of future revenue. While news reports often conflate the terms funding and financing, financing always involves some form of repayment with interest.

Funding refers to the mix of borrowed funds (bond or loan proceeds) and any funds that the government has on hand to pay for the construction of the project. Revenue refers to the future source of repayment for any financing on the project, and for future operations and maintenance (O&M). Financing refers to any borrowing that occurs on the project. When these terms are used interchangeably, it can add to the public confusion surrounding financing and project delivery tools, and the need for stable revenue sources to repay them.

Suppose an agency wanted to construct a new courthouse at a cost of $60 million. It would need $60 million in funding, which it might be able to obtain from the proceeds of a bond issuance ($50 million) and $10 million in appropriations from the city...
council. The bond could be repaid by future property tax revenue. The courthouse would be funded by bond proceeds and appropriations, financed with a bond that could be repaid with future property tax revenue.

Some tools may enable a city to lower its interest rate on a borrowing, or simply increase the amount it could borrow. While financial tools can’t create revenue, they can unlock the ability to tap into new sources of revenue, or mitigate the risk associated with entering into a new type of project delivery model (such as pay-for-success). In order to find the appropriate financial tool(s) for a project, a city has to determine what outcomes the financial tool needs to accomplish.

While it’s important to understand that financing can’t CREATE revenue, in some cases, flexible long-term financing can enable governments to tap into new sources of revenue that might not otherwise be possible to borrow against, or mitigate the risks of entering into a new business model.

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Examples of Funding, Financing, and Revenue Sources In Infrastructure Projects

Advantages of Financing Vs. “Pay as You Go” Approaches

If financing involves interest and issuance costs, why should governments borrow? The first and most basic reason is that most capital projects follow a similar expenditure pattern: there is a large up-front expenditure during construction, then typically much smaller expenditures during the period of operation, until the asset needs to be rehabilitated or rebuilt. Financing can solve the mismatch between current spending needs and revenues that only come in over a longer term. The alternative to financing (termed “pay-as-you-go”) can only work for the limited number of projects for which a city has available funding in a given year.

The Role of Rating Agencies

Credit rating agencies such as Fitch, Moody’s, or Standard & Poor’s provide investors information about the likelihood of repayment on bonds and other government obligations. These ratings have direct impacts on the interest rates that investors will demand from cities attempting to borrow from the capital markets. The agencies analyze on an individual transaction basis, but also provide an overall credit rating to municipalities that reflects the general state of their fiscal health and ability to meet obligations.

Rating implications affect what kinds of financial and delivery transactions a city will consider. Most cities are reluctant to risk a downgrade under any circumstances, since for each step down on the rating scale a city will pay higher interest on every obligation. A city may choose to engage with a particular financial tool or delivery strategy because it may not count against debt limits, or require the same levels of approval to enact. Rating agencies will largely look beyond the legal structure and consider the city’s future payment obligations in rating models, even when a structure is not legally considered city debt.
Spreading Out Costs of an Asset Over its Useful Life

Long-term financing spreads out the cost of an asset over its life, smoothing out the very “lumpy” expenditures into a more affordable annual cost. In this way, infrastructure finance resembles consumer mortgages, which enable homeowners to purchase houses that would be unaffordable on a single year’s salary. Conversely, a basic financing principle is that the debt service for an asset should not exceed its useful life—it doesn’t make sense to continue paying for an asset that’s no longer in service, or to enter into long-term debt for a short-term asset.

Allocating Costs to Current and Future Users

Infrastructure assets often have very long asset lives (some up to 75 or 100 years). By spreading out the cost over more of this period, financing also spreads out the cost of the asset over all the users that will be using it—current and future. For example, a bridge that is constructed today might last 75 years. Issuing a 30-year bond ensures that some of the taxpayers who will be using that bridge will be paying for it in the future.

Accelerating Project Construction (and Associated Benefits)

Financing can enable critical assets to be constructed earlier. By facilitating quicker construction, financing may preserve the ability to construct an asset, when land or facilities may not always stay available to an agency. While financing does involve interest and issuance cost, if it enables earlier construction it can help agencies avoid cost increases due to inflation. It can also help agencies deliver critical benefits sooner—whether it’s clean water, flood control, congestion relief, or transit service.
Bringing Resilience into the Capital Planning Process

Achieving long-term resilience requires rethinking the entire model of infrastructure performance, and the full lifecycle of the assets involved.
Traditional capital planning and project development processes don’t always consider long-term resilience. Existing financial and capital planning models usually focus on delivering the capital project, not the outcome—the public service—that benefits the community. Infrastructure capital projects are supposed to be a means to an end—providing public services that benefit residents. People don’t want storm sewers: they want to keep their neighborhoods from flooding. People don’t want bridge crossings and stairways; they want to be able to get to the places they need to go. Achieving long-term resilience requires rethinking the entire model of infrastructure performance and the full life cycle of the assets involved.

Expanding the Scope and Term of Capital Project Analysis

Everyone wants to cut the ribbon on a new project. Relatively few people want to show up three or five or ten years after it opens and pick up the broom to operate or maintain it. There is a bias in infrastructure finance (sometimes called the “the ribbon versus the broom”) towards spending money on capital costs, and not “wasting” it on operations and maintenance (O&M) or administration. The bias also occurs because fewer tools have been developed to specifically address operational and maintenance costs vs. capital costs.

For most cities, analyzing a potential capital project ends after construction. While impact on the operating budget might be estimated at a high-level, it’s rare to specifically allocate O&M costs to a specific project. O&M arrangements, liabilities, and challenges are not usually addressed in capital planning. This means cities can build up a severe backlog of O&M funding, and may be unable to optimize lifecycle costs since O&M isn’t analyzed in detail.

Avoiding the “Death Spiral” of Deferred Capital Maintenance with Diverse Funding Streams

Most cities do conduct some analysis of operational costs and future renewal needs, and the Government Finance Officers Association (GFOA) recommends (but does not require) that the impact on future maintenance costs be discussed. For example, the City of Pittsburgh includes operational savings/positive impact on operational budget as one of its criteria for selecting capital projects. Its capital plan describes the anticipated impact of each project on the operating budget, and prioritizes ones that will likely result in savings.

Yet traditionally, capital and operating budgets are not directly linked. Even when operational impact is considered when a project is built, commensurate revenue is not programmed or earmarked. Instead, agencies often have a fixed amount of funding for operating and maintaining the capital assets under their jurisdiction. This creates a permanent, structural defect in most city budgets: the number of capital assets grows every year, but the funding to operate and maintain them doesn’t.

When the inevitable shortfalls happen the response is to “spread the peanut butter thinner” and try to lengthen out the maintenance cycle. These actions may be the best way for an agency to weather budgetary uncertainties in the short term, but in the long term, they lead to even more backlogs in O&M, which lead to deteriorated assets. Once that happens, the capital shortfall also increases, since it is generally more expensive to fix an asset in worse condition. Degraded service quality can also lead to lower property values and greater inequity, as residents dependent on the infrastructure experience less reliable service.

This failure can have catastrophic consequences for future infrastructure delivery. Many urban transit agencies in particular are caught up in a “death spiral” of deferred maintenance leading to degraded service, leading to lower service base (e.g., ridership), leading to even less funding for capital maintenance. When operational funding relies even partially on user fees, agencies are less able to weather short-term service disruptions or plan for long-term resilience.

The 40-year-old Washington Metropolitan Area Transit Agency (WMATA) has been plagued by a legacy of deferred maintenance, resulting in increasing delays and accidents over the past decade. In 2016 the agency engaged in an aggressive “Back 2 Good” investment program to try to arrest the death spiral of unreliable service leading to reduced ridership and fares. Metro invested a record $16 billion in improving core services, leading to the number of on-time trips rising from 56%...
The Vicious Cycle of Deferred Maintenance

1. Reduced O&M
   - Deteriorated Capital/Lower Ridership
     - (Higher) Funding Gap
       - Greater Shortfall
         - Higher Repair & O&M Cost/Less Fare $
to 89%. Even if the system’s financial challenges are by no means solved, the program has helped to halt the slide in ridership. Yet Metro, New York’s Metropolitan Transportation Authority, and many other infrastructure agencies still struggle to catch up with the backlog of deferred maintenance.

While the agency struggles to obtain funding for its maintenance backlog, Metrorail stations increase property value markedly. A 2011 report estimated that 27% of the assessed value in WMATA’s region lay in the 4% of the area that was within ½ mile of a Metrorail station. When the privately funded New York Avenue Metrorail station was constructed in the “North of Massachusetts Avenue” (NoMa) area, assessed valuation increased 300 percent in 6 years. Not all of that value increase can be attributed to Metrorail access; but much of the development attracted to the station hinged on the availability of rail access. According to Governing Magazine, 93 percent of office projects under development are within ½ mile of a Metro station. Capturing some of that value to preserve the service that created it is a difficult sell to Metro’s regional partners, but broadening the revenue base will be key to preserving the agency’s future.

### Outcomes-Based Financing Example

**Massachusetts Pathways to Economic Advancement Project**

The Commonwealth of Massachusetts, and two nonprofit organizations, Jewish Vocational Services and Social Finance, are partnering on a workforce development program. Social Finance raised $12.43 million from 40 investors including financial institutions, donor advised funds, individuals, and foundations, to fund JVS services.

The program, the Massachusetts Pathways to Economic Advancement Project, will deliver services to approximately 2,000 adults in Greater Boston over three years. Vocational English language classes integrated with job search assistance and coaching will assist limited English speakers, including undocumented immigrants and refugees, in making successful transitions to employment, higher wage jobs, and higher education. If the program participants meet performance targets for employment and education, investors will be repaid for their investment. If performance targets are not met, investors can lose some or all of their investment.

### Applying Outcomes-Based Financing to Infrastructure

Outcomes-based financing is one approach that may help address the structural gap between capital and operating budgets. Under “pay-for-success” or outcomes-based financing, investors wishing to invest in projects that create a measurable, beneficial social impact (known as impact investors) provide funding for innovative programs designed to deliver social goals.

An investment is made to scale up an innovative program or service, with a specific goal or set of goals (such as reducing recidivism or increasing high school graduation rates). Investors get repaid only if the desired goals are achieved.

This approach allows governments and nonprofits to experiment with new ways of doing business—without having the government take on the financial risk that the new approaches won’t work. If governments set and measure performance targets appropriately, the savings and additional tax revenue from the outcomes produced by the program will create a return greater than the government’s payout to investors.

Outcomes-based financing can help cities tap into the cost savings and future value created by infrastructure development as well. An outcomes-based approach could improve infrastructure projects in three ways:

- A pay-for-success approach automatically focuses on results, not the capital facilities that are used to deliver it. If an operational or programmatic investment can substitute for a capital one, pay for success may reduce or eliminate the need for municipal capital investments, in some cases. For example, a program that helps landowners or neighborhoods construct their own green
San Francisco’s Capital Planning Fund

Funding for Holistic Capital Planning

Cities are recognizing the value of more intensive early project development, including early revenue feasibility analyses, developing information about long-term O&M and considering resilience aspects.

Finding sources of funding for this early project development is extremely challenging. San Francisco’s Capital Planning Fund—established through the city’s 10-year Capital Plan—is dedicated to project development and pre-bond planning outside the regular General Fund budget. The Fund works by requiring projects that receive early development funds to reimburse them in the first bond sale. That way the funds can be recycled for use on project development for future projects. This is much more effective than SF’s previous practice of relying on General Fund support that would be available only on an ad-hoc basis when budgets happened to be flush or experienced a surplus. Other cities also face similar challenges in identifying funding for early project development; it is not common to have a dedicated source of revenue for this.

With a regular source of revenue, the Capital Planning Fund provides resources for better planning, coordination, and support among projects over a longer time horizon. That means less disagreement among decision-makers when items go forward and greater voter confidence that bonds they are being asked to support will deliver on their promises.

For example, in 2014, the City of San Francisco adopted guidance requiring that vulnerability and adaptation to sea level rise planning be incorporated into every department’s capital plan. These funds can assist agencies in meeting this requirement. San Francisco’s Capital Planning Fund is expecting a balance of $11M in the fund in 2017. These funds will be spent on half a dozen or so projects over the next five years.

COHORT CITY SAN FRANCISCO
Case Study

The San Francisco Seawall protects the busy waterfront (shown here). The multi-generational project has used the Capital Planning Fund for project development.
Saint Paul Green Stormwater Infrastructure
Changing the Process in Flight

As part of its work with the City Accelerator, Saint Paul is pursuing stormwater management as “shared district” concept. In this approach, green stormwater infrastructure (GI) is planned as a visible upfront investment serving multiple parcels, allowing the city to elevate property value and catalyze neighborhood revitalization.

First Saint Paul had to demonstrate the value of its preferred alternative to traditional stormwater management. Developers were concerned that the district-based GI process would impose new costs or delays compared to the traditional approach. Developers had legitimate fear that the time required to pioneer new options would impact their projects, and potentially jeopardize their developments’ meeting financial and construction deadlines.

Demonstrating value required clearly establishing the typical investment cost under the traditional model. Saint Paul hoped to show an economy of scale for a district-based system as well as set a policy baseline for equitable financial contributions from benefiting properties. In essence, developers are being asked to provide the same investment but apply it towards a higher performing green system that has greater value.

Stormwater management costs are highly variable and regionally specific. The city’s local research about developer’s typical stormwater costs was difficult. Often stormwater was not isolated in construction bids; contacts were not responsive; or many contractors were no longer reachable. Yet enough information was gained to show this minor overall incremental cost increase can return greater investment value.

Saint Paul used part of its City Accelerator funding to host a forum of national experts to hear how value was demonstrated for precedent projects. It also worked with multiple public agencies to address long-term operations and maintenance concerns, including cost of O&M and liability concerns if stormwater features fail and cause flooding in the area. It also explored long-term financial tools that will allow the capital elements to be constructed in advance of the need.

This is a rendering of Hidden Creek Falls, part of the plan for redeveloping a 122-acre parcel on the site of a former Ford motor company assembly plant in Saint Paul. The plan includes daylighting Hidden Creek as a key site amenity and stormwater utility.
stormwater infrastructure might reduce the need for additional city sewer capacity. Programs that reduce recidivism will reduce the need for new jail cells; programs that improve public health may reduce the need for additional hospital beds or dialysis facilities.

• The involvement of impact investors may also lead cities to measure more closely how their infrastructure projects affect social outcomes, such as economic development, racial and income equity, and environmental quality. Infrastructure agencies are used to measuring benefits as part of generating support for project funding. They are rarely called upon to measure the impact of their projects on equity and environmental quality, after construction. Having financing tied to equity and environmentally based outcomes will add a layer of rigor and accountability.

• Finally, impact investment can serve as the venture capital of government, allowing new technologies and approaches to be tested at the risk of the private market. This will accelerate innovation and the adoption of new approaches for delivering equitable and resilient infrastructure.

The first application of a pay-for-success model for environmental infrastructure was the DC Green Bond (see case study on page 56), which combined a form of traditional bond with an outcomes-based approach. Impact investors with an interest in funding green projects provided funding to install green stormwater infrastructure, a technology less proven than more expensive “gray” solutions. If the infrastructure performs up to the standard set by the DC government, the investors will receive a market return. If the infrastructure does not perform as expected, the investors will receive a 0.5% return on their original investment. If the infrastructure performs better than anticipated, the investors will achieve a higher rate of return. This allowed the government to transfer the risk of an unproven green technology to impact investors willing to assume it.

**Applying Life Cycle and Resilience Analysis to All Projects**

As previously mentioned above, most existing capital planning processes end shortly after project construction. Performance-based, long-term analysis is more likely to occur when the public sector is considering entering into alternative procurement arrangements, including Public-Private Partnerships (P3s). Bringing in any kind of external partner—even another public agency—naturally forces greater definition of what activities need to happen, at what performance level, and which entities will be taking responsibility for them. P3 analyses are often conducted as “value for money” studies, documenting the greater potential value that could be created via a P3 arrangement. Compared to analyses of traditional projects, analyses of potential P3s usually feature:

• Longer analysis timeframes—usually through the life of the asset;

• Detailed life cycle cost analyses, including consideration of whether a higher initial capital investment might be more optimal to reduce ongoing O&M cost;

• Specific O&M and capital maintenance and renewal plans;

• Consideration of resilience in the long term, including climate changes, sea level rise, cultural changes, and business cycles that might affect the asset; and

• Community impacts in the short and long term, including considering equity of revenue sources, financing tools, delivery strategies, and outcomes.

Traditionally procured projects do analyze most of these aspects, but generally not with the rigor and long term of an alternative procurement analysis. Going through this analysis—even if a P3 option is not chosen—can be beneficial to the project. When operations and maintenance remain “in house,” it’s often not considered necessary to fill in the details. Part of the accountability achieved with P3s may be due to the need to explicitly define performance targets into the future, rather than private sector efficiencies or innovation.
By bringing in an external partner that will inspire the same accountability—extending the timeframe of analysis and documenting specific costs and risk—public agencies may be able to reap some of the performance benefits that are associated with long-term P3s.

By doing long-term, performance-based analyses for all projects, even traditional ones, public agencies may also be able to get support for receiving some of the resources that would have been dedicated if a long-term P3 model had been selected. When a long-term P3 option is chosen, the public agency is usually contractually obligated to pay the private partner for the operations and maintenance of the project. If a public option is chosen, there is usually no similar long-term dedication of O&M funding to the project. Documenting future needs and maintenance activities can also help with succession planning and workload balance for a workforce whose careers will probably not extend past the life of a particular project.

Creating New Paradigms in Flight: Mapping the Baseline

New paradigms for project development often involve changing how agencies relate to each other or to private partners. In order to get buy-in from stakeholders on the innovation, agencies have to understand how a proposed innovation might change from multiple perspectives.

Agencies often understand their individual roles in a process, but lack a holistic understanding of the steps, costs, and risks involved for all of the other participants. If cities undertake innovation without understanding how the current framework works for master developers and sub developers, it’s impossible to understand how changes might affect their costs and profits in the short and long term. For example, on the Saint Paul green stormwater initiative, master developers wanted to know the all-in cost of the new approach, and what the long-term costs would be for the sub developers who would purchase and develop individual parcels. They were familiar with how to manage stormwater costs under the current system, but had concerns about what the new costs would be, when they would be incurred, and who would pay for them. Without that knowledge, cities may face resistance from stakeholders who may be disadvantaged by the proposed innovations.

This is particularly true for complex infrastructure projects, where the sponsoring agency is unlikely to have experience across all project aspects. Transit agencies need to understand the dynamics of local retail and housing markets if they are planning on transit-oriented development as part of their financing strategy. If they offer up space or lease arrangements that don’t align with market needs, the project may not succeed. Flood control agencies need to understand the dynamics of the insurance market in order to tap into potential premium rebates for reducing the risk of catastrophic loss. To gain this kind of holistic view, agencies need to create time and space for discussions with public and private stakeholders, outside of the deadlines and context of a particular project.

In an ideal world, there would be plenty of time and space to design a perfect process. In the real world, it’s hard to focus on process improvement without the impetus of having a specific project that will benefit from it. Sometimes the adjustments made to accommodate a single innovative project can benefit the entire portfolio. However, the significant staff time invested in trying to deliver one innovative project, or to participate in a multi-disciplinary process, should be “amortized” over the entire capital plan. Otherwise, this kind of innovation won’t happen, because it will look as if one project is consuming far more than its due share of staff time and attention.

Asset Management Systems: Using Information to Inform Funding Plans

Long-term resilience can also benefit from holistic asset management systems. One way to “run a city like a business” is to record the value and condition of existing infrastructure, and document the costs to renew, rehabilitate, and maintain it. Cities are also increasingly inventorying land and real property assets, facilitating urban land reuse and potential revenue-generating activities.

Using Asset Inventories to Predict Future O&M and Renewal Needs

Cities like Pittsburgh, PA, are using Cartegraph, a GIS-based asset management system, to help gather information about current conditions and maintenance costs for
Capital Asset Replacement Scheduling System
A Long-Term Asset Management and Capital Planning Tool for the District of Columbia

In 2015, the District of Columbia began to create a comprehensive inventory of the condition and maintenance needs of its capital assets. The District is using the Capital Asset Replacement Scheduling System (CARSS) to project annual funding needs for capital renewal and replacement. The model includes horizontal infrastructure (streets and roads), vertical infrastructure, fleet and information technology, and equipment. The data from CARSS is combined with a long-range financial planning model and an optimization tool to allow the district to determine the optimal level of borrowing that fits within debt capacity limits, currently available funding, and project needs. The District’s Office of Public-Private Partnerships also reviewed each project in the pipeline to determine whether there was potential value in pursuing a P3 option for project delivery.

This diagram shows how the information in the Capital Asset Replacement Scheduling System and an optimization model provide input to the District’s Long-Range Financial Planning Model.
its infrastructure assets. By combining it with
the city’s work order system, staff can deter-
determine how often repairs and maintenance were
needed on city-owned buildings, and how
much they cost in staff time and materials.
This information can be used for budget fore-
casting, and for prioritizing capital repairs that
can avoid future costs. When a comprehensive
asset inventory is already in place, it provides
critical information that can help advance
individual projects, and allows optimal priori-
tization of funding among the entire portfolio.
It can also allow cities to forecast future work-
force needs.

Incentivizing Generating Revenue from
City-Owned Land and Capital Assets

Most city assets are managed by indi-
vidual city departments or enterprise agen-
cies, rather than centrally. Information about
these other assets is often contained within
multiple departments, in multiple formats, and
managed with different policies. Centralizing
information about city-owned assets facilitates
potential land swaps, joint development, and
other revenue-generating opportunities.

Often, city processes don’t contain any
incentives for departments to consider reve-
 nue-generating arrangements, because any
proceeds are dedicated to either the General
Fund or specific uses, not back to the depart-
ment. Given this, agencies are more likely to
“sit on their assets” than try to use them for
revenue generation.

Government accounting practice
(as recommended by the Governmental
Accounting Standards Board) is to value assets
at historical cost, not at book value. This can
understate the wealth of cities substantially, as
the historical cost of real property and facilities
lags far behind the current book value. This also
makes it difficult to identify potentially mone-
tizable or saleable assets.

In the City of San Francisco, for
example, any surplus city land must first be
considered for affordable housing develop-
ment. This is a logical response to the severe
housing crisis in the city, but doesn’t provide
an incentive for agencies in control of assets to
invest the staff time and potential transaction
costs of trying to find a way to make use of an
underutilized asset. Cities that find ways for
departments to share in the proceeds may find
greater success in identifying and making use
of potentially monetizable assets. For example,
the State of Virginia passed a law to incen-
tivize use of surplus property by state depart-
ments, providing that up to 50 percent of the
proceeds from surplus property sales can be
returned to the agency that controlled the
state-owned property.

In Australia, the federal government
provided an incentive to provincial govern-
ments to consider making use of surplus assets,
either through long-term leases or outright
sales to the private sector. The program was
termed “asset recycling” because it required
provincial governments to reinvest proceeds
from the leases into other infrastructure. The
incentive payments represented an addi-
tional 15% of those proceeds, and were also
dedicated to infrastructure. Cities in the
United States have also benefited from the
sale of surplus land. Street and pedestrian
improvements and affordable housing in San
Francisco’s Hayes Valley neighborhood were
funded by the sale of surplus California state
land (facilitated by the removal of a freeway in
the area). The resulting land was transformed
into 22 housing sites, seven of which are desig-
nated as affordable.

Removal of the Central Freeway in San Francisco’s Hayes Valley neighborhood freed
22 parcels for development, including seven designated for affordable housing.
Addressing Equity in the Capital Planning Process

Urban infrastructure projects have often come at significant cost to low-income communities, particularly people of color. Equitable planning includes diverse voices and considers development’s impacts on all city residents.
Infrastructure projects have great potential to increase the value of land and once completed, to improve the quality of life for those with access to the development. However, that very increase in value can also threaten the existing residents of the areas in which these projects are built. Agencies may successfully deliver a capital project, but the value of that success is often diminished without an early analysis of the ways in which the infrastructure project could potentially create displacement or disadvantages for residents. Addressing equity requires extending the analysis even further, to include the participation/voices of the people who will be affected by the project in the early stages, and considering how income level, race, and geography might affect outcomes and impact for residents nearby.

Inequitable Development: The History of Infrastructure and Credit Policy as a Tool of Inequity

Many of the highway projects constructed in the 1960s created enormous benefits for suburban commuters—at the cost of displacing residents and putting in physical barriers that broke apart thriving urban neighborhoods. The projects were successful, but not for the people in the communities where they were constructed. Suburban residents were able to save time on their commutes and freight was able to move faster through the interstate highway system, but at significant cost to many low-income communities, primarily occupied by people of color. Research shows that some projects were intentionally designed to maintain or enhance barriers between residents of color and predominantly white communities, or between wealthier and lower-income communities. For example, as mentioned in the “The Power Broker,” Robert Moses intentionally had the Southern State Parkway designed with lower overpass clearances, to make it harder for buses of low-income New Yorkers to reach Jones Beach in Long Island.

Beyond these infrastructural inequities, research shows us that neighborhoods with high proportions of non-white, low-income, and immigrant populations have historically been disadvantaged by federal lending policies. Some examples include recently...
discovered maps from the Home Owners’ Loan Corporation that demonstrate a ranking system offering significantly decreased lending based on the racial and socioeconomic makeup of neighborhoods, and later by the Veteran’s Administration and Federal Housing Administration. This in turn led to redlining that created disparities that continue to this day. According to Thomas Sugrue, a historian at NYU, this lack of credit impacted “every dimension of neighborhood life, in terms of the quality of real estate, the willingness of investors to come in, the prices of property, the emergence of predatory practices...These are all direct consequences of the lack of affordable loans and affordable mortgages.” Since homes are typically a family’s most valuable asset, the barriers to homeownership increased the already-significant disparities in wealth between poorer and wealthier neighborhoods.

Differential Impacts of Infrastructure on Marginalized Communities

The assumption of equality in infrastructure development is detrimental to a comprehensive analysis of the scope and possible impact because effects like job growth and income vary greatly per individual. Agencies need to measure how infrastructure projects affect low-income residents differently. Project benefits are often assessed on a macro level, often eclipsing impacts that may fall more heavily on low-income individuals and people of color.

Residents without cars, for example, are more dependent on the reliability of transit and pedestrian infrastructure. Therefore, increasing transit access to hundreds of thousands of job sites in a low-income neighborhood is going to make a huge impact on daily lives, income, resources and opportunity. In traditional infrastructure studies, a project that saves suburban commuters 10 minutes on their existing daily commute could be considered equally impactful, in terms of measured dollars of economic benefits, as a project that provided transit access for thousands of low-income commuters. Without an equity lens that accounts for these disparities, the two projects could appear identical.

Another example is residential energy efficiency programs, which historically targeted single-family residences because that’s where utilities could get the highest level of improvements for their investment in reduced energy use. From the utilities’ perspective, that made sense. An NRDC report found that energy bills for lower income individuals represented an average of 7.2% of total income, compared to 2.3% for non-low-income individuals. Energy efficiency improvements could make a much larger relative difference for lower-income individuals, yet that differential benefit often doesn’t get measured by traditional approaches.

Negative impacts are also experienced differently. Small business owners who lack capital often run their business on a cash basis. If infrastructure construction or service interruptions disrupt their customer base, they will have more difficulty proving that they’ve lost money, and claiming any compensation for it. These differences are highlighted even more during extreme weather events and...
Multi-Solving in Atlanta

The Just Growth Circle

“Atlanta is doing great with finance. A lot of businesses are coming to town. There is great progress in sustainability. But Atlanta is still ranking as one of the worst cities in the country with inequity. How can we have a progressive city without addressing this?”

— Comment prior to a series of multisolving workshops

In Atlanta, the Just Growth Circle is a collaborative convened by Partnership for Southern Equity and Climate Interactive to help make sure that green and sustainable infrastructure options, like green infrastructure for storm water management, are developed in an equitable way, guided by the needs and visions of impacted communities. Because infrastructure decisions and their impacts are so multi-sectoral the collaborative includes participants with interest and expertise in health, sustainability, conservation, water quality, economic development, and community well being. Participants include city officials, leaders from front-line communities, funders, and non-profit organization leaders.

Using multi-solving tools like FLOWER, the group has developed a set of shared values centered around equity and community self-determination and created system maps both of the co-benefits of green infrastructure and the dynamics of gentrification and displacement. Based on this foundation of relationships, shared values, and shared understanding of the underlying system, the group is committed to responding together to opportunities for more equitable development in the Atlanta Metro region.

New Markets Tax Credits in Action

Crosstown Concourse

Federal New Markets tax credits helped spur $200 million of investment in the Crosstown Concourse, a redevelopment of a five million square foot historic warehouse in a low-income area in Memphis, Tennessee. A group of Community Development Entities (CDEs) provided $56 million in federal New Markets Tax Credits as part of the financing for the project. Another $88 million in historic tax credits assisted as well. The mixed-use site includes a charter high school, an art center, apartments, retail, a fitness center and health clinics, and commercial offices.

BuildNOLA Mobilization Fund

Supporting Local Disadvantaged Businesses

The pilot BuildNOLA Mobilization Fund blends public, private, and philanthropic dollars to provide capital to local disadvantaged businesses. Created by the Network for Economic Opportunity, a partnership of government agencies and nonprofit organizations supported by the Living Cities Integration Initiative, the initial $1.5 million capital raised will help a local lender, NewCorp, expand its lending and identify barriers faced by these businesses. This will help position these business to win some of the more than $2 billion in post-Katrina funding between now and 2022. Given that New Orleans is a pioneer in green stormwater infrastructure, these new businesses will also gain valuable market experience that may be translatable to other areas that lack this experience. The Netherlands government has used some of the expertise gained in flood control and green solutions to generate revenue from consulting to other governments. New Orleans and its mobilized small businesses may be able to do the same.
infrastructure failures. Higher-income residents can self-evacuate, and have savings to tide them over during periods of disruption. Lower-income residents are more affected by service disruptions that can be exacerbated by limited digital access to information.

**Multisolving: A Tool for Holistic, Equity-Based Project Analysis**

Multisolving is one approach for ensuring that a project includes consideration of diverse impacts, and that it is not narrowly defined by one infrastructure mode or discipline. The process involves bringing multiple stakeholders to the table, and identifying the goals they could accomplish with the project. For a transit oriented development project, stakeholders could include the local transit agency, nearby business owners and developers, residents and prospective residents of all income levels and races. For a green infrastructure project, the stakeholders might be the local water agency, the local parks agency, federal regulators, housing advocates, prospective residents of all races and income levels, and private landowners.

**Tools for Addressing Long-Term Economic and Racial Equity**

Economic and racial equity have not historically been part of developing a financial strategy for infrastructure projects. Yet projects that fail to do this have faced delays or cancellation due to failure to adequately consider community impacts. Using tools like FLOWER to engage the community early and consider how the project may differentially impact economically and socially disadvantaged groups can turn a potential roadblock into a positive feature.

Other tools, like King County’s Equity Impact Review Tool, can help cities identify potential differential impacts of a project (as well as ways in which it may be able to reduce inequity). The Equity Impact Review tool begins by listing the potential determinants of equity, such as equitable access to job training, community economic development, housing, education, transportation, etc. Then for capital projects, sponsors are asked to map out demographic groups by income level, race, and other pertinent factors, and identify differential impacts on each. The City of Seattle has also developed a racial equity toolkit, which assists in identifying differential impacts of government programs and budgets. Another tool is the Natural Resources Defense Council’s Equity Toolkit, which includes a framework for assessing equity impacts of environmental projects.

The team developing the financial strategy doesn’t necessarily need to lead this process, but should be actively participating and cognizant of the results, which need to inform the financing strategy.

For example, workforce development is an obvious area for focus, and many project plans have included hiring goals that provide preferences for local residents. In some cases, federal grants or financing may preclude use of local hiring preferences. If a new tax or fee is proposed as a revenue source, its impact on low-income residents has to be part of the evaluation. If a public-private partnership with a long-term concession contract is chosen as the delivery model, agencies need to ensure that equity is considered in the performance standards for the private partner. These considerations need to be added to the criteria used to select and implement a financing strategy.

The features built into the project to reduce inequity also have to be financed, and may require innovative finance tools of their own. If affordable housing or community land trusts are contemplated, it is easier to build them into the strategy at the front end than to paste them in on the back end. Mobilization funds and other ways of providing capital to disadvantaged and minority-owned businesses also may require upfront financing.

**Workforce Development Plans**

Workforce development plans are intended to help local communities benefit from construction and operation of infrastructure projects. Going beyond simple hiring targets, workforce development focuses on preparing residents for the jobs to be created, and ensuring that they overcome any skill-based, informational, or other barriers to employment.
Mobilization Funds

Mobilization funds can assist in helping small businesses get prepared for winning government contracts for infrastructure projects. These funds provide upfront capital that may be needed to purchase equipment, meet payroll, staff up, obtain training, or otherwise prepare to respond to public sector procurements.

Community Land Trusts (CLTs)

A community land trust helps control rapidly increasing land values in areas that are being revitalized. The trust, which is a nonprofit controlled by residents, community members, and experts, owns the land underneath housing developments. Residents own their own houses, but lease the land from the CLT. If a resident wishes to sell, the CLT sets the rate. Usually resale prices provide some financial equity to residents, but not at the same level as the private market. The advantage is that residents are protected from massive increases in costs, and affordable neighborhood housing is preserved in perpetuity.

New Markets Tax Credits: Equity Financing in Low Income Areas

These tax credits are competitively allocated to Community Development Entities (CDEs), who can use them only in areas that qualify as low income (primarily those with poverty rates of greater than 20 percent or income levels at or less than 60 percent). The CDEs then select eligible projects for investment. In 2016, CDEs invested $1.9B of NMTCs in projects that involved $3B in total investment. While NMTCs do not generally fund infrastructure directly, they fund many other community facilities, such as medical and health enters. NMTCs have also funded transit-oriented development around a station area; supported development of recreational and retail amenities near an urban park; and enabled workforce development by supporting local entrepreneurs who could work on infrastructure projects.
Developing a comprehensive financial strategy starts with framing a project that serves the community, addresses multiple goals, and can be successfully operated and maintained after construction.
The broad process changes and innovations described in the previous chapter can benefit a city’s entire capital program. The next section describes an approach to developing financing strategies for individual projects.

**The Case for an Explicit Financing Process**

- Finance is traditionally a back-office operation that doesn’t always involve a great deal of engagement, either with external stakeholders or even other city departments, especially at the initial stages. While IRS regulations and municipal market norms are the same, the process for developing financial plans for individual projects, and getting them included in the capital plan varies widely from place to place. Often, project development is a multi-disciplinary effort lasting years, while the financial strategy gets developed after the rest of the project.

- Having an explicit process can allow for inclusion of diverse perspectives, both internally and externally. “Showing your work” also enables buy-in and can stave off critiques later (“Why didn’t your agency consider this?”). It also highlights changes that might be needed in order to make it possible to use an option in the future.
In many cases, the reason projects don’t get financed has less to do with inability to identify financial tools, and more to do with stakeholders who do not buy into the vision, outdated institutional frameworks, or regional government structures that leave a project without an agency champion. For example, it took decades to undertake the extension of transit service to the Dulles Airport near Washington, D.C., because of the need to have multiple state and regional governments agree on how the project would happen. An open process for developing a financial strategy can bring these challenges into the open, by bringing all the participants to the table.

### Steps in the Financial Strategy Framework

As mentioned above, each government has its own internal process for capital project finance. Often, it is an iterative process, with a sketch-level analysis at the beginning of a project, and more refined analysis as greater detail is developed. For each city, the order of the steps will vary, but most cities will go through each of these steps at some point in creating their financial strategy.
Developing a financial strategy starts with establishing the vision for the project. This guide will review how to make sure that the vision is inclusive, equitable, resilient, and responsive to the community it’s supposed to serve. In this step, cities can also expand the vision beyond the construction period to conduct long-term analyses of how the project will be operated, maintained, and renewed.

Developing a resilient financial strategy requires identifying a range of options—and back-up options that can kick in when unexpected events occur. This section will review a host of revenue, finance, and procurement tools that may be able to assist in delivering on the vision. It will also present examples of innovative tools that cities have tapped for their financing strategies. The tools are described in greater detail in the appendices.
In order to narrow down the options, cities need to decide what variables matter most and gather data. This section will review how to do this effectively, with enough accuracy to make a decision, but avoiding expensive over-precision. One of the most critical aspects is identifying short and long-term risks to the project, so that the agency can find financial and procurement tools to mitigate them.

This section involves how to prioritize and narrow down the options worth pursuing, in the short and long term.

This step addresses how to stage options in logical order, so that the necessary implementation steps are feasible in the time required, and so that the funds needed at all stages are available. This section will also discuss best practices and challenges encountered while implementing financial strategies for infrastructure finance.
Leading with the Vision, Not the Numbers

The best financial strategies don’t lead with the numbers. They lead with vision. Have you ever gone to a restaurant where the host looks straight at you and asks, “How will you be paying for this?” as soon as you enter? No one does this (unless you want to imply that your customers can’t afford what you’re serving and you really just want them to go away). But in public works, sometimes the discussion around projects begins with the available funding (or simply ends when funding isn’t available). Starting with the project vision first lets stakeholders buy into the vision before they will buy into the ways to pay for it. The most compelling infrastructure projects get funded because people buy into the vision first.

Inclusive Visioning: Determining How the Project Will Serve Communities

- **Great infrastructure projects start with vision; but that vision is incomplete if it doesn’t include the people it will serve.**

  As the project is developed, it’s important to have representation from:

  - Communities in the geographic area where the project is sited (including diverse demographic groups)
  - Communities affected by revenue and finance tools used by the project
• Agencies involved in future operation and maintenance
• Agencies and stakeholders whose missions will somehow be impacted by the project (positively or negatively, e.g., public health, economic development, housing, transportation, etc.)

Tapping Multiple Disciplines

In order to frame a project that responds to multiple challenges, it’s important to have a variety of disciplines participate in early project development.

When individuals from various disciplines and backgrounds are jointly framing a project, one question that can help surface different perspectives is “What problem(s) are we trying to solve?” For engineers, the problem may be optimizing water or traffic flow; for economic development specialists, the problem may be stimulating the local economy; for public health experts, the issue may be better air quality and walkable environments, and for community members, the issues may be access to affordable housing, safety, and green spaces. Having all of them at the table can create projects that can multisolve.

By bringing a diverse group of stakeholders to the table, agencies can also refine what kinds of services the community may need, and how their project might best be able to serve them.

Snapshot: The Atlanta Beltline

A Transformational Vision

The Atlanta Beltline project is an example of “catalytic infrastructure”—infrastructure with a bold vision that has the potential to reshape an area. The Beltline is a 22-mile loop of multi-use trails, parks, streetcars, and other urban redevelopment infrastructure, connecting and helping to transform 45 neighborhoods. The concept started with Ryan Gravel’s master’s thesis.

A few stakeholders and local politicians became champions of the idea, and the vision grew. If the project had started with the current scope and $4.3 Billion price tag, it would probably have been laughed out of every community meeting. The project grew out of a vision, and gained momentum as more and more people were brought into that vision. Now it is an integral part of Atlanta’s current and future infrastructure.
Pittsburgh’s Stairways and the Community

The City of Pittsburgh owns more than 800 sets of public stairways that are a critical part of the City’s pedestrian network. Pittsburgh’s unique topography renders residents, especially low-income residents, dependent on these stairways on a daily basis, and many are in need of repairs or enhancements, including lighting and safety improvements. The City initially envisioned conducting engineering studies on each of the stairs to estimate the costs of needed rehabilitation. Instead, the City decided to conduct a public engagement process first to gain additional information about who used the stairs, how they were used, and their role in the transportation network.

By engaging the community first, the City can determine which stairs are most used, and which ones are most relied on by residents who don’t have access to cars. The City can also determine what other features and benefits might serve the community.

In prioritizing the stairway projects, the City will use five factors:

- Destinations — the number and type of destinations reached by a set of stairs.
- Population — the number of people using the stairs or in proximity.
- Demographic factors, such as poverty rates, vehicle ownership rates, and pedestrian mode share.
- Step detour — the distance a pedestrian would have to walk from the top to the bottom of a set of steps, if the steps did not exist.
- Step density — a factor to compensate for the fact that neighborhoods with fewer steps would automatically score highly on the step detour factor (since the nearest step would be farther away). Without this factor, neighborhoods with many steps might not receive adequate prioritization.
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The City of Pittsburgh owns more than 800 stairways that differ in size, neighborhood context, level of use, and state or repair. The city gathered community input through a Wikimap (as well as through direct outreach to community groups).
The San Francisco Seawall provides flood protection for San Francisco’s historic waterfront, from Fisherman’s Wharf down to the Giants Ballpark. The Seawall was initially constructed more than a hundred years ago, in order to enable shipping to come straight to the shoreline of San Francisco. The Seawall protects some of San Francisco’s most iconic and economically active sites, including the city’s Financial District. Now the Seawall will need from $2.5 to $5 billion in improvements to protect against seismic disruption and sea level rise.

As part of its approach to this multi-generational project, San Francisco is engaging with its community to both educate them about the Seawall and learn their interests and concerns. While the Seawall is next to some of the most expensive real estate in the country, its existence protects the tourist industry at Fisherman’s Wharf, including many small businesses and jobs held by low-income individuals; vital transportation links including the BART/Muni station at Embarcadero, and the thriving Financial District in downtown San Francisco. The Seawall outreach will help demonstrate to residents how the project benefits people at all income levels, while ensuring that the project is designed to meet their needs.
A Seawall for All
San Francisco’s Generational Project

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The Seawall is a project of the Port of San Francisco, which manages the waterfront area on behalf of the city. Much of the city’s major tourist areas and financial district are protected by the Seawall.
Framing Multi-Purpose Projects, with Multiple Co-Benefits

- **Inclusive visioning allows agencies to re-frame a project to solve multiple challenges at once.**

  For example, a transit station isn’t just a transit station; it can be a locus for affordable transit-oriented development, economic development via retail space, green energy via solar features, and community gathering via park and recreational amenities. Green stormwater infrastructure, which uses plants, soil, and other natural elements to help manage excess water, can be a recreational amenity, an aesthetic feature leading to higher land values, a form of flood control, and ecosystem habitat, all at the same time.

Iterative Framing: Catching Up with a Moving Target

- **As a project evolves, and city conditions and needs change, it’s natural to revisit the framing multiple times.**

  Changes to the project vision often increase cost. It’s common when conducting outreach on public works projects for additional elements to be added at the request of the communities involved. Industry participants and academics that track increasing project budgets often criticize this phenomenon as “scope creep,” seeing it as evidence of mismanaged costs.

  In many cases, scope creep is really scope enhancement. A project may be getting larger in cost, size, and complexity but so are its benefits and the services it can offer the community. In dense urban areas, projects need to be able to serve multiple purposes and provide multiple features. If infrastructure is being done right, projects will acquire new features that will bring greater cost. The challenge for public agencies is to make sure that these cost increases bring positive, not negative publicity to the project and the agency conducting it. They also need to ensure that they are tied to the outcomes that benefit the community and stakeholders.

Considering Long Term Operations and Maintenance

- **Once a project has been framed, an agency needs to consider how it will be operated and maintained over the long term.**

  Projects that might involve a change to traditional models require particular attention, since an agency may not know how the new models or new type of infrastructure will perform over time.

  For example, managing green stormwater infrastructure (retention ponds, etc.) is very different from managing gray stormwater infrastructure (pipes and sewer systems). Municipal utility staff know how to inspect pipes and do corrosion control. Traditional gray infrastructure also isn’t as accessible to the public, so there’s less chance of vandalism or performance failure due to human action.
Green stormwater infrastructure may require more active management, weeding, raking, mulching, mowing, and removing trash and sediment. When features are also used as a recreational amenity, more people are able to access green stormwater sites and potentially leave trash or other debris. Part of the scoping for the project needs to include consideration of:

- Which agency will perform these activities (it may not be the same agency that oversees construction);
- How much they will cost;
- What the potential cost of failure would be; and
- What entity will undertake the liability risk if a failure causes flooding?

Other kinds of infrastructure may present their own asset management challenges. For example, if a city decides to create leasable space by decking over tunnels, it needs to consider how the space would be maintained, and which entity undertakes the liability risk if a failure occurs. Transit agencies that undertake joint development projects may have to consider the long-term operations and maintenance issues for commercial space (which differ from O&M for transit facilities). If an agency decides to partner with nonprofit organizations as part of its O&M approach for pedestrian infrastructure, how will it handle liability for injuries to volunteers, or for damages or injuries associated with the organizations’ failure to adequately maintain the facilities? These are just examples of the multi-disciplinary questions that need to inform long-term capital planning.

**Identifying Long-Term Risks**

- **Communities need to consider how projects will be affected by long-term trends, including climate change, demographic changes, and technology shifts.**

  Sea level rise could require hardening of flood control infrastructure and relocation or hardening of other infrastructure facilities, such as streets, transit and highway tunnels, or electrical facilities. Demographic changes might mean that more elderly residents will be using transportation infrastructure, requiring higher levels of accessibility, and making a robust transit system more vital for seniors who may no longer drive. Technology included in projects can become obsolete shortly after it is deployed. For example, early toll road P3s contained a lot of performance standards related to call centers for toll payers inquiring about their bills. There were no performance standards for a website or cell phone app, which are now much more commonly used by customers who wish to communicate about their bills.

  Identifying those kinds of risks early in the process (at a high level) can inform future procurement decisions. In particular, early risk identification can support later consideration of whether a P3 might be beneficial to the project. In general, agencies should consider P3s when there is a risk that can be managed more cost-effectively by a private entity or outcomes-based financing.
Green Stormwater Infrastructure in Saint Paul
Rain as a Resource

Saint Paul aspires towards a greener future for stormwater infrastructure: hold the water and use it as a visible resource. In traditional developments, stormwater is handled by pipes constructed by each landowner, buried underground that transport excess rainwater to sewers for disposal. Green stormwater infrastructure can transform the rain seen as a waste and a hazard into a community resource, ecosystem habitat, and selling point for future landowners. The City of Saint Paul is actively working to transform the paradigm of stormwater management, bringing stormwater out of the ground, and into the community.

Working with developers, community members, and other public agencies, the City is creating a framework for Green Infrastructure Financing Districts. Large redevelopment tracts for future urban neighborhoods will have dedicated financial mechanisms (capital and operation) to support an upfront shared, or district, green stormwater system. This visible infrastructure can also be built in areas of the land tract that are less developable, transforming less-useful land into a utility that can also be enjoyed as a recreational amenity by future residents and customers.

The West Side Flats redevelopment on the Mississippi River across from downtown Saint Paul will include a mixed-income, mixed-use community with a greenway that will provide both recreational opportunities and stormwater control.
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On Earth Day 2017, Saint Paul hosted a visioning event to include area residents in the plan for the future greenway.
Types of Funding and Revenue Sources

To generate revenue for infrastructure, agencies have traditionally looked to either taxes or user fees (for infrastructure services that people have been accustomed to paying for, like water, or wastewater). Financial strategies increasingly involve expanding the revenue base to new options, including:

- Redefining utility fees to include new types of infrastructure services (e.g., stormwater and transportation utility fees);
- Diversifying revenue sources to both project-specific and broader sources (such as combining sales tax with user fees);
- Examining revenue generation potential associated with infrastructure projects; and
- Tapping property and economic development value created by projects.
Grants

Other people’s money is everyone’s favorite funding source.

Most grant sources for infrastructure cover only a small portion of the need. Yet grants can serve as the public equity in many projects, the early funding that enables the development of a financing strategy to attract more capital.

Although chances of receiving a grant may be slim, participating in a competitive grant or credit process can have a catalyzing effect that has value beyond the likelihood of success. In order to submit an application for most grants, state, regional, private, and other partners have to coordinate on a preliminary financial plan and bring it to the table. The prospect of external money—that can be obtained without going to the voters or reducing funding for other programs—can be motivation enough to lock in commitments that can otherwise be elusive or delayed. In this sense, applying for grants can be worthwhile even when it’s a long shot, because it brings project stakeholders to the table.

<table>
<thead>
<tr>
<th>Who Pays?</th>
<th>Advantages</th>
<th>Limitations</th>
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<tbody>
<tr>
<td>Grants</td>
<td>Federal or state taxpayers or philanthropy</td>
<td>Politically acceptable (doesn’t impact voters or users)</td>
</tr>
<tr>
<td>User Fees</td>
<td>Users of services provided by infrastructure facility</td>
<td>Clear nexus between fees and project. Easily understood by public (sometimes controversial if public is not used to paying)</td>
</tr>
<tr>
<td>Enterprise Revenues</td>
<td>Willing buyers of goods and services that are not the infrastructure services being provided (e.g., advertising, food concessions, branded merchandise).</td>
<td>Politically acceptable (payers choose to pay) except when revenues come from commercialization of previously governmental enterprise</td>
</tr>
<tr>
<td>Value Capture Options</td>
<td>Property owners</td>
<td>Taps major beneficiaries of projects — landowners</td>
</tr>
<tr>
<td>General Taxes</td>
<td>Various (tourists, drivers, property owners)</td>
<td>Broad revenue base makes it easier to raise funds with smaller percentage increase. Usually less administrative cost</td>
</tr>
</tbody>
</table>

Revenue Sources: a Taxonomy
Direct Service and User Fees

Some projects come to the table with obvious sources of revenue—wastewater and water utility fees, transit fares, tolls or stormwater fees.

Most of the obvious sources charge users in proportion to their use of a facility or service. In some cases, governments can expand the potential use of service fees by defining infrastructure services that the public had not previously realized they were being provided, or by including resilience projects in the eligible costs for utility rates. For example, several cities have created transportation utility districts to pay for the cost of maintaining streets and other parts of the local transportation network (see additional information on transportation utility fees, on page 87).

Direct Service and User Fees

Enterprise revenues are revenues associated with commercial businesses linked with or occurring on the premises of an infrastructure facility.

They are usually not predictable enough to borrow against, but can provide up-front funding for project development and/or ongoing resources for O&M activities. Cities may be able to increase the amount of potential revenue from an infrastructure and economic development initiative project by considering revenue-generating potential in the project design. Local business owners can provide input on retail potential at transit stations and near park areas; community residents can indicate what kinds of fee-based recreational amenities might be desired in new urban parks.

Value Capture/Project-Specific Options

By examining co-benefits of projects as well, agencies can widen the pool of potential revenue sources to include those with a nexus to beneficiaries of the project, not just users.

Being adjacent to a transit station increases the value of real estate, for example. Studies conducted on behalf of San Francisco’s Bay Area Regional Transportation Agency (BART) by Strategenomics, Inc., found that a condominium within a half-mile of a BART station is worth 15 percent more than a condominium located more than five miles from BART, all other things being equal. A single family home located within a half mile of BART is worth 11 percent more than a similar property more than five miles away. If green stormwater infrastructure and other improvements create greater land value, land and business owners may be willing to contribute funding, either in a special taxing district or via tax increment financing, which relies on the anticipated increase in value due to a project.
Linking projects to additional benefits may also open access to other sources of funds. If a project has documented public health benefits, for example, it may become eligible for health-related grants. Projects that reduce greenhouse gas emissions may become eligible for targeted funding related to those goals.

### Selected General Taxes

- In general, the more narrowly targeted a revenue source is, the more administratively complex it is to collect and manage it (and the more volatile it can be).

Broad sources such as property and sales taxes already have a collection process in place and can raise large amounts for a comparatively small rate increase. However, these well-established sources are much in demand, and often already at high levels.

### Linking Revenue Sources to Project Benefits

- Part of building a resilient financial strategy is diversifying the revenue and funding base that a project depends on.

In general, sources that have a closer nexus to the project will be more politically acceptable (because the link between the project and the revenue source will be widely understood by voters and policy makers). The table on the next page presents some examples of how to link revenue sources to projects.
Yet the base for project-related revenue sources will tend to be limited by the scope and scale of the project and the affected areas. The impact of more targeted revenue sources will also fall on a smaller base of payers. Charging those that benefit most from a project may be perceived as equitable, but it may not reflect benefits that extend beyond a project's area. For example, the BART Silicon Valley project, which is helping link San Jose, Oakland, and San Francisco via transit, will benefit all of Santa Clara County, even in communities that have no stations. Thus, a countywide sales tax is one of several local sources being used to fund it. An infrastructure reuse project may occur only in one economically distressed area of a city, but the property value increase, economic development, and increase in incomes that happens to area residents will benefit the city as a whole. Requiring all of a project to be paid for by revenue sources that are tied to residents and businesses in the distressed area may also make it more difficult for the project to succeed, as it may disincentivize development in that area.

### Creating a “Basket” of Revenue and Funding Options for Analysis

**Many major projects investigate dozens of potential sources in order to come up with a robust mix of funding and financing sources.**

It is tempting to cross less feasible items off of the list at the earliest stage, and not even expend the time or resources to analyze them. Creating a comprehensive list, and documenting the reasons why an option may not be feasible can help convince stakeholders who may be wedded to ideas that sound good, but are not workable in practice. For example, many people believe that advertising and sponsorship revenue should be used to help support transit capital projects. While these can be viable, and are much more palatable to the public than taxes or fees that they might be called upon to pay, in most markets they don't add up to more than a small share of total capital costs.

Another reason to create a comprehensive list is to build resilience into the financial strategy; options have the potential to become obsolete or less robust. Infrastructure financing is an open book test: agencies are allowed and encouraged to adopt ideas from other cities, and one of the best sources for ideas is cities that have recently financed similar projects. Unfortunately, there is not a single repository for financing plans for municipal capital projects, and many cities are too busy delivering projects to document them. Many states have guidebooks that describe the basic financing options available to cities under state law. Some federal resources to draw on include publications from the EPA's Environmental Financial Advisory Board and Environmental Finance Centers and the US Department of Transportation's Build America Bureau.
Matching Uses to Potential Stairway Revenue Sources in Pittsburgh

As it engages with the community to prioritize city-owned stairs for rehabilitation, the city of Pittsburgh will also be better able to match each stair project to potential funding sources.

By narrowing the focus to a smaller group of prioritized projects, and gathering more data about each stair and its context, the City will likely be able to tap into sources of funding that are targeted to different uses and benefits. For example, the Federal Highway Administration provides dedicated funding for “Safe Routes to School.” Stairs that provide routes for students to reach local schools may qualify under that program.

Similarly, stairs that help residents access health care facilities may qualify for public health funding, or for in-kind or cash contributions from the hospitals that can be reached from the stairs. Foundations may be willing to support stairs that advance social goals that are high priority for them, such as providing job access to low-income residents, or improving walkability in low-income neighborhoods.

Businesses and universities may also be willing to provide additional support if the city can document how stairs help residents to access their facilities. For nonprofit organizations such as universities and hospitals, contributions might be made through negotiated agreements for payments in lieu of taxes (discussed further in this section on page 86).

Many of Pittsburgh’s more than 800 stairways are in beautiful, park-like settings, but in need of repair and ongoing maintenance.
### Exploring: Identifying Diverse Revenue and Funding Sources

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<td>- RM3 - Bridge Tolls</td>
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<td>- Regional Gas Tax</td>
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<td>- Business Gross Receipts Tax Surcharge</td>
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<td>- Philanthropy</td>
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<td>- Pension Plan Investment</td>
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San Francisco Seawall Finance Working Group List of 48 Revenue and Finance Options

These agencies focus their resources on the types of projects they support (environmental and transportation infrastructure) but are important resources for cities seeking innovation in all infrastructure modes. The High Line Network, a peer network for urban infrastructure reuse projects, is an example of the power of peer exchange. (See brief case study on following on page).
Once a list of options has been identified, the next step is to gather enough information about each option to determine if it could be applicable.

**Legal Authority**

- **Does the city have the necessary legal authority to implement the options?**

  Legal authority for most finance and delivery options at the city level initially derives from state legislation. Cities need to determine whether their jurisdictions have the authority to enact an option (or if it can be obtained?). Given the lifespan of major infrastructure projects, it can be worth including an option in a financing strategy, even if it is not
currently available. When conditions change, policymakers may be willing to alter current law or policy in order to accomplish a project. For example, a financing strategy may identify a P3 as potentially beneficial before a city has authority to enter into it.

In some cases, an option may be technically legal, but present too great a risk of lawsuits if undertaken. For example, the Santa Clara Valley Transportation Authority (VTA) was seeking options to finance the BART to San Jose and considered using its legal authority to create a benefit assessment district (BAD) near stations, to generate dedicated taxes from landowners, whose property values were likely to increase markedly. The statute establishing BADs requires agencies to charge landowners based on the specific benefit accrued to their property. This standard was so exacting that the districts attracted expensive and protracted legal challenges. Rather than pursue that option, the VTA examined other methods of capturing value from landowners who benefited from the project.

Revenue Potential

Does the option have the potential to raise sufficient revenue or create sufficient financial capacity to make it worth exploring (especially compared to its administrative cost and difficulty)?

At the earliest stages, it is unnecessary (and costly, and perhaps impossible) to try to develop precise estimates of revenue potential. A ballpark range ($10–$50 million; under $2 million) is usually sufficient for analysis.

Part of evaluating the potential for grant funding sources is evaluating the likelihood of a city actually receiving the assistance. Being eligible for funding under a federal, state, or philanthropic program is like having a lottery ticket; it doesn’t guarantee that a city will get the funding; it just gives it the right to enter the competition for it. The best way to get a real-world prediction of a city’s chances at receiving assistance is usually to talk to internal and external experts with experience in the grant application and award process and/or the legislative process.

For example, the first five rounds of the USDOT’s discretionary Transportation Investments Generating Economic Recovery (TIGER) grants were overwhelmingly oversubscribed, receiving more than 5,200 applications requesting $136 billion in funding for $2.6 billion in available grants. This means the USDOT could award less than 2% of the requested funds.

Revenue Stability/Predictability

Will the revenue stream identified be predictable enough to borrow against or rely on for funding?

For example, while federal and state grants are popular ways to fund programs, since they don’t call on either users or taxpayers, often they are not predictable enough streams of revenue to borrow against. Similarly, some types of tax revenue (such as special taxes on IPOs) fluctuate substantially, making it hard to pledge them for regular debt service. When the public sector is designing a new revenue option, it can take steps to make it more predictable. For example, stormwater fees can be structured to have a fixed component and a variable component that fluctuates with the level of runoff from each property.
The table above presents an hypothetical, high-level comparison of some of the revenue tools explored by the City Accelerator participants, based on the criteria above. Additional information about each revenue tool is included in Appendix A.
Administrative Ease & Cost

How difficult will an option be to implement, both in cost and staff time?

Some revenue options may have great benefits and offer financing capacity, but they require substantial investment of staff time and higher transaction costs. Adding on to existing taxes or fees is generally cheaper and easier than developing a new tax or fee and the accompanying administrative infrastructure.

Political Feasibility

Will the option be politically palatable?

An option can be legal, administratively easy, and raise sufficient revenue, but be so unpalatable that it can sink a project (and the careers of elected officials who support it). California Governor Gray Davis was recalled, partially due to supporting increased vehicle registration fees. Other projects have faced difficulties implementing unpopular tolling and tax programs.

Racial and Economic Equity

How will the chosen option affect the community (at implementation, and in the future)?

Some taxes and user fees may have a disproportionate effect on low-income individuals. Targeted rebates and discounts can sometimes mitigate these impacts. For example, tax-increment financing or property value-based special assessments could have income-based exemptions, discounts, and payment deferral options. Fees and taxes can also be structured to target beneficiaries (who generally have assets) rather than users (who may not).

Positive Incentive Effects

Will the selected option incentivize consumer and market behavior that an agency desires? Will it discourage future investments or encourage consumer/market behavior that it does not want?

For example, increasing vehicle registration fees might provide a good source of funding for transportation infrastructure projects, but increasing the fixed costs associated with vehicle ownership gives people an incentive to drive rather than take transit. In some cases, an option can be structured to align incentives with agency goals. Stormwater programs can offer fee rebates if landowners construct their own green stormwater infrastructure. This can incentivize homeowners and developers to install the type of green infrastructure communities want to have.
Resilience/Sustainability

How resilient will the options be to climate, technology, and other shifts?

Will the source of revenue be affected by sea level rise? Will it be more susceptible to certain business cycles/downturns? Will it become obsolete as technologies shift? For example, the gas tax has historically been used as the primary funding source for transportation capital projects. Yet as fuel efficiency increases and electric cars take a larger share of the market, the gas tax generates less revenue.
Financial tools have different benefits, which may be valued differently by cities depending on their situation. Some cities may seek to increase financial capacity, while others may be more interested in tools that lower interest or facilitate use of new revenue sources.

### Potential Benefits of Financial Tools

#### Reduced Interest Cost (Compared to Traditional Municipal Finance)

- **By reducing interest costs, some financing tools can produce actual cash savings, which can be turned into revenues used to support additional project funding or O&M expenses.**

  Especially on large projects, achieving even a hundredth of a percentage decrease in interest rate can lead to hundreds of thousands or even millions in savings to a local government. For example, a loan from a State Revolving Fund for wastewater infrastructure (which was created with federal grants) often comes at a much lower interest rate than would be available to municipalities on the market. Instead of reducing costs directly, some innovative financing and procurement tools reduce the risk that a government’s credit rating will be downgraded due to a default or the perceived risk of a default. An agency with a higher credit rating is able to borrow at lower rates, and is able to access capital markets more easily, so avoiding the risk of downgrade is critical.

#### Appeal to Wider Pool of Investors

- **Some innovative tools are designed to increase the pool of investors interested in lending to the project.**

  For example, green and sustainability bonds are designed to appeal to socially-motivated investors; crowdfunding bonds such as neighborly or Denver’s mini-bonds program appeal to local residents. The appeal may make a bond issuance sell more rapidly, but does not always translate into interest cost savings, at least in the short term. Still, by widening the pool of investors who have an interest in the project, it can increase the long-term resale value of the bonds.

#### Increased Financial Capacity

- **Some financial tools can simply increase public sector capacity to finance projects.**

  Public financing often has policy or statutory limits that may not accommodate new projects. Public agencies also often have more conservative debt ratios that make municipal bonds raise less funding than private financing for the same amount of future revenue. These “coverage ratios,” indicate how much anticipated revenue the city will have compared to projected annual debt service. Many public agencies require minimum coverage ratios of above 2.0x annual debt service—understanding the consequences of any kind of default to debt ratings and future interest costs. Private financing, particularly for special purpose entities, is typically done with lower coverage ratios, because debt policies do not have to consider long-term ratings impacts.
Enabled Utilization of New Revenue Sources via Patient, Flexible Capital

- Traditional capital markets are by definition impatient capital; their payback goal is usually under 10 years, even for impact investors.

  For most communities, public works projects may not see a payoff for a decade or more, but lenders often can’t wait. Though a project may be very likely to pay off in 20 years, it may be unable to weather business cycles or attract financing patient enough to wait for revenues to accrue. In some cases, incorporating certain features into a project (such as green stormwater infrastructure features like rain gardens, transit-oriented development, or community art) may build long-term value, but capital markets can be reluctant to take a risk on a new revenue source. Patient capital can enable a revenue source to be “securitized” or borrowed against, when it would otherwise be too unpredictable or risky.

Facilitation of Alternative Delivery Models

- Some innovative finance tools can facilitate alternative delivery models.

  For example, federal credit assistance is provided to private and public entities on the same basis. This facilitates use of low-cost federal credit for public-private partnerships, since many other municipal finance tools are not available to private partners, or are taxable, and thus higher-cost. Other vehicles, such as outcome-based bonds, can facilitate transferring the risk of testing innovative approaches to private investors, as in the case of the DC Green Bond.

Denver Union Station
Unlocking Future Land Value with Patient Capital

A federal loan from a program known as the Transportation Infrastructure Finance and Innovation Act (TIFIA) facilitated the use of tax-increment financing revenue from property that was part of the Denver Union Station development. Without the long repayment term (up to 35 years) and flexible repayment schedule, including the ability to defer repayments for up to five years after project construction, it would have been difficult or expensive to borrow using future increases in land value as the source of repayment. Loans that feature longer repayment terms can allow time for new revenue sources to be established, value increases to occur, and new paradigms to be established.

Denver Union Station’s financing benefited from a TIFIA loan partially supported by revenue from increased property values.
The DC Green bond is an example of how outcome-based financial tools can transfer the risk of an innovative infrastructure approach from agencies to impact investors. The District of Columbia was required by the U.S. EPA to address water quality problems arising from combined sewer overflows (CSOs). These occur when water flows from heavy rainfall exceed the capacity of the District’s sewer system, causing sewage to runoff into area watersheds, such as the Potomac River and Rock Creek.

The city was interested in using a green infrastructure (GI) model instead, but was concerned about the risk that less proven green technologies (permeable pavement, bioretention, subsurface storage, rooftop collection practices before rain barrels and downspout disconnections) and targeted sewer separation wouldn’t perform well enough to meet their legally-required water quality targets. The more expensive alternative was to use a more traditional “gray infrastructure” approach that would have expanded the capacity of the sewer system with tunnels.

The District issued an environmental impact bond to fund initial construction of the GI projects. The GI approach also includes a significant workforce development component, offering training on GI maintenance and inspection via a partnership with the Water Environment Federation. At least 51% of the participants will be District residents.

Both DC Water and an independent validator will measure the effectiveness of the GI investments, by comparing the level of runoff after construction to the baseline. The performance target is to reduce runoff by at least 18.6%. The $25 million bond is structured to pay the investors a $3.3 million “Outcome Payment” if the GI approach reduces runoff greater than 41.3%. The investors will pay a $3.3 “Risk Share Payment” if the GI system delivers less than 18.6% runoff reduction. These performance ranges were based on modeling scenarios, with the most likely outcomes falling between 18.6% and 41.3%.

The bond issuance was designed to attract part of a growing class of “impact investors” who seek to use their capital for projects that also advance social goals.
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The bond issuance was designed to attract part of a growing class of “impact investors” who seek to use their capital for projects that also advance social goals. If the GI achieves its goals, which are runoff reduction between 18.6% and 41.3%, the investors (Calvert Foundation and Goldman Sachs) will get an expected return of 3.43%, and the District will adopt the GI approach for planned future projects. If it exceeds performance goals, and the investors receive the Outcome Payment, the expected return will rise to approximately 6.4%. If the goals are not met, the risk share payment will reduce the investors’ return to only 0.5%. If this happens, DC Water will probably just construct tunnels for future projects.
Basic Borrowing Options

Most municipal governments have access to three kinds of financing options: bonds, loans, and private equity investment. The private equity investment can come either via special federal programs such as the New Markets Tax Credit, or under alternative project delivery structures, such as a public-private partnership (P3) or a non-profit-public partnership (NPP). Not all municipal governments have access to all kinds of project delivery options; state legislative action may be required in order to enable certain arrangements.

Municipal Bonds

Most municipal governments use the municipal bond market, which is a tax-advantaged way for state and local governments to borrow for public purpose projects.

Federal law permits the interest earned on these bonds to be exempt from federal taxes, and most states also exempt the interest from any state income tax. Thus, investors are willing to accept a lower interest rate on these bonds, because they do not have to pay taxes on the income.

Municipal bonds feature low interest rates, compared to commercial loans, and longer borrowing terms (up to 30 years in some cases). However, most jurisdictions have policy and statutory limits on bond issuance, because they do not want to obligate future stakeholders to high levels of debt. They also can be less flexible than other options, incur higher transaction costs and involve significant legal obligations in terms of disclosure to investors and following IRS rules related to the tax exemption on the bonds.

Loans

Municipalities can also access loans from commercial banks or from state and federal programs or philanthropic sources.

Usually government loans offer subsidized interest rates for certain kinds of public purpose projects. Commercial loans tend to carry higher interest rates than tax-exempt bonds, but may be more flexible, since the government only has to negotiate with a single lender.
Certain alternative delivery models involve the private sector taking on responsibility for financing infrastructure projects.

Private entities might finance construction of a new facility as part of a long-term Design-Build-Finance-Operate-Maintain (DBFOM) concession. Another possible model is a Nonprofit-Public Partnership (NPP) using a 63-20 bond issuance for financing. These models are discussed further in the alternative delivery section that follows.

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<th>Increases Financial Capacity</th>
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<tr>
<td>E-B 5 Immigrant Investor Program</td>
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</table>

The table above presents some illustrative benefits of the financial tools explored by the cohort. Definitions and additional information about each tool are included in Appendix B.
In the past three decades, multiple initiatives have touted public-private partnerships (P3s) as the answer to infrastructure funding problems. While they can provide many benefits, generally P3s and other innovative delivery models aren’t a solution for funding gaps. P3s don’t usually generate revenue: they require it to work. Agencies may be motivated to explore P3s to attract private investment, but alternative delivery models are more likely to deliver value through performance-based accountability and innovation.

While P3s and other alternative delivery models vary considerably in structure, all of them involve the transfer of greater risk to the private sector than under a typical infrastructure finance project. The chart on page 65 shows some of the available project delivery models, ranging from the least amount of risk transfer (and private return) to the greatest. Selected alternative project delivery models are included in Appendix B to this report. Additional options are also included in the report on P3 Project Structuring Guidelines for Local Governments commissioned by the DC cohort as part of the City Accelerator work (available on the Stanford Global Projects Center website).

Threshold Factors for Considering Alternative Delivery

Some of the decision factors for alternative delivery are binary—go or no go—decisions, rather than quantitatively determined.

**Legal Authority**

- **Before considering alternative delivery models, cities need to ensure that they have the legal authority to enter into an alternative delivery model.**

  It’s usually not worth going too far down the path of a potential procurement without having either legal authority or the reasonable expectation of obtaining it from the legislature or city council.

**Minimum Size**

- **Alternative delivery usually involves higher transaction costs—both in funds and in staff time—compared to conventional projects of a similar size.**
Each city’s threshold may be different depending on availability of staff time and funds, and anticipated costs, but a typical minimum threshold is $50 million or above. This minimum may be achieved by bundling a number of similar projects.

**Policy Appetite**

- If political leadership is unwilling to support greater private involvement for a particular type of project, it’s not likely to be worth pursuing.

Alternative delivery projects need a champion who understands the potential benefit(s) and is willing to go through the necessary analyses and approval processes to do it.

**Risk-Based Factors for Considering Alternative Project Delivery**

Alternative delivery models can often involve private financing and the contribution of private equity into infrastructure projects. Yet like all kinds of debt, private financing requires repayment, and is often more expensive (from an interest rate perspective) than public financing that might be available to a city. Cities may become interested in P3s due to the financing potential; but the performance and risk transfer aspects are really what make them potentially beneficial.

Before considering alternative delivery, cities may wish to consider the following questions:

- Does the project feature technological risk that the private sector is better able to manage? Usually, projects with technologies that run on less than a 5-year cycle (e.g., IT, telecommunications, social media) are better handled by the private sector.

- Does the project feature design aspects or construction aspects that the private sector is better able to manage (e.g., if the public sector lacks experience with building tunnels, bridges, or certain types of GI)?

- Does the project feature O&M of new types of infrastructure that the private sector has greater knowledge of, or experience with (for example, GI)?

- Does the project include aspects that might create overall life cycle cost savings if a private partner were able to invest more up front in the facility? For example, is there a way to use more expensive materials or a design that is likely to reduce future O&M cost?
Traditional Procurement Model: Design-Bid-Build (DBB)

Most public works projects in the United States are constructed on a “design-bid-build” basis, where the public sector circulates a design for an infrastructure project, and seeks the lowest bidder to construct it. For example, suppose a city wished to construct a new city-owned parking garage. Under the traditional process, the public sector would design (or engage a consultant to design) the garage, and then seek bids from construction firms to build it. The public sector would select the lowest bidder. The firm would then construct the project, and be paid as it was completed, generally with the proceeds from public financing, such as a municipal bond issuance. The project would be turned over to the public sector after completion, and the public sector would maintain and operate it.

Potential Advantages of Design-Bid-Build (DBB)

 Doing a DBB in a low-bid procurement makes it easy to compare alternative bids. This helps to prevent corruption, compared to more subjective evaluation processes, and can reduce costs by incentivizing bidders to reduce their bids. Traditional procurement also generally involves lower transaction costs (especially when the agency has already invested in developing its procurement systems and processes) and can be faster than undertaking a P3 or other innovative model.

Limitations of DBB

 Under the DBB model, the lowest bid is not usually the final price. Public agencies can be required to pay significantly more via “change orders” to the scope which are frequently initiated by the private contractor for expenses that are not considered their responsibility under the contract, such as design flaws or delays due to legal or permitting timeframes. Often courts are asked to decide whether these change orders claims are legitimate, or merely a strategy by companies that lower their bids in order to win the work, but seek additional compensation via change orders. Whether legitimate or not, change orders result in great uncertainty as to the final price of a project that can make it difficult to create a financial strategy. Having price certainty—even at a higher initial price—is one key advantage sought by cities pursuing alternative delivery models. In a DBB project post-construction, obtaining compensation for any discovered defects or design flaws would require legal action against the constructing firm. Yet legal action to recover damages can be difficult when the public sector has already paid for the project, and when the constructing firm is often structured as a single-project consortium that ceases to exist after construction.
The private sector also has no incentive to minimize operations and maintenance cost, since this will be the responsibility of the public sector. It also has no incentive to use more expensive and durable materials, since replacement and rehabilitation will not be its responsibility either. Cities can (and often do) attempt to mandate use of certain materials, but it may be difficult for them to determine when the cost of such materials will pay off in the long run. Also under the traditional system, no long-term “warranty” is available for long-term projects. The warranty on a bridge that is constructed under a low-bid system is probably shorter than most of the cars that drive over it.

Change Orders as a Business Practice in DBB

The Case of Tutor Perini

City agencies can experience unexpected cost increases following a DBB procurement. In 1995, Tutor Perini, a contractor hired by the Los Angeles County Metropolitan Transportation Authority to construct the Red Line, sued for $16 million in additional expenses they claimed were due to design flaws or other issues that were the responsibility of the public sector. In 2001, after years of legal battles, Metro won the dispute and was awarded $29 million. The dispute excluded the company from contracting for Metro for years, but the company was the lowest bidder and was selected to construct the Purple Line in January 2017. Like many other firms in the construction industry, the firm continues to use claims and change orders to resolve disputes with both public and private clients. Tutor Perini’s March, 2017 SEC 10-Q financial report reported $464 million in claims and $250 million in unapproved change orders. The company claims that they are simply meticulous about documenting flaws and aggressive about ensuring that they are paid all of the funds they are entitled to. Regardless of the merit of the claims, the change order process is one of the challenges to the DBB system.

The private sector also has no incentive to minimize operations and maintenance cost, since this will be the responsibility of the public sector. It also has no incentive to use more expensive and durable materials, since replacement and rehabilitation will not be its responsibility either. Cities can (and often do) attempt to mandate use of certain materials, but it may be difficult for them to determine when the cost of such materials will pay off in the long run. Also under the traditional system, no long-term “warranty” is available for long-term projects. The warranty on a bridge that is constructed under a low-bid system is probably shorter than most of the cars that drive over it.

Public-Private Partnership Model (DBFOM) Availability Payment Concession

Under a P3 model, the public sector might offer a concession under which a private partner would design, build, finance, operate, and maintain (DBFOM) a new parking garage for a 35-year period.

Concessions that involve construction of a new facility are called “greenfield concessions. Under this model, cost overruns and delays would be the responsibility of the private firm. The private sector has incentives to choose a design that will be cheaper to maintain and operate. It also has incentives to use longer-lasting materials, since its involvement in the project will be longer. The long-term arrangement serves as an implied warranty, since the concession contract usually penalizes any kind of performance failure over the term.
Potential Advantages of a DBFOM P3

- **P3s may be able to deliver cost savings—and not necessarily by paying lower wages than government agencies.**

  In some cases, cost savings can be achieved because a P3 partner enjoys economies of scale. A global parking operator is more familiar with the purchase and operation of parking technology, and may be able to obtain a better price than an agency that might operate a smaller group of facilities. Cost savings can also be achieved because the private partner can apply best practices and efficiencies earned from operating multiple projects.

  P3s are also generally able to deliver greater certainty with respect to schedule and cost overruns, compared to traditional projects. While traditional contracts can be structured to mandate payment of “liquidated damages” (financial penalties) for late delivery, contractors are often able to blame the public design for schedule delays. Under P3 arrangements, the private sector usually doesn’t receive performance payments until a project is complete, and it cannot receive project-related revenues such as parking fees until a project opens. These incentives mean that P3s generally are constructed on time. Transferring the risk for cost overruns to the P3s also prevents cost overruns from the public perspective.

Potential Limitations of a DBFOM P3

- **P3s involve higher investments of staff time, consultant resources, and transaction costs.**

  They also generally involve financing at a higher cost. This “risk premium” is supposed to be offset by transfer of some of the project’s risks to the private sector. If a project is not well scoped, or an agreement is not well written, risk transfer may not be successful, and the public sector may still pay a premium while being on the hook for additional cost. It can be difficult for public agencies to develop performance-based standards instead of the traditional materials-based standards. For example, instead of requiring that a contractor construct a specific type of stormwater solution, a performance-based standard would mandate that the solution handle a certain amount of runoff. The choice of solution (and the risk of any innovations) would be left up to the private partner.

Managing Technological Risk

**The Port of Miami Tunnel**

One of the reasons the Florida Department of Transportation chose a P3 availability payment model for the construction of the Port of Miami tunnel was to obtain a partner with tunneling expertise. FDOT had not constructed a tunnel of this scope in decades, and sharing the construction and design responsibility with a private consortium that had recent tunneling experience mitigated some of the performance risk.
### Risk Transfer in a DBFOM P3

#### Traditional Model vs. P3 DBFOM Concession

<table>
<thead>
<tr>
<th>Risk</th>
<th>Traditional Model</th>
<th>P3 DBFOM Concession</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost overrun due to design flaw</td>
<td>Usually responsibility of public agency via “change orders.” Public agency and contractor may engage in legal fight regarding who is responsible</td>
<td>P3 is contractually responsible for both design and construction throughout the period of the concession.</td>
</tr>
<tr>
<td>Schedule Delay</td>
<td>Some contracts include liquidated damages or other incentives to avoid delay, but legal action may be required.</td>
<td>Performance-based payments can be withheld or reduced for delay, or concession can be canceled.</td>
</tr>
<tr>
<td>Construction Defect</td>
<td>Most firms do not offer more than a one or two-year warranty</td>
<td>Performance or revenue risk concession offer an “implied warranty” – if project fails, payments or revenues will be reduced or eliminated.</td>
</tr>
<tr>
<td>Technological Risk</td>
<td>The public sector holds risk for any new technologies included in a DBB</td>
<td>The private sector holds the risk for any technological innovations or it may be shared.</td>
</tr>
<tr>
<td>Financing Risk</td>
<td>The public sector holds this by default.</td>
<td>The private sector takes on this risk.</td>
</tr>
<tr>
<td>Soil/Conditions Risk</td>
<td>The public sector holds this risk.</td>
<td>May be shared or transferred.</td>
</tr>
</tbody>
</table>

Examples of Potential Risk Transfer in a DBFOM P3

### Long-Term Brownfield DBFOM P3s

- **Some existing city-owned facilities could be operated at a net profit, such as airports, seaports, toll bridges or tunnels, or electric utilities.**

  Private partners typically lease these projects in a form of DBFOM P3 for terms from 50 to 99 years in exchange for an upfront payment. This is typically termed a “brownfield concession” rather than a greenfield concession because it involves a lease of an existing facility with a proven revenue stream. (This is not to be confused with the term “brownfield” as used in land development to refer to potentially contaminated sites). The leases generally include consumer protections (such as limits on rate increases) and performance requirements for public facilities. In exchange, the private partner is permitted to keep the revenues from the enterprise.

### Potential Advantages to Brownfield DBFOM P3s

- **Brownfield P3s allow cities to take advantage of their revenue-producing assets to support the ones that are operated at a loss.**

  The City of Chicago was able to use proceeds from its long-term P3 for the Chicago Skyway to pay down city debt, which in turn resulted in a rating upgrade that reduced the cost of borrowing for every other infrastructure asset. In some cases, the private sector may be able to achieve cost savings in management, compared to the public sector.
Potential Limitations to Brownfield DBFOM P3s

The companies that bought the long-term concession for the Chicago Skyway and the Indiana Toll Road lost money on their investments (though the public sector did not).

Chicago's 75-year lease of its parking facilities to a private consortium has been widely criticized, because it resulted in increased parking rates, and because the contract obligated it to compensate the consortium for removals of parking meters. This means every time the city wants to expand a bike lane or do bus rapid transit, it has to compensate the private partner for the loss of any parking meters that results. The public sector can lose considerable flexibility when it enters into long-term contractual arrangements.

Nonprofit Public Partnerships (NPPs) and the National Development Council’s American Model

The term “public-private partnership” is used for many types of relationships between public agencies and the private sector, both for-profit and nonprofit.

It can be used for everything from one-time philanthropic donations to a new library's capital campaign to a 99-year toll concession with a for-profit global infrastructure developer. In this guide, we introduce the term “Nonprofit-Public Partnership” because the partnerships entered into by public-purpose nonprofit organizations and agencies are materially different from the “P3s” conducted with the private sector.

Nonprofits often play key roles in infrastructure without being directly involved in capital project delivery. For example, every infrastructure reuse project in the High Line Network’s portfolio features a nonprofit partner whose role has been integral to the development of the project. The Friends of the Highline helped found the High Line, and now help fund and maintain the park. Nonprofits face fewer restrictions than government agencies on soliciting and accepting philanthropic capital contributions, and may be better able to quickly hire staff and engage in partnerships with the private sector.

The National Development Council is a national community and economic development organization dedicated to community revitalization. NDC’s innovative model involves partnering with local governments to deliver projects.

NDC works with local governments to create a special purpose nonprofit entity that manages the project. The NDC American Model uses two financing tools available to nonprofits—tax-exempt bonds under IRS Revenue Ruling 63-20, or through Section 501(c)(3) bonds. 63-20 bonds may be issued if the circumstances meet the following tests:

- A local government endorses the financing;
- The facility will be occupied by a governmental or tax-exempt entity.
- The facility reverts to the ownership of the local government upon retirement of the debt.
Cities may become interested in P3s due to the financing potential; but the performance and risk transfer aspects are really what make them potentially beneficial.

The government transfers ownership to the nonprofit during the term of the project, and leases it back from the nonprofit. Lease payments pay for the debt service and/or payments to the developer. The special purpose nonprofit hires a development team (architect and developer), using an integrated delivery model. The development team can receive incentive payments for successful completion of schedule and budget performance targets. Post-construction, the nonprofit contracts with a firm for maintenance and operations, and establishes a dedicated reserve for repair and replacement.

If conditions are favorable, the local government can refinance the project and ownership will revert to it. Usually NDC’s contracts also include an option allowing the government to buy NDC out for $1 (the government retains the obligation to retire the bonds, however).

Potential Advantages of the NDC American Model

**NDC’s model offers technical assistance along with financing.**

NDC staff has conducted multiple procurements, and is familiar with how to structure and monitor integrated delivery contracts. This can be particularly important for smaller cities or cities without experience with integrated delivery, or in designing incentives for performance-based contracts.

NDC’s 63-20 bonding enables the delivery of large projects without large up-front payments, or bond issuances that count against statutory debt limits. Communities may be able to finance facilities without seeking voter approval (although any long-term obligations will count towards rating agency ratios). The model offers transfer of integrated delivery risk to the nonprofit, and ultimately, to development team (if successful).
King County, Washington, used an NPP to deliver a medical facility whose construction had stalled under a traditional approach. Voters approved a bond issuance for construction of the new 9th and Jefferson Building (NJB), part of the county-owned Harborview Medical Center. However, when a cost overrun occurred on the project and another bond project under the original delivery model, the county had to seek alternative options. King County decided to work with the National Development Council (NDC), a national nonprofit focused on community development. NDC proposed to construct the new building using the 63-20 model.

Under this model, the county leased the land to NDC for a nominal fee. The nonprofit created a special purpose nonprofit entity that issued bonds, as permitted under IRS revenue ruling 63-20. The nonprofit then engaged a developer to construct the project, using a contract with performance incentives that might be more difficult to accomplish under a traditional procurement process. Construction was completed on schedule for approximately $188.7 million. The restructured project was able to meet Harborview’s expansion need immediately, without awaiting a future renovation. The county leased the building back from the nonprofit when complete (a lease/leaseback arrangement). The county receives all the lease revenue from the medical tenants from the building, and uses it to pay the lease payments to the NDC. After the bonds are paid off, ownership will revert back to King County.

The county was able to transfer some of the oversight, budget, and schedule risk to the nonprofit, which had overseen construction of many similar medical facilities. The project was delivered with a larger space, at a lower effective cost, than originally anticipated.

Under the traditional system, no long-term “warranty” is available for long-term projects. The warranty on a bridge that is constructed under a low-bid system is probably shorter than the warranty on most of the cars that drive over it.
Potential Limitations to the NDC Model

- While the 63-20 bond does not count against statutory debt ceilings, rating agencies consider lease payments an obligation of the local government.

If revenues are insufficient to pay debt service, the local government will likely have to step in to pay off the bonds. NDC’s model doesn’t include the motivation of having private equity, or “skin in the game” for the long term. This does not provide direct incentives to NDC or the developers it hires to make life cycle capital investments to reduce future O&M costs, for example). It is important to note that other 63-20 transactions are spearheaded by for-profit firms. They may create a special-purpose nonprofit in order to qualify for 63-20 financing, but a special purpose nonprofit, specifically created by the private sector for a project, would not have NDC’s long-term community development mission and experience with managing private developers on behalf of the public sector.

Other Resources on Alternative Project Delivery

There are numerous other examples of possible alternative delivery models in addition to the above. Appendix C includes an additional selected subset of alternative project delivery options that might be potentially used by cities. As part of its cohort work, the DC team also commissioned a report on alternative agreement structures for municipal P3s; *P3 Project Structuring Guidelines for Local Governments: The District of Columbia P3 Project Delivery: A Case Example*, by Julie Kim (Senior Fellow, Stanford Global Projects Center, and Urban Infrastructure Finance Fellow, New Cities Foundation, and Mike Bennon, (Managing Director and Director of P3 Financial Literacy in the Public Sector (P3 FLIPS) Initiative, Stanford Global Projects Center (GPC).
Establishing Specialized P3 Offices

DC's Office of Public-Private Partnerships

Some local governments, including the District, are creating dedicated offices to consider and implement alternative project delivery approaches in their capital programs. Examples include:

- The City of Denver, Colorado, which is currently designing a new municipal P3 office and program;
- The Office of Extraordinary Innovation (OEI) recently created by the Los Angeles County Metropolitan Transportation Authority (“LA Metro”) to manage alternative procurements like P3s and also to facilitate the adoption of new technologies for the County’s transportation system; and
- The Mayor’s Office of Civic Innovations (MOCI) established in 2012 by the City of San Francisco to introduce new approaches, resources, and technology for meeting the City’s priorities, including using P3 delivery option for the one-of-a-kind FTTH and broadband network with universal coverage; and
- The City of Chicago created the Chicago Infrastructure Trust, a nonprofit dedicated to pursuing alternative procurement approaches for city infrastructure.

Dedicated P3 and alternative procurement offices have multiple benefits. They can:

- Facilitate a programmatic approach to alternative project delivery, analyzing a city’s project pipeline holistically to identify projects that may benefit from alternative approaches;
- Reduce the transaction costs associated with alternative delivery models, by creating model analysis and agreement frameworks that can be reused for multiple projects;
- Build internal P3 capacity, since dedicated P3 staff are involved in multiple transactions internally (while sponsoring agencies often only have one or two P3s a year at most);
- Coordinate complex government endeavors like infrastructure projects that involve multiple public agencies or offices; and
- Serve as a relatively neutral party in identifying and resolving any interagency conflicts.
- Protect confidentiality of private partners, with information protection and handling policies that may not be required for more typical procurements; and
- Balance confidentiality with transparency by providing centralized public reporting on project structures and outcomes.
Like many other P3 offices, OP3 currently serves as an advisor to other parts of the city government as opposed to a direct signatory to a P3 transaction. Along with the OCFO and other agencies, OP3’s procedures include designating an “owner agency” for each procurement, which OP3 will work with to manage the procurement and develop a project agreement. The owner agency may also provide funding to cover the costs of the procurement process. In addition to drafting the final project agreement, OP3’s role involves working with the owner agency to draft the RFQ and RFP for the procurement and manage the evaluation process. OP3 also provides reports for the City Council before releasing the RFP and finalizing the project agreement. The Council must approve both documents during the procurement process.

For more information about the DC OP3 office and other municipal P3 efforts, see the report commissioned by OP3 with funding from the City Accelerator, from which this case study was adapted. The District of Columbia P3 Project Delivery: A Case Example, by Julie Kim (Senior Fellow, Stanford Global Projects Center, and Urban Infrastructure Finance Fellow, New Cities Foundation, and Mike Bennon, (Managing Director and Director of P3 Financial Literacy in the Public Sector (P3 FLIPS) Initiative, Stanford Global Projects Center (GPC).
Prioritizing Goals

- **Priorities depend on each city’s unique situation.**
  
  For example, some cities may not have the administrative capacity or bandwidth to handle implementation of a new funding source or financing tool, or have competing projects and priorities with greater importance. Those cities will prioritize administrative ease in selecting options. Others may be focused on increasing financial capacity, and be willing and able to invest in additional staff time and expense.

Developing Benchmark Criteria

- **Some factors may be threshold factors, where a low score would immediately eliminate an option from further analysis.**
  
  For example, most cities would reject an option with a known negative rating impact, because it would increase costs across their entire portfolio. Others factors may indicate the need for caution in investigating a particular source, but wouldn’t necessarily rule it out. For example, tax increment financing might score low on administrative ease and cost (because it requires establishing a new infrastructure financing district and administrative services that don’t exist) but score highly enough on other criteria to be considered.

Scoring Tools Against Criteria

- **For most of the factors, it doesn’t make sense to spend a great deal of time in the initial screen to develop precise revenue estimates or detailed analyses on the other factors.**
Since the initial analysis is high level, to avoid false precision, these factors should be grouped at a high level, with qualitative rankings (High, Medium, Low). San Francisco’s Seawall Finance Strategy Working Group took this approach, ranking options as high, medium, or low against the criteria it developed.

Rather than taking the time to establish formal criteria for each ranking, it may make the most sense to coordinate a discussion. For example, rather than having multiple criteria to determine whether an option ranks highly on administrative ease and cost, a group could just describe what would be involved and subjectively decide whether it’s “High, Medium, or Low.” Subsequent rounds after the initial screen can go into greater depth, as needed. Note that it helps to have all the rankings in the same (positive) direction, so a “High” score is always good. This means the factors all need to be framed positively—e.g., administrative ease, not difficulty, and Positive Incentive Effects, not incentives.

Establishing Core, Complementary, and Backup Sources

In city government finance, staff time is a limited resource.

Part of the prioritization goal is to make sure that time is spent chasing revenue sources with sufficient potential to pay off. Investing significant staff time in exploring an option that’s administratively difficult and has low revenue potential may not make sense. Conversely, if trying to secure a revenue option seems relatively simple, it may be worth pursuing even if it’s a low dollar amount.

A “heat map” with color-coding for high, medium, and low scoring can identify which options have the greatest potential. A robust strategy can establish a “core” set of options that the city would definitely pursue, complementary sources that a city will continue to investigate, and other sources that remain possibilities but that will not be actively pursued. This will allow substitution of option as conditions change, and will also allow planners to explain the status of each option to stakeholders.
### Funding Strategies Heat Map

<table>
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<tr>
<th>Rank</th>
<th>Revenue Tools/Characteristics</th>
<th>Source of Funds</th>
<th>Revenue Generating Potential ***</th>
<th>Cost of Funds</th>
<th>Long Term Sustainability</th>
<th>Flexibility of Funds</th>
<th>Tradeoffs for Other City Needs</th>
<th>State/Federal Political Feasibility</th>
<th>Local/Regional Political Feasibility</th>
<th>Administrative Complexity</th>
<th>Equity/Cost Burden</th>
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<td>Increased Parking Revenues</td>
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- **Strength**
- **Partial strength**
- **Neither strength nor weakness**
- **Partial weakness**
- **Weakness**

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*** Criteria Triple Weighted

- **Strength**
- **Partial strength**
- **Neither strength nor weakness**
- **Partial weakness**
- **Weakness**
Implementation

Putting the Strategy into Practice

Financial strategies require a lot of upfront investment of staff time to deliver. The investment doesn’t stop at the point of implementation. Even after implementation, public agencies will face ongoing demands, including disclosure requirements, post-implementation evaluation, re-negotiations, economic changes, and revenue shortfalls.

Estimating Cash Flow Needs and Timing

Once options have been identified, the city needs to compare the timing of the funding to the anticipated funding needs of the project.

Financial management best practices are to match costs with funding as closely in time as possible. It doesn’t make sense to pay interest on capital funds that won’t be needed until later in the process. Yet new kinds of capital projects may have different expenditure patterns than traditional ones. For example, infrastructure reuse projects may feature lower initial capital investment (because most of the infrastructure is being recycled) but higher operations and maintenance cost.
Integrating Project Delivery Innovations with Financing

- **In some cases, innovative delivery strategies can affect the timing of costs.**

  For example, incentives in long-term P3s may encourage developers to finish projects early, but the project’s cash flows may be aligned to the original schedule. It doesn’t help to design an innovation to deliver a project early and then be unable to pay the bill if it happens. Some agencies have addressed this cash flow concern by specifying a maximum payout curve in the P3 contract. With this contract provision in place, if the contractor earns a higher payment for meeting performance targets, the payment will be made over a more predictable time period.

Staging: Matching Project Timing with Other Processes

- **Implementing a capital project involves walking through numerous approval and negotiation processes, each with its own timing and requirements.**

  In one implementation calendar, a city might have to integrate:

  - Legislative and regulatory steps required to obtain revenue and finance tools or enter into alternative delivery arrangements, or simply to construct the project (This can be complex in states where legislatures only meet every two years, or when cities want to strategize to put referenda on the ballot in presidential election years).
  - Negotiations with utilities and other affected stakeholders, such as community groups and residents;
  - Grant and credit application processes (including obtaining a credit rating, if applicable);
  - Alternative or traditional procurement processes;
  - Environmental clearance processes; and
  - Construction staging/impact mitigation plans.

  These processes can be interdependent. For example, an agency may be unable to obtain a federal grant or credit assistance until it has environmental clearance; and it may be unable to obtain environmental clearance without showing that it has enough funding to complete the project.
Implementing a capital project involves walking through numerous approval and negotiation processes, each with its own timing and requirements.
The Way Forward: Reaching into the Future with Equitable and Resilient Finance Tools

Infrastructure finance is rapidly evolving. This section describes some possible future strategies to bring cost savings and wealth “back from the future.”
Expanded Financing Via Cost Saving (NegaRevenue)

With Energy Savings Agreements (ESAs) agencies are able to fund the capital costs of energy efficiency improvements through cost savings. These approaches directly securitize savings achieved through capital improvements.

While energy efficiency is pretty straightforward to calculate, infrastructure projects generate other cost savings as well that might be monetized in the future. It’s common to consider avoided costs in infrastructure project analysis, but rare to consider it as a form of revenue that could be used to support capital investment. Framing avoided cost as “NegaRevenue,” could encourage both capital markets and cities to expand this approach to more types of projects.

NegaRevenue has great potential to expand beyond the energy space into new areas. For example, could a transit or highway agency use NegaRevenues to invest in new signal infrastructure to reduce operating cost? To make NegaRevenue financing work on those kinds of projects, cities will need to track project benefits and resulting cost savings more closely. It will also help to link the capital and operating budgets, with techniques such as the ones described below.

Cap2Op and Op2Cap Financing: Linking Operational and Capital Budgets in New Ways

Capital investment can be paid off via operational savings. The converse is also true—greater operational investments might create savings from avoiding capital costs. Since operating and capital budgets are usually managed separately, and in different budget cycles, most cities lack a framework allowing city employees to propose either kind of project. Creating a mechanism by which departments could link the dollars in their operational budgets to the dollars in the capital budget—and vice versa—could help foster even more creative thinking about how to optimize life cycle costs.

Op2Cap Projects: Investing Operational Cost Savings in Capital Projects

Suppose a department identified a capital project that would lead to operational cost savings, compared to current expenditures. For example, purchase of hybrid vehicles for a city fleet might result in substantial fuel savings. Many cities have done this, but the savings could be accelerated if there were a direct mechanism for employees to propose a project that would dedicate those savings to financing the fleet upgrade. Where social goals would also be achieved, impact investors may be willing to support the financing. For example, an impact investment fund might be interested in helping a city reduce public health spending due to high rates of type 2 diabetes cases in neighborhoods without bike-able or walkable infrastructure. City staff could identify pedestrian, bicycle, and lighting infrastructure improvements that could facilitate health promotion programs in those neighborhoods.

Cap2Op Projects: Investing Capital Cost Savings in Operational Services

Capital cost savings could also be used to fund alternative cheaper operational improvements that could eliminate (temporarily or permanently) the need for a capital improvement. For example, funds intended to construct new lanes to reduce congestion could be used for active traffic management, ramp metering, or other operational activities that would deliver an equivalent level of congestion reduction. Instead of building a new prison, or expanding an existing one, employees could propose a restorative justice program that would reduce the need for new prison beds. This could provide a direct source of funding for programs backed by outcomes-based financing.

Community Dividends: Sharing the Value of Infrastructure Development

Almost every year, Alaska’s Permanent Fund distributes a dividend to residents that comes from development of publicly owned energy resources like oil and gas. Could the benefits of infrastructure project development be similarly shared? What if governments retained part of the land in infrastructure reuse projects, or adjacent to transit developments, and leased them to the private sector? Part of the returns could be allocated to low-income community members in equity shares. These could be distributed to residents living within the geographic area, below a certain income.
The Urban Forest as Health Care Infrastructure
A Potential Application for NegaRevenue

A September 2017 report by the Nature Conservancy and the Trust for Public Land describes the strong links between urban forests and health outcomes. A U.S. Forest Service-funded study of 10 U.S. cities found that the presence of urban trees has the potential to remove enough pollution to reduce annual health costs significantly, from $1.1 million (Syracuse) to $60.1 million (New York). Trees can also protect public health by mitigating extreme summer temperatures, a phenomenon that is expected to increase with climate-related warming. Urban forests have also been shown to have other benefits to mental and physical health.

What if some of the savings from avoided health care costs and work losses (from illness) could be used to fund planting and maintenance of urban forest? Tapping public health savings usually presents what impact investors call a “wrong pockets” problem. The benefits of park and forest projects may be experienced in lowered health care expenditures, but they may be difficult to track precisely, and will likely be enjoyed by a different department than the one responsible for street tree planting. Still, there may be a role for an outcomes-based financing via impact investment, if the holistic benefits of urban forests can be monetized and used to repay it.

Reprinted, with permission, from “Funding Trees for Health: An Analysis of Finance and Policy Actions to Enable Planting Trees for Public Health,” the Nature Conservancy, the Trust for Public Land, and Analysis Group, 2017.
Municipal Building Retrofit in Chicago via Energy Services Agreement (ESA)

The Municipal Building Retrofit in Chicago is an example of a financing entirely based on cost savings, or “NegaRevenue.” The Chicago Infrastructure Trust (CIT) was created by the City of Chicago in 2012 as a nonprofit organization to pursue projects that leverage private resources for public benefit through alternative procurement arrangements. In that year, the city faced a $635.7 million budget deficit, and needed to find innovative ways to improve infrastructure without increasing debt.

In its first project, the CIT was able to finance energy efficiency improvements, including lighting, heat, and air conditioning, and building automation services, to 60 city buildings, including police stations, libraries, and health care facilities. The deal required no up-front investment by the City or the CIT. The capital and implementation costs were financed entirely based on the anticipated cost savings from the improvements.

The transaction was based on two agreements: an Energy Services Agreement (ESA) between the CIT and the city (the end user of the buildings) and a Guaranteed Energy Performance Contract (GEPC) between the CIT and three Energy Service Companies (ESCOs).

Under the GEPC, the ESCOs commit to procure and install improvements, such as LED lighting and more efficient heating and cooling technology in municipal buildings. In the GEPC, the ESCOs guarantee a specific level of annual energy savings. In general, the savings are not guaranteed per individual project, but for the entire group of projects handled by each ESCOs. This diversifies the risk for each ESCo, since they may be able to offset any savings they do not realize on one project with additional savings on another.

The CIT financed the entire group of improvements via a tax-exempt private placement financing, based on the ESA between it and the city (the end user of the buildings). The ESA gives the CIT the rights to the energy savings from specific projects. The agency will use these savings to repay the investors. If the savings are less than the agreed amount, the ESCOs pay the difference to the CIT, under the GEPC. If the savings are greater than the agreed amount, the city and the CIT will share the upside. $12.2 million of 15-year, tax-exempt debt was placed with Bank of America at a rate of 4.95%. Like a revenue bond, the debt is “non-recourse” — the creditors only have a claim against the savings included in the ESA, not any other source of revenue.
The CIT selected the ESA model partially because the arrangement was considered “off balance sheet” under accounting rules, and also is not generally regarded as a fixed payment obligation by rating agencies. This will preserve the City’s limited bonding capacity for projects that don’t have this option. Retrofits for the buildings were completed in 2015, and the ESCos reached their guaranteed savings target for the first partial year of operation.
Using Pensions to Fund Placemaking and Placemaking to Fund Pensions

In a sense, urban infrastructure agencies are real estate developers. The three most important things about real estate are, as always, “location, location, location.” Unlike traditional developers, cities have an unprecedented power to reshape location. When people think about where a location is, their mental map locates it by the time it takes to reach other places. By improving transit infrastructure, a city can change where a location is in the public mind—from 45 minutes to downtown by bus, to 20 minutes downtown (by rail). By improving walkability, building parks, and improving aesthetics, these amenities can make a formerly distressed area thrive economically to benefit existing residents.

Cities know that these kinds of improvements will increase property values—eventually. Yet tapping into that long-term value can be difficult, especially when most capital sources want to see returns within a decade, or even shorter-term.

Meanwhile many state and local governments are having trouble meeting their pension obligations. Pensions overseas have provided a lot of the seed capital for infrastructure investment funds. Pensions and infrastructure are a natural fit: pensions have money to invest now, and need a long-term payoff; infrastructure projects need money now, and expect a long-term payoff.

Investing a limited amount of state and local pension funds as subordinated capital for placemaking could help shore up pension financing while providing a truly patient source of capital. Communities could be more receptive to projects making a return if that return were shoring up local pension funds.

Bringing that concept to a national level, the federal government could invest a small share of the Social Security Trust fund in resilience projects to address sea level rise and extreme weather. Right now, Social Security investments are severely limited to safe, but low-paying securities. Shoring up coastlines could bolster the United State’s most important national pension fund at the same time. Of course, as with all of the projects featured in this guide, the challenge will be identifying a revenue source to pay that investment back.

Conclusion: A Time for Bold Ideas and Innovation

Challenges for municipal infrastructure agencies seem to increase daily—from deteriorating infrastructure, budget shortfalls, extreme weather events, polarized politics, and persistent and growing racial and income inequity.

Yet enormous private, philanthropic, and impact investing resources are also growing rapidly. These sources of committed, involved capital can help agencies take on the risk of experimenting with new approaches. The accountability provided by new results- and outcome-driven investment models can help cities collect the data they need to refine those approaches. As a result, infrastructure finance innovations are being diffused and adopted at historic rates.

Indeed, many of the new ideas included in this guide are from the past five years (and some of them from the past few months). We hope that the tools, resources, and approaches in this guide will help other cities to develop their own innovative approaches to solving the long-term challenges of equity and resilience.
Appendices
Appendix A: Selected Revenue Tools

Grants

Federal Grants

Federal funding for infrastructure has been declining over the past few decades. Some infrastructure programs have been reduced or eliminated—for example, grants for wastewater treatment were converted into the State Revolving Fund (SRF) program for wastewater. Still, many cities receive substantial funds from the federal-aid highway program, transit capital grants from the Federal Transit Administration, and other funding for capital projects.

Even as funding has declined, many federal programs have increased the types of projects that are eligible for support and the kinds of grantees that can apply. Many agencies have expanded eligibility for grant funding to more innovative projects, including equitable and resilient approaches. Without increased funding, however, this increased eligibility just makes the competition for federal funding more intense. Eligibility doesn’t guarantee that a city could obtain grant funds, just indicates that a project could be eligible in theory. As grants become more competitive, federal agencies are requiring applicants to demonstrate that the project has a complete financial plan before they will award federal assistance.

The Catalog of Federal Domestic Assistance (CFDA) includes all forms of federal assistance that can be provided to governments and individuals. Agencies can scour CFDA for possible sources, but usually a more effective way of identifying potential grant funds is to monitor industry publications and maintain strong relationships with the federal agencies associated with each type of infrastructure that is being funded.

Federal funding comes with federal requirements, including minimum wage scales under Davis-Bacon, rules requiring major components to be American-made (so-called “Buy-America” requirements), applicability of the National Environmental Policy Act (NEPA), and federal restrictions on local hiring preference programs. Depending on the size of the project, the cost of complying with these restrictions may not be worth the federal funds.

State Grants

States are stepping in to fill the gaps in federal funding in different ways. In the past five years, more than 22 states have raised their gas taxes to pay for transportation infrastructure improvements (while the federal gas tax has not been increased since 1993). Most of these gas tax funds are being provided to infrastructure projects, some in the form of competitive grant programs, and some allocated to specific projects. The State of California dedicated much of its proceeds from a carbon-trading program to a competitive grant program for infrastructure projects.

Philanthropic Grants

Philanthropic capital can get behind projects that align with the social missions of organizations. The Friends of the High Line raised $44 million of the total $152 million cost for initial construction of the elevated park in New York City. The Atlanta Beltline received $41 million in philanthropic contributions in the initial stages, and the strategic plan anticipates up to $275 million in philanthropic support by 2030, when all the project elements are complete.

Philanthropic capital is generally contributed via a nonprofit that works in close partnership with the city, rather than directly to a city. This model avoids complex ethical issues that could arise if city employees solicited donations directly (often a prohibited activity). Conflicts of interest may have to be managed in any case, in terms of contributions from any sources that are depending on city action or permits.

Payments in Lieu of Taxes (PILOTS)

Payments in Lieu of Taxes (PILOTS) are voluntary contributions by otherwise tax-exempt entities to help defray municipal governments’ costs of providing services to them. A 2012 report by the Lincoln Land Institute found that at least $92 million in PILOTS had been received by at least 218 localities in 28 states since 2000. According to the report, more than 90 percent of PILOTS come from “eds and meds”—colleges/universities and hospitals, with the university sector contributing 2/3rds of payments and hospitals about one quarter.

PILOT payments are often negotiated with nonprofits in the context of expansion plans that might impose additional costs/service requirements on cities. For example, the city of Boston’s PILOT program would make contact with nonprofits whenever they acquired new properties and requested a real estate tax exemption.

Corporate Contributions

Companies are sometimes willing to contribute directly to infrastructure assets that create specific benefits for them. For example, Micron PC paid the entire cost of installing an interchange at its headquarters in Boise, ID. The athletic shoe company New Balance is paying up to $16 million to build a new transit station in its Boston-area headquarters. To accept these contributions, infrastructure agencies need to ensure that they do not compromise existing planning and environmental analysis processes, or conflict-of-interest policies.

Crowdfunding

Crowdfunding via sites such as ioby.com (in our backyards), Spacehive.com, or www.citizinvestor.com can also provide funding for infrastructure. Citizens can contribute directly to projects in their communities, and get a tax deduction in exchange for the donation. Crowdfunding is typically most appealing for projects on a smaller scale, and connected to a popular mission, such as parks or community gardens. According to Rodrigo Davies, who researched the issue while at Stanford University’s Center for Work, Technology and Organizations, the median amount raised from crowdfunding campaign for infrastructure projects was only $6,357.

Direct User Fees

Tolls

For highway projects, tolls are an obvious source of funding. Cities do not always have control over toll policy on facilities in their geographic area, but often state legislation will provide a degree of local control or input as to tolling policy.
Drivers generally expect the proceeds of tolls to be used on the facility or group of facilities on which they are charged, and sometimes resist their use for other projects. In some cases, policy makers have gained support for dedicating tolls to transit and other projects along the same corridor that may reduce congestion on the tolled facility. For example, tolls on the Bay Area’s Golden Gate Bridge fund bus and ferry operations that reduce bridge traffic.

The most popular forms of tolling in the last decade have been “managed lanes” where single-occupancy drivers can buy their way into a carpool lane that would otherwise be limited to vehicles with more than two or three occupants. Other projects offer “express lanes” dedicated solely to paying customers. These lanes offer a higher level of service, for which drivers are often willing to pay. Rates can vary depending on congestion and time of day. By spreading out use to less congested times of days, congestion pricing may reduce or eliminate the need for facility expansion. In fact, studies have shown that congestion relief benefits from facility expansion can be short-lived, while pricing strategies can continue to keep managed or express lanes free flowing.

Establishing a new tolling program involves a lot of administrative expenses, from buying the toll technology to creating the back-office operations and customer service that will collect tolls. If tolling already exists in the area, this expense is lowered. In addition, there is considerable uncertainty surrounding the revenue forecasts for “greenfield,” or newly constructed toll facilities, and usually toll revenues take several years to ramp up before they achieve their full potential. A number of P3 projects have faced financial failure because of optimism bias in their initial toll projections. As a result, financing new build toll facilities solely with tolls as a pledged revenue source can be difficult.

**Transit Fares**

Transit fares have historically not covered the full operating cost of delivering transit service. The average so-called “farebox recovery” rate for transit rail systems in the U.S. is less than 29%. Thus, transit fares are not solely relied upon as a primary source for new capital projects, except in rare situations where service can be delivered cheaply and the market will support fares greater than the operating cost.

**Parking Fees**

Many cities control a valuable commercial asset in the form of on-street parking and city-owned parking facilities. Some cities, including San Francisco, actively manage on-street parking, changing rates according to demand. Demand-based parking fees can involve administrative costs, but can help cities accomplish multiple goals: ensuring that spaces are available in high traffic areas, so that shoppers aren’t discouraged from coming downtown, steering commuters to longer-term options and other modes, and generating revenue.

**Traditional Utility Fees (Drinking Water, Wastewater, Electric)**

Traditional utility fees are generally set to recover the capital and operating costs of delivering utility service. If a project can be defined as part of a utility’s mission, then it might be possible to incorporate it into its rate base, and achieve capital funding. For example, some green stormwater infrastructure might be alternatives to more expensive wastewater capital projects, and could be recouped through wastewater utility rates. The ability to coordinate for projects on the city’s portfolio depends on the relationship between the city and the utility.

**Stormwater Utility Fees**

Many communities have established stormwater utility fees to recoup the cost of storm sewers and other solutions to reduce runoff and control flooding. Stormwater utilities usually attempt to charge fees that are proportionate to a parcel’s demand on the stormwater system. Larger properties with the highest percentage of impervious pavement are likely to impose the greatest cost on the system. These fees can be used to support financing for stormwater-related infrastructure, including green stormwater infrastructure.

**Transportation Utility Fees**

Like stormwater utility fees, transportation utility fees (TUFs) attempt to allocate the cost of using a system based on the demand imposed by a property on the system. A TUF allocates cost of street improvements according to an estimate of the trips generated from each type of property Loveland, Colorado, Grants Pass Oregon, and Provo, UT have all established transportation utility fees at some point. Most of the cities that establish these programs have generated between a couple hundred thousand dollars to a few million in annual revenue. The fees have been challenged in courts because in some states, a charge must be “voluntary” in order to qualify as a fee. Otherwise, it is considered a tax, which general requires enabling legislation from the state government and/or a voter referendum to impose.

**Impact Fees/Proffers**

Another method for raising funding for infrastructure is to impose impact fees on new development. Many cities use these fees to mitigate the cost of providing wastewater, water, stormwater, and transportation services to new developments. These fees are usually attached to initial construction of new houses, and can range from a few thousand dollars to $50,000 or more per parcel. While they can generate significant revenue, they place an additional burden on developers and may make it even more difficult to keep housing affordable. They also tend to be less predictable than utility fees, since they are generally charged on a one-time basis as houses are constructed. A city could get millions in impact fees in a high development year, and little or none in a subsequent year. Thus, this source can provide upfront funding, but is not generally securitized. Another alternative to impact fees is “proffers”—requiring a developer to provide in-kind infrastructure in lieu of impact fees for new developments.

**Enterprise Revenues**

**Advertising/Sponsorship**

Some agencies generate revenue through advertising on city-owned facilities, including buses, transit stations and trains, benches, and other locations. Usually revenues from these activities aren’t predictable or large enough to serve as a source of funding for capital projects, but can sometimes support elements such as lighting, or maintenance activities, such as cleaning. Some cities have policies...
that restrict advertising on city-owned assets, to avoid over-commercialization of civic facilities. In some cases, instead of direct advertising, cities permit sponsorship in exchange for dollars or in-kind contributions, such as the San Francisco Municipal Transportation Agency’s arrangement with Clear Channel Outdoors. Under this arrangement, Clear Channel installs and maintains bus shelters in exchange for the right to advertise.

Naming Rights

Some cities have been able to benefit from selling naming rights for transit stations and other major facilities. In 2015 the University of California, San Diego entered into a $30 million, 30-year deal with the Metropolitan Transit System for naming rights for the stations on the Mid-Coast Trolley Line. As with advertising, some oppose the idea of having civic facilities “branded” with private names. It is also difficult for both public and private sector to estimate the value of these rights. When Boston’s MBTA system tried to do the same thing in 2014, it didn’t get any bidders at the prices it named.

Recreational or Food Concessions

Cities may be able to generate revenue from minor recreational, or food concessions associated with civic facilities. For example, cities may create a food court or food truck gathering near a public park, or create an ice rink. Unless they have a proven track record of operation, concessions that are ancillary to a project generally don’t produce enough of a reliable surplus to borrow against. Even when predictable, the level of funding is usually only enough to support operations and maintenance funds. (In contrast, a project that creates substantial leasable land or joint development opportunities might be able to use lease or tax proceeds to finance part of the infrastructure development).

Branded Merchandise

Some agencies or associated projects can benefit from branded merchandise. The New York MTA generates $500,000 each year from MTA-branded T-shirts and other licensed products. The Friends of the High Line generate $1 million per year from the sale of High Line-branded merchandise.

Value Capture Options

Tax Increment Financing (TIF)

Tax increment financing is a method of capturing the expected future value of an infrastructure project development. The “tax increment” dedicates a portion of property tax that represents the increased value created by an infrastructure project. The property value is usually “frozen” at the level prior to creation of the district. Then some or all of the tax on the additional value in subsequent years is allocated to the project.

TIF districts are popular tools in some cases because they tap a new, not existing source of revenue, and may be perceived as competing less with existing priorities. TIFs are speculative and sometimes difficult to finance because many factors other than the infrastructure project may affect land value. If a TIF district is created immediately prior to a downturn in the business cycle, there may be no incremental net revenue available. The City of Austin uses its TIF as a grant to increase the supply of affordable housing; developers can put the TIF on their properties back into building more affordable units. In some cases, a city can ensure that the value of land subject to a TIF will increase by “upzoning” it to a higher use. For example, if development is restricted to a certain height, and the city increases it, the land will automatically be worth more because more units are feasible.

Special Districts (Business Improvement Districts)

Special districts can also be established in the geographic areas that are expected to benefit from a project. Districts can levy taxes or fees that can be per-parcel, or based on property value, anticipated benefit, proximity to the infrastructure project, or by other means. Special districts can be perceived as more equitable than other funding options because those who benefit most from the economic development in a growing region wind up paying for the costs of the infrastructure. They can also be created as independent or nonprofit entities that may have more flexibility than traditional municipal agencies in hiring and contracting. Yet in some cases, residents may perceive them as “double taxation” since they are already paying all of the other taxes that other local residents pay for infrastructure services. Special districts also add another layer of administration that can lead to inefficiency/diseconomies of scale compared to having an existing entity levy taxes.

If poorly structured, special districts can also have unintended consequences, discouraging the economic development they were supposed to support. In the late 1980s a number of counties in the state of Texas used special districts in rapidly developing areas. The districts were structured such that if a landowner were unable to pay its special assessment, the unpaid assessment was added to the obligations of all of the other payers. When the recession hit in the early 1990s, many landowners in each district declared bankruptcy, and then their debt was added to the ones who were still afloat, causing them to go bankrupt as well. Subsequent special districts have been structured to avoid this “death spiral” by adding other collateral and reserves in case of unexpected reductions in property values.

Density Bonuses/Transferable Development Rights (TDRs)

Density bonuses and transferable development rights are another method of using property value to fund infrastructure development. A density bonus can be awarded to a developer in exchange for a cash or in-kind contribution to an infrastructure project. The bonus would allow denser development than would otherwise be zoned. Transferable development rights are a similar mechanism in which a developer buys up the development rights from one site (which will be protected from further development, via easement, in perpetuity) and is able to use them to develop a different site more intensively. TDRs usually used to protect rural or environmentally land from development, but could also protect affordable housing by prohibiting further development or change in use.

General Taxes

Property and Property Transfer Taxes

Property taxes are a highly competitive source that already funds a high percentage of local government activities, including serving as the primary source for schools in most areas. One
common way for infrastructure to tap this source is via property transfer taxes, which serve as a proxy for the pace of development. Rapidly growing areas experience more rapid turnover of properties, leading to higher transfer tax receipts.

Sales Tax
Sales taxes are increasingly popular sources for transportation and other infrastructure. The policy argument for devoting sales tax to infrastructure, particularly transportation infrastructure, is that even if individuals don’t use the transportation facilities that they fund, they buy the goods that are transported to stores by using the transportation system. Sales taxes are also a proxy for capturing the value of economic development that may be associated with infrastructure. Yet sales taxes are considered regressive, since lower-income individuals wind up paying a higher share of their overall income in sales taxes than higher-income individuals.

Transportation Related-Taxes (Gas Tax, Vehicle Registration Fees, Parking Tax, Bicycle Tax)
Transportation-related taxes are often used for transportation infrastructure. Historically gas taxes have served as a proxy for direct user fees like tolls (since the amount that a person drives has some relationship to how much gas is used). With the advent of late-model fuel-efficient cars, gas taxes have become increasingly inequitable as a source of revenue, since the lowest-income individuals tend to have less fuel-efficient vehicles. Vehicle registration fees feature similar equity concerns, although rebates and discounts can be easier to accomplish than on a gas tax.

Tourist Taxes (Rental Car Tax, Hotel Tax)
Tourist taxes are often popular ways to build infrastructure because voters don’t pay. Hotels and other tourist businesses can be convinced to support their use for infrastructure if they perceive a link between the infrastructure and tourist activity. Yet in many jurisdictions, these taxes have already been increased for projects directly related to tourism, such as funding convention centers, and there may be little opportunity for further increases for infrastructure.

Appendix B: Selected Financial Tools

Bonds

General Obligation Bonds
For General Obligation (G.O.) bonds the issuing government pledges its “full faith and credit.” If revenues are not sufficient to pay debt service, governments commit to raise taxes in order to meet their obligations. Because they are more secure, these types of bonds command the lowest interest rates. However, they also tend to be the most restricted by state and local law, because of the degree of commitment. Most municipalities have legal and/or policy limits on the amount of G.O. bonds they will issue, and many require voter approval.

Revenue Bonds
For revenue bonds, cities pledge to repay investors with a specific revenue source, such as electric utility fees or a dedicated gas tax. Since the pledge is not as comprehensive as a G.O. bond, the interest rates can be higher, but the restrictions on issuance and voter approval requirements are also less stringent.

Private Activity Bonds
Private Activity Bonds are a form of tax-exempt bond that is not subject to all of typical restrictions on private activity associated tax-exempt bonds. IRS rules restrict the length and type of management contracts that can be entered into on a facility financed by tax-exempt bonds, as well as other kinds of private activity. A limited amount of Private Activity Bonds not subject to these restrictions can be issued by each state. While they are not limited by the private activity bond rules, they are subject to the many other requirements associated with tax-exempt bonds. The U.S. Department of Transportation is also authorized to choose certain projects that will be able to make use of up to $4 billion in remaining PAB authority. PABs are valuable tools in alternative delivery projects for infrastructure, because they allow the lower cost of tax-exempt financing in conjunction with the benefits of private involvement.

63-20 Bonds
The IRS allows certain nonprofit organizations to issue tax-exempt bonds on behalf of a public agency, if applicable restrictions are followed. These bonds are often used to enable some kinds of Nonprofit Public Partnerships (NPPs) as described in the project delivery section on page 66. In particular, they may allow governments to benefit from integrated delivery options, without running afoul of private activity restrictions on tax-exempt bonding.

501(c)(3) Bonds
Nonprofit charitable organizations are also allowed to issue tax-exempt bonds for public purpose projects. These can also be used in conjunction with an NPP; however, 501(c)(3) bonds have similar restrictions to governmental bonds in terms of limitations on private activity. They also are generally limited to maximum issuance amounts of $150 million, a cap that is not applicable to 63-20 bonds.

Green Bonds, “Social Bonds” and Sustainability Bonds
Green bonds are similar in financial structure to standard municipal bonds, but issuers pledge to use the proceeds of the bonds towards projects that will improve environmental quality or advance environmental goals. While exact data is difficult to confirm, issuers may get a slight “green premium” because there is greater demand among investors for bonds funding programs with positive environmental impacts. The Climate Bonds Initiative, an international nonprofit formed to promote the issuance of these types of bonds, estimated in 2016 that the U.S. had issued $9.7B in labeled green bonds, and $30.3 million in “climate-aligned bonds” that will advance environmental goals.

Many of the initial green bonds were self-labeled as such, and investors desiring to buy bonds that aligned with climate goals sought greater accountability. Various organizations offer certification, using different principles and requirements. In 2016, the San Francisco Public Utilities Commission issued the first water bond certified by the Climate
Bonds Initiative as a Water Climate Bond. The ICMA also has principles for social bonds (defined as bonds that finance projects that meet social goals) and sustainability bonds (whose proceeds can be used to fund projects with either green or social goals).

Obtaining the certification as a green, social, or sustainability bond and fulfilling the transparency and management requirements involves some cost to cities—perhaps $10,000 or $50,000 per issuance, at minimum. In exchange, cities and states issuing these bonds may have an easier time marketing their bond issuances to a wider pool that includes socially motivated investors. A lower interest rate from a “green premium” may offset certification costs.

Outcome-Based Bonds

In the infrastructure context, outcome-based can be used to repay investors if infrastructure achieves a desired social goal, such as runoff or emissions reduction. The DC Water Green bond, which will help fund green stormwater infrastructure, is the first example of applying this kind of approach to an infrastructure solution (see full case study on page 56).

Crowdfunding Investments/ Minibonds

The City of Denver undertook a successful “minibond” program to permit smaller scale investments by Colorado residents in its Better Denver program. The bonds were offered at amounts as low as $500, and allowed investors to earn returns several times what was being offered on savings CDs, while investing in projects that would benefit the community. Other cities are using new online platforms such as Neighborly or Infrashares to package and sell bonds to smaller scale investors.

Resilience Bonds: A Proposed Concept

Catastrophe bonds are financial instruments designed to provide payouts that limit economic disruptions in the event of a triggering event (e.g., a catastrophic flood). After the severe disruption wrought by Hurricane Sandy, the New York Metropolitan Transportation Agency issued two rounds of catastrophe bonds that will pay the agency a set amount upon certain “triggers” or catastrophic conditions. The bonds act as a form of insurance, for which the agency pays an annual premium to investors.

Resilience bonds are a new proposed subset of catastrophe bond, developed by Refocus Partners, in which payments can be reduced by linking the bonds to projects that reduce the likelihood and/or severity of the triggering event. For example, if a coastal community invested in seawall improvements and other activities that would make flooding less likely, the premium on a catastrophe bond could be reduced proportionately. The premium reductions could be used to finance the project that will lead to the risk reduction. To date, no resilience bonds have been issued, but the concept is under active discussion in several communities.

Loans

Federal Infrastructure Credit Programs (Transportation Infrastructure Finance and Innovation Act (TIFIA), Railroad Rehabilitation and Improvement Act (RRIF), Water Infrastructure Finance and Innovation Act (WIFIA)

The federal government has created several competitive credit assistance programs to provide long-term, flexible financing for public purpose infrastructure. These programs are cost-effective from a federal budget perspective, because the cost to the federal government is “scored” at the expected loss. The program essentially allows the federal government to pass on its low cost of borrowing to public and private borrowers constructing eligible transportation or water/wastewater projects.

All of these programs feature the following flexibilities.

• Fixed, low interest rates that are linked to the federal government’s own cost of borrowing. Unlike private market loans, federal infrastructure credit program interest rates don’t vary with the project risk—the rate is solely based on Treasury instruments of a similar maturity. For the RRIF program only, the borrower has to pay the “subsidy cost” (the amount charged to offset the potential loss to the government if the loan is not repaid).

• Long-term financing, with no prepayment penalty, or carrying costs other than credit monitoring fees.

• Flexible repayment schedules. Repayments don’t need to start until five years after “substantial completion” of the project, and can be aligned with income (so if the project produces less revenue than anticipated, repayments can be temporarily reduced. If it produces more, then the loan can be paid off early.

• Borrowers can be public or private entities. As long as the project is eligible under the program, a private entity constructing an eligible project can receive the assistance (as long as State and local agencies support the project and include in their transportation plans).

State Revolving Loan Funds (SRFs)

Each state in the U.S. operates “state revolving funds” that provide low-cost financing for eligible drinking and wastewater infrastructure projects. Wastewater SRFs have been expanding eligibility to include green stormwater infrastructure in addition to more traditional wastewater and drinking water capital projects.

SRF rates vary, but they are always at or below market rates. SRF loan terms and underwriting policies are set by each state. The funds “revolve” because loan repayments are put back into the SRF, and made available for other lending.

State Infrastructure Banks (SIBs)

State Infrastructure Banks (SIBs) were initially created by federal legislation in 1998 that provided states with seed funding for a revolving loan fund for eligible transportation projects. 33 states have established SIBs and provided some form of assistance. States can establish their own lending policies, within federal parameters. Maximum loan terms are 30 years after substantial completion, and interest rates must be at or below market. Generally, SIBs can support projects that would be eligible for federal transportation funding under Titles 23 or 49 of the U.S. Code. The level of
funding in each bank varies considerably, depending on whether the state chose to add to the federal seed funding, and how active its lending portfolio has been. SIBs have helped local governments advance projects by providing low-cost, long-term financial assistance.

**Impact Investment Loans**

“Impact investors” are investors who seek social as well as financial returns on their investments. Impact funds can be managed by for-profit and nonprofit firms, and may be focused on particular social goals, such as environmental protection, economic justice, or corrections reform. Loan amounts, interest rates, terms, and underwriting policies are established by each fund. For example, the Local Initiatives Support Corporation (LISC) supports investments in creative placemaking, by providing loans for renovation and reuse of urban land for parks and other amenities. The assistance can also be structured in alternative forms, such as bonds or equity investment, and may also be supplemented with grants.

**Equity Investment Tools**

**New Markets Tax Credits**

New Markets Tax Credits (NMTCs) are a financial tool designed to encourage private equity investment in economically distressed communities. From 2015–2016, $7 billion in NMTCs were allocated via a nationwide competitive process to Community Development Entities (CDEs) that provide loans, investments, and financial counseling in low-income areas. A wide variety of investments made by CDEs are eligible, from broadband in Alaska to conversion of a former tobacco factory into a mixed-use development.

The NMTC legislation defines a low-income area as a metropolitan area where the poverty rate is greater than 20 percent, and/or an area where incomes do not exceed 80 percent of the metropolitan area median income. NMTC investors receive tax credits for up to 39 percent of their total Qualified Equity Investment (QEI) in a CDE. The tax credit is taken gradually, with 5 percent over the first 3 years, and 6 percent each in the final four years. The investment must be held for at least 7 years or all tax credits are recaptured with interest. The tax credit is a low-cost way for CDEs to finance economic development projects, which may include some infrastructure aspects.

**Private Equity Investment Via Employment Based Fifth Category Visas (EB-5)**

The Employment Based Fifth Category (EB-5) program, also known as the Immigrant Investor program, is another financial tool that can assist some communities in delivering infrastructure. EB-5 was established in 1990 and is named for the fifth category of U.S. immigrant visa.

Under the EB-5 program, immigrants can receive a U.S. visa by making an equity investment of $1 million ($500,000 in a rural or low-income area) and creating at least 10 jobs. The investor receives a temporary visa, which can be converted into a permanent visa if the jobs are created within two years of the investment.

Typically, EB-5 financing features very competitive rates, often half the interest rate that municipal bonds would be for similar projects, making it an attractive alternative for cities. Investors can either make their investments directly in a commercial enterprise, or through certified “regional centers” that identify projects and assemble capital on their behalf.

The Port Authority of New York and New Jersey and the Metropolitan Transportation Authority worked through the New York City Regional Center to use EB-5 financing to redevelop a bus station and hub on the George Washington Bridge, and to construct, operate, and maintain the subway system’s wireless network. The Seattle Waterfront Project is also being financed with EB-5 financing via the New World Regional Center. The project will create plazas, pomerades, and a series of parks along the 26-block footprint of the Alaskan Way Viaduct. The viaduct is being turned into a tunnel for seismic reasons.

If the promised jobs are not created, the investor can be permanently denied their visa. Some financing agreements will refund the EB-5 contribution if this happens, but it is not a program requirement. The program has been criticized as inegalitarian for allowing some immigrants, typically the wealthiest in their countries, to “buy their way in,” to U.S. residency, while lower-income individuals have no such pathway to residency. The U.S. Government Accounting Office also reported concerns about invested funds potentially being obtained illegally, and laundered through the EB-5 program. Despite these criticisms, the program has been extended multiple times, and currently is set to expire in December 2017.

**Surplus Land Development and Swaps**

Another form of alternative delivery is funding infrastructure through private development of existing facilities or surplus land. For example, construction of the new Long Beach Civic Center was primarily funded by private development of the site of the old civic center. The developer entered into a long-term DBFOM P3 and accepted an availability payment that was capped at the current operating cost of the old civic center. Under the transaction, the city’s cost for a new civic center was limited to its existing outlays for operations and maintenance.

In addition to making use of surplus land, a city may also be able to realize value from swapping parcels with the private sector. For example, valuable, well-located land may be used for a purpose (such as parking cars or storing maintenance vehicles) that could be relocated to a lower cost location without a loss of efficiency. The original sites could then be sold or leased for a higher use, such as a retail mall or hotel, and generate enough funding to construct a facility at a new site, or for other projects.
In 2015, the City of Portland, ME, swapped a city-owned parking lot for a parcel that would enable them to relocate their public works department that was located in a prime downtown area. The swap freed up the former Public Works site for higher-value waterfront redevelopment, increasing economic activity and property values.

**Commercializing Government-Owned Assets**

Some assets with commercial development potential, such as seaports, toll bridges or tunnels, incinerators, or electric utilities, can be directly sold to the private sector to generate funding for infrastructure projects.

**Potential Advantages to Commercialization**

Commercialization may be appropriate for civic assets that are not core public services, such as incinerators or other utilities. A private partner may be able to manage some of these assets more cost effectively than an agency, particularly if that agency only has one asset of that class in its portfolio. A government may also be able to use proceeds from commercialization to support projects with less revenue potential.

**Potential Limitations to Commercialization**

Commercialization may be politically unpopular if it results in rate increases that the public perceives as being due to the commercialization, or if the public perceives that the private sector got the best of the deal, without adequate compensation for the public asset. Defining adequate compensation can be difficult, since many transactions are structured as "one off" deals, which are particularly difficult to value.

Governments may lose important flexibility when/if they turn over control of assets to the private sector. Unionized government workforces may fear that commercialization will lead to lower salaries and less secure employment arrangements. Many commercialization or franchise projects have stipulated employment protections for the existing workforce, but it is almost always a concern.

**Urban Wealth Funds**

In their 2017 book, *The Public Wealth of Cities*, Dag Detter and Stefan Folster propose the creation of "Urban Wealth Funds" to provide outsourced management of commercial assets owned by cities. In this model, cities turn over their commercially viable assets to the funds to manage professionally. This could include airports, seaports, government-owned commercial space, electric utilities, and wastewater treatment plants. The urban wealth funds are usually one step removed from political leadership, and may sell shares although the government usually remains a majority shareholder. The proceeds from their operations are returned back to the government that created them. For example, in 2015, the urban wealth fund MTR returned $590 million in dividends to the Hong Kong Government.

**Potential Limitations to the Urban Wealth Fund Model in the U.S.**

While this model has been used in Europe and Asia, American cities and states have not adopted it. This could be due to the unique nature of the U.S. tax-exempt bond market, which creates an incentive for assets to remain in public hands. This barrier might be overcome by establishing an urban wealth fund as a nonprofit corporation. Another issue in the U.S. market would be traditional anti-corruption policies that limit private involvement in the siting and development of infrastructure facilities.

Hong Kong’s urban wealth fund, MTR, frequently receive land from the government that abuts future planned rail lines. The agency develops the land as it constructs the line, and the sale of that land repays the cost of developing the line. In the U.S., there would be concern about the potential for corruption as the urban wealth fund worked with private companies to develop a project.

**Potential Limitations to Land Swaps**

Real estate valuation is an art, not a science, and public agencies may get criticized for selling or swapping assets without adequate return. It may be difficult to foster an open, transparent process in a real estate environment where developers are used to transacting deals behind the scenes.

**Potential Advantages to Land Swaps**

Cities may be able to capitalize on surplus land and/or allow use of an existing facility in exchange for construction of a new one.

**Potential Limitations to Land Swaps**

Wealth Funds Model in the U.S.
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Capital financing has always involved a kind of time travel.

Resilient and equitable financial strategies simply reach into the future in a different way.