

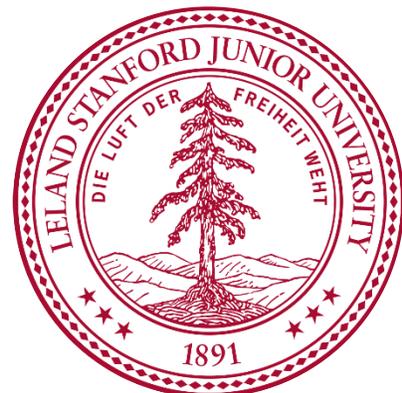
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US Federal Infrastructure Policy:

Opportunities for Change

Policy White Paper

The Stanford Global Project Center (GPC) is an interdisciplinary research center that studies infrastructure delivery and finance. The GPC studies major projects and investment programs around the world to develop policy recommendations and best practices for infrastructure investment and governance. Publications, news and perspectives at gpc.stanford.edu



Introduction

In the United States, support for infrastructure construction and rehabilitation remains a rare area of bipartisan agreement. 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. Bipartisan support is needed to revamp the federal infrastructure policy reform and improve the processes by which local, state, and federal level procure infrastructure assets. This white paper details how federal proposals overlap with recent GPC research areas, and specifically how federal infrastructure policies can (1) support local infrastructure without prescribing it, (2) reform stakeholder engagement, (3) improve contracting and delivery models, (4) apply long-term approaches for long-term projects, and (5) increase federal capacity to implement megaprojects of regional and national significance.

Supporting Local Infrastructure

Local and state governments play a critical role part in overseeing the nation's infrastructure assets. Local agencies are usually tasked with managing these assets, and local communities directly benefit from infrastructure investments. Even though local and state governments manage infrastructure assets, the federal government has historically played a large role in local and state infrastructure delivery. Because the benefits of infrastructure are primarily local, most of the funding (taxes and user fees) should also remain local and these projects should reflect local needs.

Prior to the 2010 ban on earmarks, Congress would choose "winning" infrastructure projects by channeling federal tax dollars to specific projects. Earmarks have been proven inefficient and are often considered unreliable means of paying for infrastructure delivery. The most infamous case of earmarked dollars occurred in 2006 when \$398 million of the federal budget was directed towards the Gravina Island Bridge in Ketchikan, Alaska (also known as the Bridge to Nowhere). The project has been cited as wasteful spending because of the large project costs and small beneficiary population (50 residents and



airport travelers) on Gravina Island who already had access to ferry transport between Gravina Island and Ketchikan. While an extreme case, other “Bridge to Nowhere” investment decisions have illustrated the need to design federal infrastructure programs that allocate resources to the most economically-beneficial projects.

To that end, the federal government should expand market-based initiatives that support projects based on financial viability and user demand, not political favorability. The Transportation Infrastructure Finance and Innovation Act (TIFIA) and Water Infrastructure Finance and Innovation Act (WIFIA), are two such programs. These programs provide flexible, federally supported loans to projects that are financially viable via local user fees or tax revenues. Additionally, as part of the TIFIA and WIFIA application process, state and local governments have to justify how infrastructure projects will improve local quality of life and create a positive economic impact for taxpayers.

Not all projects are sufficiently supported by a financially viable via user fees (tolls, passenger tickets, monthly billing). 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. In these cases, state and local governments can issue bonds, provide tax measures, and incorporate public subsidies (such as availability payments) to help repay loans.

Enabling Long-term Perspectives

Infrastructure projects require both significant initial investment and continual maintenance spending to prevent rapid deterioration. Because infrastructure investments have long time horizons, the process is naturally out of sync with term cycles for elected and appointed decision makers. For example, the I-4 Ultimate highway project in Florida has an initial budget of \$2.3 billion and a lifespan of 50 years. The decision to reconstruct the I-4 occurred in 2002, construction will be completed in 2021, and the operations and maintenance contract extends to 2052. During this period, there will be 13 local government election cycles and 50 state and federal budget cycles. When decision makers do not consider the infrastructure’s long time

Community Investment – Innovation at the State and Local Level

In the wake of reduced US federal spending for infrastructure, state and local governments are seeking innovative funding mechanisms to address their infrastructure needs. Recent policy initiatives at a federal level have unlocked community investment as an innovative funding mechanism. Community investment allows individuals who benefit from, or who are impacted by, an infrastructure project to donate to or invest equity/debt in the project. The benefits are twofold – the project gets both additional financing and community support.

State and local governments are experimenting with community investment models by using crowdfunding platforms. One model involves simple donations to support civic infrastructure projects, and this has been successful in cities with strong civic engagement. For example, Michigan’s statewide crowdfunding campaign allows community leaders to propose projects that are then funded via grants and individual donations. Other states have used community investment principles to repackage municipal bond offerings to make them more accessible to citizens. In Denver, Colorado the city’s office reduced their municipal bond offerings from \$3000 to \$500 to increase access for local retail investors (community members) to invest in their own local infrastructure projects.

horizon and make decisions based on shorter timelines, the resulting short-termism is detrimental. Firstly, decision makers could choose to defer infrastructure maintenance spending to fund other initiatives and close budget gaps for other programs. Secondly, decision makers could plan infrastructure projects based on only the project's up-front capital costs, leaving future officials to sort out how to pay for long-term operations and maintenance. In both cases, short-termism can lead to poor decision making and future infrastructure deterioration.

One way to ensure that a project has a long-term perspective is to require a lifecycle cost assessment. This is usually required when a project includes a revenue stream. When proposing to finance a project via revenue streams, there must be comprehensive

accounting of project design, construction, operations and maintenance costs. With a lifecycle cost assessment, operations and maintenance expenses cannot be ignored. Even when a project does not have direct revenue streams, a lifecycle cost assessment is an important part of considering design alternatives and ensuring a long-term perspective. Life-cycle cost assessments can also include more qualitative components that reflect the public's benefit of receiving the project, the expected economic growth from the project, and potential project risks.

Life-cycle procurement is another way to get around short-termism during infrastructure planning and delivery. With life-cycle procurement, projects are funded via a dedicated revenue stream, as opposed to just up-front capital costs. And, life-cycle procurement

Revenue Stream Appropriation for Infrastructure

Many infrastructure projects do not have an easily-packaged revenue stream like tolls, ticket sales, or user fees. State and local governments can still deliver them via life-cycle based procurement contracts with private investors by creating an Availability Payment for the project or, for some projects, supporting the project with Redevelopment Revenue.

Availability Payments: Availability Payments (APs) are simply regular payments to a contractor over the life of an infrastructure project to make it available to the public. APs are often supported by property or other taxes, and are always performance-based to link payments to actual project outcomes. The government starts making payments when the asset is first made available, after construction. Afterwards, the contractor receives regular payments over the planned life of the project only if it is well maintained and meets performance standards. Similarly, if an asset is not available for a period of time for any reason (for example, a train line closed for repairs) APs are reduced to compensate for the lost availability. This structure aligns the incentives of contractors to keep infrastructure in good working condition over the long-term.

Redevelopment Revenues: Redevelopment Revenues are another way governments can capture the benefits of new infrastructure to offset the costs of projects. Infrastructure projects often significantly impact property values in the area, and redevelopment revenues are a model that governments can use to leverage some of those gains against project costs. New transit hubs are a prime example, with economic benefits that increase property values in the surrounding areas. Increases in property values can be captured to offset project costs in several ways. Often, local governments can simply pass property tax increments based on projected appreciation from the project. For some life-cycle based procurements, governments can also include local property development opportunities in the infrastructure concession, thus increasing the value of the total procurement.

contracts require the contractor to not just construct the project, but also design, operate and maintain the project at a given standard. This model ensures maintenance costs cannot be deferred, and holds state and local governments accountable for those project costs from the beginning of project planning. Life-cycle procurement effectively “bundles” project components into a single contract with a contractor (otherwise known as the concessionaire), and in doing so can lead to other efficiencies. In a traditional construction contract, for example, a contractor is incentivized to build the project as cheaply as possible while still meeting the public sponsor’s technical specification. That isn’t the case under a life-cycle procurement. Since the contractor will be responsible for maintaining the project after it is built, the incentives are there to make smart investments during construction that minimize the life-cycle costs of the project.

Reforming Stakeholder Engagement

Large infrastructure projects involve many stakeholders, including various government agencies, contractors and consultants, and community members. But project stakeholder networks aren’t just complex, they also change

over the life of a project. On large projects with complex and dynamic stakeholder networks, stakeholders often have competing interests that can lead to conflicts and result in litigation, costly project delays, or even project cancellation. There is clearly an opportunity to reform stakeholder engagement and project regulations to help project sponsors better align stakeholder interests, mitigate conflict, and move projects from design to “shovel ready” more quickly.

One such reform would be to adjust the environmental study and approval process to identify and engage stakeholders earlier in the planning process. Current project studies and approvals involve an intricate (and sometimes opaque) process. Instead of soliciting input from stakeholders and the public during project planning and design, government agencies often only solicit input from stakeholders and the public once design is complete. This is when conflicts between stakeholders start to emerge. Engaging stakeholders prior to design completion could extend the preconstruction process, but it will result in better stakeholder relations, create alternative and innovative solutions, expand project accountability measures, and decrease project risks.

California High-Speed Rail – A Case of Stakeholder Conflict

The California high-speed rail project (CAHSR) is an example of a large infrastructure project with complex and dynamic stakeholder relations. While seemingly every complicated infrastructure project will have some number of opponents and supporters, the CAHSR garnered enough political support to make it through state legislation with an initial amount of funding. However, during project team selection and test track construction, lawsuits began. For example, multiple organizations, including the cities of Menlo Park and Atherton, filed suit for violations of federal legislation and environmental quality legislation, citing noise, safety, responsibility of costs, and design elements.

Instead of pursuing early and meaningful stakeholder engagement, stakeholder engagement consisted of limited political debate and a relatively small public education campaign. More extensive stakeholder engagement occurred after the project was conceptualization, fully funded, and construction began. Thus, initial stakeholder engagement was largely a process for removing obstacles, and included only a few of the stakeholders.

In addition to improving communications early in the development process, project approvals could be reformed to give a project greater certainty once key decisions are adequately studied and well communicated. Often when construction on a large project begins and it becomes more visible through media attention, new and previously unengaged stakeholders take notice. This can spark conflict and, in some cases, a re-litigation of issues already studied and addressed. Clearly a balance is needed, but reformed federal regulations could reduce costs and significantly

increase the speed of the development process by both improving stakeholder communications earlier in the design process and improving project certainty once decisions are studied and addressed.

Overhauling Procurement Models

Under traditional infrastructure procurement in the US, projects are selected by a public agency, contracted to an engineering firm for design, and then transferred to a construction company to

Alternative Procurement – Public-Private Partnerships

Public Private Partnerships (P3s) are an alternative procurement model in which a sponsoring agency contracts with a concessionaire for multiple infrastructure phases (such as design, construction, finance, and operations/maintenance). Because of the long-term nature of these contracts, P3 procurement models are more suited to larger, complex projects with capital expenditures of \$100 million or more. While the exact structure and terms differ from project to project, most P3 procurement models employ the following elements:

- **Procurement “Bundled” Across Phases:** Instead of hiring separate companies to design, construct, and then maintain a new infrastructure asset. P3 procurements hire a single concessionaire to be responsible for the project for the entire life cycle. This can lead to certain efficiencies and incentive alignment to reduce total life-cycle costs of a project.
- **Performance-Based Contracting:** Under traditional infrastructure procurement, the project sponsor (usually a government entity) specifies technical designs before hiring a concessionaire. With a P3 procurement, to the extent possible or desired by the project sponsor, contractual requirements are drafted on a performance-basis. This ensures that the constructor meets the sponsor’s needs but has technical and design flexibility.
- **Risk-Transfer:** A core component of a P3 is the transfer of risk to the private concessionaire. This is part of the reason P3s are often better suited for large, complex projects, which often entail a considerable amount of risk. Much of the P3 procurement process involves determining the specific risks (cost overrun, maintenance, and demand) and transfers that risk to the concessionaire.

If structured correctly and applied to the right projects, P3 procurements can create value by transferring risk to the private sector and ensuring project sponsors account for the full life-cycle costs of developing and maintaining a project from the outset. The use of P3s to procure large infrastructure projects has become increasingly prevalent in both developing and developed economies, but the delivery model has faced slower adoption in the United States. Unlike similar developed countries like Australia and Canada, infrastructure delivery in the United States has traditionally been provided by the government and has only recently adopted a user fee model that is a central component to many P3s. In the decades following WWII, the US federal government has played a much larger role in infrastructure investment than peer nations. As state and local governments in the US begin to take more responsibility for funding and developing local infrastructure, they are more likely to adopt sustainable or efficient procurement models (like P3s) where appropriate.

build. This model is efficient for infrastructure projects with relatively small size and low complexity. For larger, complex projects that involve many stakeholders and expose the public to considerable risk, alternative procurement models can better align stakeholder interests, more efficiently allocate risk, and increase cost savings. The US has significantly lagged behind other developed economies (such as the UK, Australia, and Canada) in adopting alternative procurement models for infrastructure delivery.

The range of procurement models for infrastructure, from design-bid-build to design-build-finance-operate-maintain (which includes public-private partnerships), can be customized to meet individual project demands. There is no one-size-fits-all approach to infrastructure delivery, but there are some project factors that can help identify particular procurement models that will yield better outcomes. For example, as technical complexity and scale increases, more stakeholders are impacted by the project and there are inherently more risks. Under these circumstances, using a “bundled” procurement

model (such as design-build-operate-maintain) can help mitigate risks. Other project factors that can influence the procurement model selection include the institutional maturity of the sponsoring agency, and whether the agency has completed similar projects in the past, available funding or revenue streams for the project, and natural environment constraints.

If project factors are not considered during the procurement selection process, it is possible to create competing priorities and interests among stakeholders. One strategy that limits adversarial stakeholder relations for complex projects is relational contracting. Relational contracts align stakeholder objectives by using contractual terms, where contracted stakeholders share in the risks and rewards of the project. One successful example of relational contracting is Integrated Project Delivery (IPD). Initially developed and used for healthcare projects in California, IPD has now been used on over one hundred commercial construction projects in North America. IPD creates a ‘project-based company’ where all of the contracted

Infrastructure Australia – De-politicizing Federal Infrastructure Priorities

Most would agree that federal priorities for infrastructure spending should be based on the projects that have the highest benefits for the national or regional economy at the lowest cost, as opposed to basing spending decisions on political compromises. For an example of a way to de-politicize federal infrastructure priority making, the US could look to Australia’s infrastructure prioritization program.

In 2008, Australia created Infrastructure Australia (IA) and later reorganized it in 2014. IA is an independent agency that is governed by a board of civic leaders from the public and private sector, as well as academia. In addition to infrastructure audits and policy recommendations, the agency publishes a rigorous priority list of projects for the federal government to invest in and manage. The agency also publishes its estimates of the regional and national economic benefits and the costs of developing and maintaining each project to justify where each project sits on its list of priorities.

IA’s priority list is updated quarterly, but isn’t necessarily the list of projects that the Australian Parliament chooses to invest in. In fact, the federal government simply publishes an explanation when it chooses to invest in a project that doesn’t align with IA’s priority list. IA also maintains and updates a rolling 15 year plan for the nation’s infrastructure stock.

This is one example of a program created to help de-politicize federal investment decisions in regionally significant infrastructure and provide an independent examination of federal investment priorities.

stakeholders agree to a single multi-firm contract called an integrated form of agreement. Then, the contracted stakeholders set a target project cost and make design and construction decisions to meet that project cost, and all of the firms share the profits (or losses) if they meet or go above their budget.

In the US, there are several federal reforms that can help state and local governments overcome the barriers to the adoption of alternative procurement models such as IPD and P3s. Adoption of alternative procurement models require different skill sets and competencies. Because alternative procurement models are often only used for fairly large-scale projects, state and local agencies often lack the experience or competencies to manage them effectively. The federal government provide additional support for existing programs to provide technical and procurement support for state and local agencies in the US. The federal government can also reform policies around infrastructure contracts to enable more federal agencies to participate in alternative procurement models, such as P3s. Current policies require budget scoring practices that prohibit agencies from being a part of P3 projects.

Federal Leadership for Megaprojects

There is an opportunity for the federal government to serve as a platform for creating knowledge and building capacity that state and local governments can leverage for more innovative models of infrastructure delivery. Currently, the Department of Transportation sponsors Centers of Excellence and offices that specialize in innovative projects. These entities aggregate industry best practices, standardize contracting models, and offer support for local and state officials. By increasing these types of federal initiatives, it is possible to offer state and local governments resources for:

- ▶ using alternative procurement models,
- ▶ effectively managing stakeholder networks,
- ▶ more aptly streamlining the permit process,
- ▶ leveraging technological advancements, and
- ▶ facilitating a shift towards a long-term lifecycle approach.

Even though most local and state sponsored projects are best supported (not prescribed) by federal initiatives, the federal government has an additional responsibility to help develop megaprojects. Megaprojects are large projects that span multiple states and/or impact multiple states and the national economy. These are not only complex in their technical scale, but also in their governance. Most cross state lines or require the involvement of many federal, state, and local agencies. Often there is no clear authority to allocate costs, benefits and responsibility. These are problems that can really only be addressed through federal support and direct involvement.

In the years following the Great Depression, megaprojects helped spur the economy and increase quality of life. The Tennessee Valley Authority (TVA) 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 building dams and reservoirs that would provide electricity and control flooding within the Tennessee Valley for decades. This project would simply not have been possible without the initiative and leadership of the federal government. Federal management of megaprojects is not only necessary because of their scale and complexity, though. Megaprojects also enable the federal government to implement and model principles for successful infrastructure delivery. These are the projects that should be the focus of a federal program to directly invest in national infrastructure.

Conclusion

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 federal spending. In sum, we see opportunities for reform and improvement along the following thematic areas:

1. Infrastructure will always be a primarily local endeavor. Washington can support local infrastructure without prescribing specific projects. This will allow state and local governments to craft optimal investment plans, innovate, and compete for investment.
2. Federal policy should incentivize a long-term perspective in infrastructure planning by procuring projects via revenue stream, not just up-front capital costs.
3. Stakeholder engagement and project approvals can be improved by improving engagement in early project planning and increasing certainty once key decisions are adequately studied and resolved.
4. Federal policy can assist 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.
5. The federal government can focus direct efforts effectively through regionally and nationally significant megaprojects.

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 new federal funding is invested in the most beneficial projects, is invested efficiently, and that the projects it supports are maintained for the long-term.

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