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## **Viewpoint: Opportunities for Change in US Federal Infrastructure Policy**

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# OPPORTUNITIES FOR UNITED STATES INFRASTRUCTURE POLICY: A ROUNDTABLE OF EXPERTS

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## ABSTRACT

Federal policy continues to play a critical role in ensuring that our nation's transportation, water, sanitation, energy, and civic infrastructure assets are well maintained, and that responsible investment decisions are made. In recent years, chronic short-termism and inconsistent policies at the federal level have led to underinvestment and a lack of maintenance in our national infrastructure networks. Following the 2016 United States presidential election, there has been increasing momentum for infrastructure spending from both sides of the aisle. In February 2017, Stanford hosted infrastructure policy experts to debate and discuss the future of infrastructure in the United States and potential policy and funding reforms. This paper presents four central principles that were discussed during the round table event: (1) renewing federal leadership, (2) supporting local infrastructure efforts, (3) de-risking and streamlining projects, and (4) adopting alternative procurement models and innovations.

## KEYWORDS

Infrastructure policy, funding/financing, federal government, local government, private sector involvement

## INTRODUCTION

Increased federal investment in United States infrastructure was a rare bipartisan point of agreement in the contentious 2016 presidential election. Since the election, the White House has hinted at plans for a \$1 trillion infrastructure investment (Merica, 2017). At the same time, Senate Democrats have also suggested a \$1 trillion infrastructure investment plan (Caldwell, 2017). Strong bipartisan support suggests infrastructure spending is a national priority, especially since the most recent ASCE report card graded the nation's infrastructure at D+, reflecting the vulnerable state of the nation's transportation, water, sanitation, social, and energy infrastructure (American Society of Civil Engineers, 2017). This paper argues that United States' critical infrastructure needs, coupled with the current political environment, offers an

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opportunity not only to invest more in infrastructure, but also to reform federal infrastructure policy and improve the way the US invests in, develops, and maintains critical infrastructure.

Current infrastructure policy fails to incentivize long-term planning for critical infrastructure assets. As long-lived assets that require significant up-front capital investment, infrastructure also requires continued operations and maintenance activities to prevent premature degradation. This is a particularly challenging issue. Well executed maintenance programs are much less expensive than capital funding for asset replacement, but are much less politically attractive. For example, the East Span of the California Bay Bridge was estimated early on by a UC Berkeley study to cost \$200 million for seismic retrofits. Ultimately government leaders choose to spend over \$6.3B to replace the bridge span (Staff Report, 2010). Moreover, local, state, and federal budgets for infrastructure spending tend to be short sighted. In the years since the 2007-08 recession, local government budgets have shifted away from infrastructure operations and maintenance activities given their need to fund growing public sector pension obligations and other programs. In addition to this tension, the shortsighted nature of budgetary, administrative, and political cycles creates conflict with maintenance needs for infrastructure assets that are designed to endure over decades. As such, many infrastructure assets (including the nation's highway network and larger water and wastewater systems) were constructed in the 1950s and 1960s, and these assets are nearing their expected lifespans. Without continued and regular maintenance, asset rehabilitation and reconstruction has become extremely costly. Because these assets have long lifecycles, infrastructure policy has long term consequences.

In an effort to tackle the challenge of US federal infrastructure policy reform, Stanford's Global Project Center and the Stanford Center on Democracy, Development, and the Rule of Law co-hosted a roundtable in early February 2017 to identify key principles that should guide federal infrastructure policy reforms. The event brought together academics, practitioners, and policymakers who, under Chatham House Rules, spoke openly from their respective perspectives. Detailed notes were taken throughout all sessions, and immediately coded for recurrent themes. Coded notes were then analyzed, and this paper presents the findings across four roundtable themes:

1. Federal Leadership and 'Infrastructure America'
2. Supporting Local Infrastructure Efforts
3. Streamlining Project Approvals and Permitting
4. Procurement Models and P3 Innovations

## **RENEWING FEDERAL LEADERSHIP**

Although local and state governments are responsible for a majority of the infrastructure assets in the United States, the federal government still plays an important role in facilitating projects and showcasing best practices in infrastructure development. There is a great opportunity for the federal government to serve as a platform for facilitating the selection and delivery of infrastructure projects. Because of the challenges facing infrastructure delivery in the United States, it is important that federal infrastructure leadership shift towards a new model that can increase

capacity for local and state governments. Instead of a top-down approach, this new approach would facilitate collaboration between local, state, and federal government to better incentivize and align private sector partnership.

As part of this new model, the federal government would reassert its historical role in developing megaprojects. Megaprojects should be the focus because of their size, complexity and significant regional and national influence. In the years following the Great Depression, megaprojects helped spur the economy and increase quality of life. For example, the Interstate Highway System championed by President Eisenhower after WW II transformed the 48 loosely connected US states into a national marketplace for goods and services. Additionally, the government took on delivery of the Tennessee Valley Authority (TVA) which expanded beyond Tennessee's borders into Alabama, Mississippi, Kentucky, Georgia, North Carolina, and Virginia. The TVA Act was signed by the President in 1933 with the purpose of constructing dams and reservoirs that would provide electricity and control flooding within the Tennessee Valley for decades. This project had an impact on the regional and national economy and would not have been possible without the initiative and leadership of the federal government. Other megaprojects include the federally funded dams on the Columbia River and the Bonneville Power Authority which created similar benefits for the Northwestern US. Unlike projects that were earmarked during an annual budget cycle, these megaprojects were selected because of their national importance.

However, in recent decades, the number of megaprojects has decreased due to lack of federal fiscal capacity and political will, inconsistent infrastructure funding, and short-sighted decision making. Megaprojects are not only important because of their impact on the economy, they also allow the federal government to implement and model principles for successful infrastructure delivery. At the same time, these projects frequently lack clear authority to allocate costs and benefits, and often suffer years of delays in project planning and coordination. Therefore, the federal government has a responsibility to facilitate delivery of nationally significant projects and help to manage stakeholder relationships by identifying/creating a lead agency to manage project development, versus relying on multiple agencies to voluntarily and haphazardly coordinate and regulate projects.

A key element of this proposed new model is creation of a central infrastructure authority that has the authority to prioritize nationally significant megaprojects and facilitate their delivery. Because of the enormous scope and scale of current infrastructure needs in the United States, the possibility of a central authority (or a new cabinet level position) was discussed several times. In regards to a new cabinet level position, the office of the Secretary of Infrastructure would be established as a temporary office within the Executive Branch and would oversee the prioritization, funding, and management of nearly \$1 trillion worth of infrastructure project development and renewal. The agency would have a fixed lifespan and sunset provisions. Creating a new federal agency was controversial in light of the challenges encountered in creating the Dept. of Homeland Security, but roundtable participants generally agreed that a central authority for infrastructure delivery would facilitate infrastructure delivery by (1) prioritizing projects, (2) establishing funding/financing and contractual strategies, and (3) serving as a knowledge center.

Prior to project selection, the authority would develop a management framework or accountability tool that would help evaluate the success of each proposed project and attempt to extract lessons learned for delivering future projects more effectively. This idea stems from the infrastructure initiatives of peer nations (specifically the UK, Australia and Canada) that have a strong history of alternative infrastructure project delivery. The UK, Australia and Canada have created similar infrastructure advisory and facilitation authorities that have efficiently delivered dozens of mega-projects. They have done this by creating metrics and allowing local and state governments to propose projects that will be evaluated on this set of metrics. After prioritizing projects in a transparent, rational and apolitical manner, the authority is able to create a plan for project delivery by drawing on of the committee's make-up of expert practitioners.

Once projects are selected and prioritized, the authority would initiate front-end planning and assign a lead development agency to shepherd the project through its regulatory approvals, most likely a state or local government agency or a newly created authority, such as Crossrail in London, with the sole focus and requisite capacity to deliver a single megaproject. During this process, the authority would help lead agencies develop a custom strategy for funding/financing, as well as contracting, the project. In regards to funding/financing, the authority would have its own separate capital investment account to distinguish infrastructure spending from regular government consumption and use this money strategically, and in coordination with other funds, for project delivery. The capital investment account would further emphasize national attention on infrastructure, and encourage conscious fiscal planning for infrastructure.

With nearly \$1 trillion identified for infrastructure delivery in the United States, there is a great need for a central infrastructure authority that will manage the future of infrastructure in the country. Currently, infrastructure prioritization, funding and regulation is divided between multiple different federal, state and local departments and agencies. With a powerful central coordinating authority to direct and manage federal investment in infrastructure, there is an opportunity to aggregate best practices and expertise to aid state and local governments with their infrastructure projects. Similar knowledge centers exist within specific departments such as the Department of Transportation's Centers of Excellence that specializes in innovative project strategies. These entities aggregate industry best practices, standardize contracting models, and offer support for local and state officials within a single sector. Consolidating these efforts would provide state and local governments with new resources for:

- facilitating a shift towards a long-term lifecycle approach;
- using alternative procurement models;
- effectively managing stakeholder networks;
- streamlining the entitlement process without compromising essential environmental and social safeguards; and
- leveraging technological, financial and managerial advancements.

## **SUPPORTING LOCAL INFRASTRUCTURE EFFORTS**

Local and state governments play an integral part in overseeing the nation's infrastructure assets. Local governments provide the majority of funds for development, local agencies are usually tasked with managing these assets, and local communities directly benefit from infrastructure investments. Even though local and state governments develop infrastructure assets, the federal government has historically played a dominant role in funding and regulating large local and state infrastructure projects. But, with continued decentralization and declining federal funding, local governments have recently taken on more responsibilities for infrastructure planning, financing and development. And, because each local government entity approaches infrastructure development differently, there are inherent barriers to delivering projects efficiently across locales. There are several strategies that can help local governments more effectively create partnerships and construct/maintain infrastructure assets.

Local governments should organize and prioritize projects based on the availability of project revenue sources. Through Capital Improvement Plans (CIPs), local governments continuously reassess what infrastructure projects are most needed in their communities. Even though local governments create CIPs on a regular basis, planning how to fund and finance these projects occurs less frequently. Traditionally, local governments depend upon annual budgets (comprised of taxpayer dollars) to fund projects. The only way to increase this budget is to reallocate or raise taxpayer dollars. Because this may not be possible for a local government, the limited pool of funding is usually not large enough to cover all capital and operations/maintenance costs. By prioritizing projects based on availability of project revenue sources, the local government can identify alternative financing models, incentivize private sector partners, and expand their portfolio of projects to build and operate/maintain. And, while it may be difficult to change policies that will explicitly enable alternative financing mechanisms, there is some latitude for governments to work within current legislative and political environments to identify alternative financing mechanisms. Before doing this, it is important to identify projects that have direct revenue sources via user fees (tolls, passenger tickets, monthly billing, etc.) and projects that have indirect revenue sources (tax incremental financing, bundling projects, grants, availability payments, private real estate value capture, etc.). In some cases, direct revenue sources (via user fees) are small or nonexistent and require supplemental funding. For example, ticket sales for public transit projects rarely meet loan repayment requirements even though the benefits from public transit extend well beyond the direct ridership. As such, local and state governments must use both alternative and traditional funding mechanisms to construct, operate, and maintain these assets.

Once projects are organized and prioritized, it becomes easier for local governments to identify projects that will need additional state and federal funding, as well as projects that qualify for specific government finance programs like TIFIA or WIFIA for making projects viable by lowering project risks and attracting private sector partners. Currently, projects that are submitted for federal finance requests are evaluated based on project capital costs, primarily budget scoring practices, which present issues for local governments. Budget scoring creates a metric that shows how projects will impact government budgets over the duration of the project. In some

cases, this process can be prohibitive because it shows the full life-cycle cost of the project in the initial year of construction. Rather, it is more important to understand the life-cycle, amortized costs of construction, operations and maintenance and the other benefits and costs of the project. And instead of concentrating on the cost of infrastructure development, it is more important to create a set of metrics that consider the indirect benefits for evaluating projects. Metrics that reflect direct and indirect project benefits and costs can be used as decision making tools for state and federal governments to identify worthy projects to fund. Private sector tools such as LEED and Envision measure the environmental and social sustainability of a project in an effort to shift the conversation away from hard project costs and better represent the total lifecycle costs of project delivery.

During the project prioritization process, the local government will have identified potential project partners, including private sector entities and other government agencies, to facilitate project development. This core team of stakeholders will navigate challenges in the project development process. Currently, the inconsistencies between different local government regulations and infrastructure delivery processes require stakeholders to create one-off processes and project documents. To address this problem, it is important that local governments build capacity to work with and coordinate private sector partners, as well as state and federal governments, in a more streamlined and consistent manner. The local government is central to project delivery, because of their knowledge of the project context and their responsibility to operate and maintain the infrastructure asset after construction. For example, in the case of energy infrastructure, some projects are overbuilt for extreme redundancies instead of considering how household use of energy can be tapped and energy companies can “be in communication with energy users and can buy back from the users” (as one roundtable participant stated). Understanding the local context of these projects can be beneficial for better sensitizing communities to user fees for upgraded services and better maintaining infrastructure assets.

To accomplish all of this and facilitate partnerships with the private sector and government agencies at different levels, local governments need to build enhanced managerial capacity. Currently local governments have “little expertise within an area and don’t have exposure to alternative forms of project funding and finance,” but there is interest in expanding capacity so that local government can feel empowered to solve infrastructure delivery problems and work with private sector partners in a meaningful way. At the same time, by sharing in the rewards and risks of project outcomes, the local government should be knowledgeable about project delivery and development and identify a champion, eliminate environmental and political risks that could lead to early project termination, and provide context-specific knowledge that can improve project outcomes. Executive education, delivered online in a low-cost and scalable way, is one means to address the capacity shortfalls in local government agencies.

## **DE-RISKING AND STREAMLINING PROJECTS**

After projects are appropriately identified and selected, a number of pre-construction project activities take place. These include land acquisition (often provoking legal contestation), right-of-way permissions, permits and approvals, subsurface investigations, etc. These front-end, pre-construction activities often carry large risks.

To account for these risks, it is common practice for local government to allocate these risks and include the costs of preconstruction activities into the private sector's scope of project delivery. Local governments often lack internal financial resources, and in some cases expertise, to self-perform these front-end aspects of project development. Thus, the cost of front-end project development activities is rolled into the construction contract with significant risk premiums. As a result, developers must hedge against the long durations and potential delays of taking on front-end pre-construction work. One roundtable participant suggested that in a typical PPP infrastructure project as much as 40 (and even 50) percent of total project costs are in the front-end pre-construction activities.

One way to use capital more efficiently for infrastructure development is for local government to assess risks and de-risk projects prior to bidding. By doing this, local governments are able to assume those risks they are best suited to address (such as siting, permitting, and environmental approvals), and to hand off engineering, construction, operations, financial, and innovation risks to other stakeholders who are better suited to manage these risks. In doing so, front-end project de-risking (prior to project bidding), can increase the field of potential qualified designers/contractors, and reduce overall project costs and, hence, general funding requirements. One way to facilitate this is to create federal project planning grants that can pay for increased capacity for local governments to develop truly 'shovel-ready' projects (already de-risked) for more competitive bidding. Participants in the roundtable suggested: "planning grants can really catalyze a project to get it to go somewhere" and "Seeding with small amounts of money can go a long way." Planning grants could come from a revolving fund with grant repayment by local governments once the respective projects begin construction or operation. The federal government can also aid local government by offering guidance through the planning grant application process. This would be particularly useful for local governments with limited staff and experience in infrastructure development and provide local governments with best practices for selecting and hiring consultants, stakeholder engagement, etc.

Another way federal attention can directly support local infrastructure is by streamlining the project approval and permitting processes. Roundtable participants repeatedly emphasized the local nature of infrastructure, even as infrastructure development requires interaction with multiple state and federal agencies. Given multiple agency involvement and little clarity on authority, hierarchy, and process, it is difficult for project sponsors/developers to navigate the complex multi-agency, multi-level gauntlet of permitting and approvals efficiently. Currently approvals are often sought sequentially rather than simultaneously, which in addition to the aforementioned complexities, often leads to costly and unforeseen delays. Additionally, many of the costs and delays in permitting are the result of duplicative processes at the state and local level. It is unclear, for example, why nearly identical Environmental Impact Statements are required at both the federal and state levels. Federal leadership and action can simplify the process of approvals by (1) establishing clear lines of authority between agencies, and even legislatively consolidating approvals processes for environmental decisions (e.g. deferring to state regulators when certain minimum standards are met), (2) creating a 'road-map' between agencies to make permitting predictable and accountable, and (3) preempting local and state permits if the process takes longer than a fixed time period (6 months



was suggested by roundtable participants). It was noted that “even in complex projects, all permitting should be done in less than two years.” Federal action to reform the permit and approval process would reduce project costs related to delays, and expedite value realization of infrastructure assets to users by enabling state and local governments to de-risk the front end of infrastructure projects.

Finally, infrastructure projects face tremendous litigation risks. The United States generally grants much broader standing to parties seeking to use the courts to block projects they don’t like. Action to limit standing (at both the state and federal level) to parties with genuine interests at stake, with time limitations and transparency requirements for those filing lawsuits, would also streamline the process of infrastructure development.

### **ADOPTING PROCUREMENT MODELS AND INNOVATIONS**

All levels of government should focus on value creation by shifting the emphasis from infrastructure problems and costs to infrastructure benefits and long term value creation. This is particularly important when resource scarcity is coupled with infrastructure capacity deficits — the current US situation. Value creation is based on: (1) clearly understanding the needs of local stakeholders; (2) establishing metrics for selecting/developing appropriate infrastructure assets; and (3) evaluating infrastructure with objective performance measures over an asset's entire life-cycle. This life-cycle value creation perspective of infrastructure goes beyond the traditional infrastructure procurement models.

In traditional government-funded Design-Bid-Build (DBB) procurement, for example, local government (1) generally selects individual projects for development for which they can secure funding; (2) separates design and construction activities, with a period for contractors to bid for the cost of delivering an asset that conforms to the detailed, prescriptive design and specifications; and then (3) takes over operations and maintenance activities. Discontinuities across the different steps of procurement, and virtually no private sector funding considerations, prevent the traditional DBB model from capitalizing on innovations and efficiencies for financing, design, construction, and operations. Such fractured delivery models forgo the essence of life-cycle value considerations because of inability to link key stakeholders across infrastructure needs/planning through funding/financing, development, and throughout the entire operational life of the assets. However, when infrastructure assets are viewed in a ‘business case’ framework, with metrics such as job creation, revenue generation, increasing local competitiveness, etc. as criteria for asset development, then various private sector efficiencies make sense and can be leveraged.

To this end Design-Build (DB), Public-Private Partnerships (PPPs), and other alternative procurement models have demonstrated advantages by incentivizing stakeholders across the asset’s life-cycle, with the private sector entity's compensation based on the total cost of capital and operations, customer satisfaction, and asset utilization. This requires greater transparency from both local government and private developers, and more early inclusion of the broader network of stakeholders to identify metrics for success and to share performance data. If the local government can identify community needs and build strong consensus among various stakeholders, value creation is possible. This value creation presents an opportunity to have beneficiaries support and pay for that value.

When local government agencies obtain consensus on what stakeholders seek, the issue then turns to value capture. As noted earlier, both political parties support infrastructure development. However a nuanced goal conflict was explained at the roundtable. “Republican and Democratic groups want to do infrastructure. But, Republicans don’t want to release funds, and Democrats want to permit it to death. We need more than just public spending for infrastructure, but *value capture*.” Furthermore, it was noted that “we need to run infrastructure as a business and learn how to serve the customer better. Governance here is the marketplace, we actually need to deliver value or no one will use it [the infrastructure asset].” Therefore, assets with strong business cases and revenue generation potential revolve around the community’s support and ability to fund development effectively. This can happen in a variety of ways. The best known and most direct “beneficiary-pays” methods are tolls and similar types of user fees. In Colonial times, user fees funded ferries, canals, roads, railroads, etc.; and, user fees have once again become a more politically and socially viable option in the US. But, more recently tax incremental financing (TIF) has become a popular method for value capture. Because infrastructure assets increase surrounding land value, they inherently increase property value and thus increase tax revenues. Tax incremental financing captures the increased land value and corresponding property tax increases from real estate surrounding the development of new or enhanced infrastructure assets. This increase in tax revenue can directly fund or be bonded against infrastructure development.

Additionally, the private sector can engage effectively in delivering assets and capturing value by more efficiently delivering infrastructure assets through alternative procurement models. Aligning the local government’s well defined and broadly supported infrastructure asset needs with the private sector’s inherent focus on value capture has proven successful in multiple cases. For example, a recent Anacostia River restoration and development project utilized a PPP model. Project stakeholders were able to increase project scope and overall budget to add additional features valued by the public. Due to the strong alignments between public sponsors and their local community, and the public sponsor and private developers, the project was still completed and made available 1-year faster than originally planned. Once again, transparency was an important key. Private developers can pursue comprehensive procurement models such as design-build-finance-operate-maintain (DBFOM) PPP models (or similar alternative procurement models), and measure projects by performance metrics that are also disclosed publicly.

In some cases, critical infrastructure assets may not be supported by strong business cases. In these scenarios procurement models can emphasize bundling projects that have weak revenue generation potential with projects that have strong revenue generation potential. Private developers are thus incentivized to take on a portfolio of assets for development and deliver value capture benefits across assets. The new Long Beach Civic Center is a good recent example of this because the portfolio includes assets with direct revenue streams and others without direct revenue streams. Also, greater use of project bundling delivery models, particularly projects of similar scopes and geographic locations, can reduce transaction costs to local government and private developers. Moreover, as infrastructure assets leverage

some user-fees in their funding mechanisms, there is more potential to shift traditional public funding towards those projects with weak revenue potential.

## **CONCLUSIONS**

This paper provides a high level overview of areas in which a new federal infrastructure program invests in projects, and reforms and supports our institutions for developing and maintaining infrastructure. An integrated approach between government, industry, and academia is needed to implement these principles and translate them into policy and institutional reforms. Infrastructure investment is vital to our national economic growth, but policy and institutional reforms are needed in addition to increase federal, state, local and private sector spending. In sum, we see the following opportunities for reform and improvement by the federal government:

1. Focusing direct efforts effectively through regionally and nationally significant megaprojects that impact and involve multiple state and local governments.
2. Supporting local infrastructure with federal funds, credit enhancements and advisory capacity without prescribing specific projects. This will allow state and local governments to craft optimal project financing and funding plans, innovate, and compete for investment, because infrastructure is always going to be primarily a local endeavor.
3. Incentivizing a long-term perspective in infrastructure planning by assisting local government in procuring projects via long term concessions with user-supported and broader beneficiary-supported revenue streams, not just up-front capital costs.
4. Helping local governments to de-risk projects through project planning assistance including planning grants, thus making the deployment of local capital more efficient.
5. Reforming and streamlining the permitting processes and establishing clear lines of authority between agencies to minimize slow construction starts and the accompanying delay costs.
6. Assisting state and local agencies in implementing alternative procurement programs such as Public-Private Partnerships successfully by providing additional procurement support and enabling federal agencies to enter into alternative procurement contracts.

Infrastructure networks continue to be the center of our nation's economic, social, and environmental well-being, and major programs to increase federal infrastructure investment enjoy bipartisan support. But the US needs more than just additional spending to fix our infrastructure - institutional reforms can ensure public and private investments are placed in the most beneficial projects, efficiently, and that projects are supported and maintained for the long-term.

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## INTRODUCTION

Increased federal investment in United States infrastructure was a rare bipartisan point of agreement in the contentious 2016 presidential election. Since the election, the White House has hinted at plans for a \$1 trillion infrastructure investment (Merica, 2017). At the same time, Senate Democrats have also suggested a \$1 trillion infrastructure investment plan (Caldwell, 2017). Strong bipartisan support suggests infrastructure spending is a national priority, especially since the most recent ASCE report card graded the nation's infrastructure at D+, reflecting the vulnerable state of the nation's transportation, water, sanitation, social, and energy infrastructure (American Society of Civil Engineers, 2017). This paper argues that United States' critical infrastructure needs, coupled with the current political environment, offers an

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opportunity not only to invest more in infrastructure, but also to reform federal infrastructure policy and improve the way the US invests in, develops, and maintains critical infrastructure.

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capacity for local and state governments. Instead of a top-down approach, this new approach would facilitate collaboration between local, state, and federal government to better incentivize and align private sector partnership.

As part of this new model, the federal government would reassert its historical role in developing megaprojects. Megaprojects should be the focus because of their size, complexity and significant regional and national influence. In the years following the Great Depression, megaprojects helped spur the economy and increase quality of life. For example, the Interstate Highway System championed by President Eisenhower after WW II transformed the 48 loosely connected US states into a national marketplace for goods and services. Additionally, the government took on delivery of the Tennessee Valley Authority (TVA) which expanded beyond Tennessee's borders into Alabama, Mississippi, Kentucky, Georgia, North Carolina, and Virginia. The TVA Act was signed by the President in 1933 with the purpose of constructing dams and reservoirs that would provide electricity and control flooding within the Tennessee Valley for decades. This project had an impact on the regional and national economy and would not have been possible without the initiative and leadership of the federal government. Other megaprojects include the federally funded dams on the Columbia River and the Bonneville Power Authority which created similar benefits for the Northwestern US. Unlike projects that were earmarked during an annual budget cycle, these megaprojects were selected because of their national importance.

However, in recent decades, the number of megaprojects has decreased due to lack of federal fiscal capacity and political will, inconsistent infrastructure funding, and short-sighted decision making. Megaprojects are not only important because of their impact on the economy, they also allow the federal government to implement and model principles for successful infrastructure delivery. At the same time, these projects frequently lack clear authority to allocate costs and benefits, and often suffer years of delays in project planning and coordination. Therefore, the federal government has a responsibility to facilitate delivery of nationally significant projects and help to manage stakeholder relationships by identifying/creating a lead agency to manage project development, versus relying on multiple agencies to voluntarily and haphazardly coordinate and regulate projects.

A key element of this proposed new model is creation of a central infrastructure authority that has the authority to prioritize nationally significant megaprojects and facilitate their delivery. Because of the enormous scope and scale of current infrastructure needs in the United States, the possibility of a central authority (or a new cabinet level position) was discussed several times. In regards to a new cabinet level position, the office of the Secretary of Infrastructure would be established as a temporary office within the Executive Branch and would oversee the prioritization, funding, and management of nearly \$1 trillion worth of infrastructure project development and renewal. The agency would have a fixed lifespan and sunset provisions. Creating a new federal agency was controversial in light of the challenges encountered in creating the Dept. of Homeland Security, but roundtable participants generally agreed that a central authority for infrastructure delivery would facilitate infrastructure delivery by (1) prioritizing projects, (2) establishing funding/financing and contractual strategies, and (3) serving as a knowledge center.

Prior to project selection, the authority would develop a management framework or accountability tool that would help evaluate the success of each proposed project and attempt to extract lessons learned for delivering future projects more effectively. This idea stems from the infrastructure initiatives of peer nations (specifically the UK, Australia and Canada) that have a strong history of alternative infrastructure project delivery. The UK, Australia and Canada have created similar infrastructure advisory and facilitation authorities that have efficiently delivered dozens of mega-projects. They have done this by creating metrics and allowing local and state governments to propose projects that will be evaluated on this set of metrics. After prioritizing projects in a transparent, rational and apolitical manner, the authority is able to create a plan for project delivery by drawing on of the committee's make-up of expert practitioners.

Once projects are selected and prioritized, the authority would initiate front-end planning and assign a lead development agency to shepherd the project through its regulatory approvals, most likely a state or local government agency or a newly created authority, such as Crossrail in London, with the sole focus and requisite capacity to deliver a single megaproject. During this process, the authority would help lead agencies develop a custom strategy for funding/financing, as well as contracting, the project. In regards to funding/financing, the authority would have its own separate capital investment account to distinguish infrastructure spending from regular government consumption and use this money strategically, and in coordination with other funds, for project delivery. The capital investment account would further emphasize national attention on infrastructure, and encourage conscious fiscal planning for infrastructure.

With nearly \$1 trillion identified for infrastructure delivery in the United States, there is a great need for a central infrastructure authority that will manage the future of infrastructure in the country. Currently, infrastructure prioritization, funding and regulation is divided between multiple different federal, state and local departments and agencies. With a powerful central coordinating authority to direct and manage federal investment in infrastructure, there is an opportunity to aggregate best practices and expertise to aid state and local governments with their infrastructure projects. Similar knowledge centers exist within specific departments such as the Department of Transportation's Centers of Excellence that specializes in innovative project strategies. These entities aggregate industry best practices, standardize contracting models, and offer support for local and state officials within a single sector. Consolidating these efforts would provide state and local governments with new resources for:

- facilitating a shift towards a long-term lifecycle approach;
- using alternative procurement models;
- effectively managing stakeholder networks;
- streamlining the entitlement process without compromising essential environmental and social safeguards; and
- leveraging technological, financial and managerial advancements.



## **SUPPORTING LOCAL INFRASTRUCTURE EFFORTS**

Local and state governments play an integral part in overseeing the nation's infrastructure assets. Local governments provide the majority of funds for development, local agencies are usually tasked with managing these assets, and local communities directly benefit from infrastructure investments. Even though local and state governments develop infrastructure assets, the federal government has historically played a dominant role in funding and regulating large local and state infrastructure projects. But, with continued decentralization and declining federal funding, local governments have recently taken on more responsibilities for infrastructure planning, financing and development. And, because each local government entity approaches infrastructure development differently, there are inherent barriers to delivering projects efficiently across locales. There are several strategies that can help local governments more effectively create partnerships and construct/maintain infrastructure assets.

Local governments should organize and prioritize projects based on the availability of project revenue sources. Through Capital Improvement Plans (CIPs), local governments continuously reassess what infrastructure projects are most needed in their communities. Even though local governments create CIPs on a regular basis, planning how to fund and finance these projects occurs less frequently. Traditionally, local governments depend upon annual budgets (comprised of taxpayer dollars) to fund projects. The only way to increase this budget is to reallocate or raise taxpayer dollars. Because this may not be possible for a local government, the limited pool of funding is usually not large enough to cover all capital and operations/maintenance costs. By prioritizing projects based on availability of project revenue sources, the local government can identify alternative financing models, incentivize private sector partners, and expand their portfolio of projects to build and operate/maintain. And, while it may be difficult to change policies that will explicitly enable alternative financing mechanisms, there is some latitude for governments to work within current legislative and political environments to identify alternative financing mechanisms. Before doing this, it is important to identify projects that have direct revenue sources via user fees (tolls, passenger tickets, monthly billing, etc.) and projects that have indirect revenue sources (tax incremental financing, bundling projects, grants, availability payments, private real estate value capture, etc.). In some cases, direct revenue sources (via user fees) are small or nonexistent and require supplemental funding. For example, ticket sales for public transit projects rarely meet loan repayment requirements even though the benefits from public transit extend well beyond the direct ridership. As such, local and state governments must use both alternative and traditional funding mechanisms to construct, operate, and maintain these assets.

Once projects are organized and prioritized, it becomes easier for local governments to identify projects that will need additional state and federal funding, as well as projects that qualify for specific government finance programs like TIFIA or WIFIA for making projects viable by lowering project risks and attracting private sector partners. Currently, projects that are submitted for federal finance requests are evaluated based on project capital costs, primarily budget scoring practices, which present issues for local governments. Budget scoring creates a metric that shows how projects will impact government budgets over the duration of the project. In some

cases, this process can be prohibitive because it shows the full life-cycle cost of the project in the initial year of construction. Rather, it is more important to understand the life-cycle, amortized costs of construction, operations and maintenance and the other benefits and costs of the project. And instead of concentrating on the cost of infrastructure development, it is more important to create a set of metrics that consider the indirect benefits for evaluating projects. Metrics that reflect direct and indirect project benefits and costs can be used as decision making tools for state and federal governments to identify worthy projects to fund. Private sector tools such as LEED and Envision measure the environmental and social sustainability of a project in an effort to shift the conversation away from hard project costs and better represent the total lifecycle costs of project delivery.

During the project prioritization process, the local government will have identified potential project partners, including private sector entities and other government agencies, to facilitate project development. This core team of stakeholders will navigate challenges in the project development process. Currently, the inconsistencies between different local government regulations and infrastructure delivery processes require stakeholders to create one-off processes and project documents. To address this problem, it is important that local governments build capacity to work with and coordinate private sector partners, as well as state and federal governments, in a more streamlined and consistent manner. The local government is central to project delivery, because of their knowledge of the project context and their responsibility to operate and maintain the infrastructure asset after construction. For example, in the case of energy infrastructure, some projects are overbuilt for extreme redundancies instead of considering how household use of energy can be tapped and energy companies can “be in communication with energy users and can buy back from the users” (as one roundtable participant stated). Understanding the local context of these projects can be beneficial for better sensitizing communities to user fees for upgraded services and better maintaining infrastructure assets.

To accomplish all of this and facilitate partnerships with the private sector and government agencies at different levels, local governments need to build enhanced managerial capacity. Currently local governments have “little expertise within an area and don’t have exposure to alternative forms of project funding and finance,” but there is interest in expanding capacity so that local government can feel empowered to solve infrastructure delivery problems and work with private sector partners in a meaningful way. At the same time, by sharing in the rewards and risks of project outcomes, the local government should be knowledgeable about project delivery and development and identify a champion, eliminate environmental and political risks that could lead to early project termination, and provide context-specific knowledge that can improve project outcomes. Executive education, delivered online in a low-cost and scalable way, is one means to address the capacity shortfalls in local government agencies.

## **DE-RISKING AND STREAMLINING PROJECTS**

After projects are appropriately identified and selected, a number of pre-construction project activities take place. These include land acquisition (often provoking legal contestation), right-of-way permissions, permits and approvals, subsurface investigations, etc. These front-end, pre-construction activities often carry large risks.

To account for these risks, it is common practice for local government to allocate these risks and include the costs of preconstruction activities into the private sector's scope of project delivery. Local governments often lack internal financial resources, and in some cases expertise, to self-perform these front-end aspects of project development. Thus, the cost of front-end project development activities is rolled into the construction contract with significant risk premiums. As a result, developers must hedge against the long durations and potential delays of taking on front-end preconstruction work. One roundtable participant suggested that in a typical PPP infrastructure project as much as 40 (and even 50) percent of total project costs are in the front-end pre-construction activities.

One way to use capital more efficiently for infrastructure development is for local government to assess risks and de-risk projects prior to bidding. By doing this, local governments are able to assume those risks they are best suited to address (such as siting, permitting, and environmental approvals), and to hand off engineering, construction, operations, financial, and innovation risks to other stakeholders who are better suited to manage these risks. In doing so, front-end project de-risking (prior to project bidding), can increase the field of potential qualified designers/contractors, and reduce overall project costs and, hence, general funding requirements. One way to facilitate this is to create federal project planning grants that can pay for increased capacity for local governments to develop truly 'shovel-ready' projects (already de-risked) for more competitive bidding. Participants in the roundtable suggested: "planning grants can really catalyze a project to get it to go somewhere" and "Seeding with small amounts of money can go a long way." Planning grants could come from a revolving fund with grant repayment by local governments once the respective projects begin construction or operation. The federal government can also aid local government by offering guidance through the planning grant application process. This would be particularly useful for local governments with limited staff and experience in infrastructure development and provide local governments with best practices for selecting and hiring consultants, stakeholder engagement, etc.

Another way federal attention can directly support local infrastructure is by streamlining the project approval and permitting processes. Roundtable participants repeatedly emphasized the local nature of infrastructure, even as infrastructure development requires interaction with multiple state and federal agencies. Given multiple agency involvement and little clarity on authority, hierarchy, and process, it is difficult for project sponsors/developers to navigate the complex multi-agency, multi-level gauntlet of permitting and approvals efficiently. Currently approvals are often sought sequentially rather than simultaneously, which in addition to the aforementioned complexities, often leads to costly and unforeseen delays. Additionally, many of the costs and delays in permitting are the result of duplicative processes at the state and local level. It is unclear, for example, why nearly identical Environmental Impact Statements are required at both the federal and state levels. Federal leadership and action can simplify the process of approvals by (1) establishing clear lines of authority between agencies, and even legislatively consolidating approvals processes for environmental decisions (e.g. deferring to state regulators when certain minimum standards are met), (2) creating a 'road-map' between agencies to make permitting predictable and accountable, and (3) preempting local and state permits if the process takes longer than a fixed time period (6 months

was suggested by roundtable participants). It was noted that “even in complex projects, all permitting should be done in less than two years.” Federal action to reform the permit and approval process would reduce project costs related to delays, and expedite value realization of infrastructure assets to users by enabling state and local governments to de-risk the front end of infrastructure projects.

Finally, infrastructure projects face tremendous litigation risks. The United States generally grants much broader standing to parties seeking to use the courts to block projects they don’t like. Action to limit standing (at both the state and federal level) to parties with genuine interests at stake, with time limitations and transparency requirements for those filing lawsuits, would also streamline the process of infrastructure development.

### **ADOPTING PROCUREMENT MODELS AND INNOVATIONS**

All levels of government should focus on value creation by shifting the emphasis from infrastructure problems and costs to infrastructure benefits and long term value creation. This is particularly important when resource scarcity is coupled with infrastructure capacity deficits — the current US situation. Value creation is based on: (1) clearly understanding the needs of local stakeholders; (2) establishing metrics for selecting/developing appropriate infrastructure assets; and (3) evaluating infrastructure with objective performance measures over an asset's entire life-cycle. This life-cycle value creation perspective of infrastructure goes beyond the traditional infrastructure procurement models.

In traditional government-funded Design-Bid-Build (DBB) procurement, for example, local government (1) generally selects individual projects for development for which they can secure funding; (2) separates design and construction activities, with a period for contractors to bid for the cost of delivering an asset that conforms to the detailed, prescriptive design and specifications; and then (3) takes over operations and maintenance activities. Discontinuities across the different steps of procurement, and virtually no private sector funding considerations, prevent the traditional DBB model from capitalizing on innovations and efficiencies for financing, design, construction, and operations. Such fractured delivery models forgo the essence of life-cycle value considerations because of inability to link key stakeholders across infrastructure needs/planning through funding/financing, development, and throughout the entire operational life of the assets. However, when infrastructure assets are viewed in a ‘business case’ framework, with metrics such as job creation, revenue generation, increasing local competitiveness, etc. as criteria for asset development, then various private sector efficiencies make sense and can be leveraged.

To this end Design-Build (DB), Public-Private Partnerships (PPPs), and other alternative procurement models have demonstrated advantages by incentivizing stakeholders across the asset’s life-cycle, with the private sector entity's compensation based on the total cost of capital and operations, customer satisfaction, and asset utilization. This requires greater transparency from both local government and private developers, and more early inclusion of the broader network of stakeholders to identify metrics for success and to share performance data. If the local government can identify community needs and build strong consensus among various stakeholders, value creation is possible. This value creation presents an opportunity to have beneficiaries support and pay for that value.

When local government agencies obtain consensus on what stakeholders seek, the issue then turns to value capture. As noted earlier, both political parties support infrastructure development. However a nuanced goal conflict was explained at the roundtable. “Republican and Democratic groups want to do infrastructure. But, Republicans don’t want to release funds, and Democrats want to permit it to death. We need more than just public spending for infrastructure, but *value capture*.” Furthermore, it was noted that “we need to run infrastructure as a business and learn how to serve the customer better. Governance here is the marketplace, we actually need to deliver value or no one will use it [the infrastructure asset].” Therefore, assets with strong business cases and revenue generation potential revolve around the community’s support and ability to fund development effectively. This can happen in a variety of ways. The best known and most direct “beneficiary-pays” methods are tolls and similar types of user fees. In Colonial times, user fees funded ferries, canals, roads, railroads, etc.; and, user fees have once again become a more politically and socially viable option in the US. But, more recently tax incremental financing (TIF) has become a popular method for value capture. Because infrastructure assets increase surrounding land value, they inherently increase property value and thus increase tax revenues. Tax incremental financing captures the increased land value and corresponding property tax increases from real estate surrounding the development of new or enhanced infrastructure assets. This increase in tax revenue can directly fund or be bonded against infrastructure development.

Additionally, the private sector can engage effectively in delivering assets and capturing value by more efficiently delivering infrastructure assets through alternative procurement models. Aligning the local government’s well defined and broadly supported infrastructure asset needs with the private sector’s inherent focus on value capture has proven successful in multiple cases. For example, a recent Anacostia River restoration and development project utilized a PPP model. Project stakeholders were able to increase project scope and overall budget to add additional features valued by the public. Due to the strong alignments between public sponsors and their local community, and the public sponsor and private developers, the project was still completed and made available 1-year faster than originally planned. Once again, transparency was an important key. Private developers can pursue comprehensive procurement models such as design-build-finance-operate-maintain (DBFOM) PPP models (or similar alternative procurement models), and measure projects by performance metrics that are also disclosed publicly.

In some cases, critical infrastructure assets may not be supported by strong business cases. In these scenarios procurement models can emphasize bundling projects that have weak revenue generation potential with projects that have strong revenue generation potential. Private developers are thus incentivized to take on a portfolio of assets for development and deliver value capture benefits across assets. The new Long Beach Civic Center is a good recent example of this because the portfolio includes assets with direct revenue streams and others without direct revenue streams. Also, greater use of project bundling delivery models, particularly projects of similar scopes and geographic locations, can reduce transaction costs to local government and private developers. Moreover, as infrastructure assets leverage

some user-fees in their funding mechanisms, there is more potential to shift traditional public funding towards those projects with weak revenue potential.

## **CONCLUSIONS**

This paper provides a high level overview of areas in which a new federal infrastructure program invests in projects, and reforms and supports our institutions for developing and maintaining infrastructure. An integrated approach between government, industry, and academia is needed to implement these principles and translate them into policy and institutional reforms. Infrastructure investment is vital to our national economic growth, but policy and institutional reforms are needed in addition to increase federal, state, local and private sector spending. In sum, we see the following opportunities for reform and improvement by the federal government:

1. Focusing direct efforts effectively through regionally and nationally significant megaprojects that impact and involve multiple state and local governments.
2. Supporting local infrastructure with federal funds, credit enhancements and advisory capacity without prescribing specific projects. This will allow state and local governments to craft optimal project financing and funding plans, innovate, and compete for investment, because infrastructure is always going to be primarily a local endeavor.
3. Incentivizing a long-term perspective in infrastructure planning by assisting local government in procuring projects via long term concessions with user-supported and broader beneficiary-supported revenue streams, not just up-front capital costs.
4. Helping local governments to de-risk projects through project planning assistance including planning grants, thus making the deployment of local capital more efficient.
5. Reforming and streamlining the permitting processes and establishing clear lines of authority between agencies to minimize slow construction starts and the accompanying delay costs.
6. Assisting state and local agencies in implementing alternative procurement programs such as Public-Private Partnerships successfully by providing additional procurement support and enabling federal agencies to enter into alternative procurement contracts.

Infrastructure networks continue to be the center of our nation's economic, social, and environmental well-being, and major programs to increase federal infrastructure investment enjoy bipartisan support. But the US needs more than just additional spending to fix our infrastructure - institutional reforms can ensure public and private investments are placed in the most beneficial projects, efficiently, and that projects are supported and maintained for the long-term.

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