THE PUBLIC-PRIVATE-PARTNERSHIP (P3) MODEL AS A TOOL FOR BUILDING AND RETROFITTING INFRASTRUCTURE FOR SUSTAINABILITY AND RESILIENCY IN THE U.S.

ABSTRACT: On the path towards a more sustainable world, investing in green and resilient infrastructure is essential. Various actors have acknowledged the P3 model for its potential to foster sustainable development, particularly from the perspective of project inception, bidding criteria, and construction management of new infrastructure. However, as it relates to existing infrastructure, the challenge is identifying areas of opportunity for sustainability in retrofits in a cost-effective and timely manner. This paper demonstrates how the P3 contract model is suitable to respond to the sustainability needs of new and existing infrastructure and provides examples of how U.S. P3 parties are undertaking climate change mitigation projects (e.g. Fargo-Moorhead flood diversion), integrating Environmental, Social and Governance (ESG) considerations in retrofitting projects (e.g. Washington DC Streetlight) and in operating assets (e.g. Port of Miami Tunnel).

METHODOLOGY: Literature Review and Interviews. This study utilized publicly available information, including research papers, reports, media articles, and websites to demonstrate how private investment in infrastructure can produce beneficial results for the owner, the private sector, and society. Key Informant Interviews were developed to discern proxies, key facts, and identify typical practices and trends in the P3 industry related to sustainability and ESG.

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EXECUTIVE SUMMARY

Climate change, social equity, and the need to upgrade aging infrastructure and invest in resilient and climate-adaptation solutions are among the most concerning challenges the U.S. is currently facing. These challenges are intimately related since the infrastructure gap profoundly impacts environmental and social conditions1. Likewise, climate change poses a variety of threats to infrastructure that differ from region to region and require geographically targeted solutions of multidisciplinary nature2.

Under this context, the understanding and definition of infrastructure have evolved to include not only traditional infrastructure (i.e. roads, bridges, ports, flood diversion, etc.) but also other project categories that reflect long-term commitments to address climate change, clean air, and water, and smart-city infrastructure, among other areas. The U.S. faces funding gaps in both traditional and new categories of infrastructure3 due to issues related to longstanding trends of underinvestment combined with worsening budget constraints that limit the local government’s ability to improve existing and construct new infrastructure4.

In recognition of these issues, the U.S. Federal Administration has committed to climate goals and passed economic stimulus plans with unprecedented investments in infrastructure, many of which are also aimed at addressing climate change and social equality concerns, providing an opportunity for local governments to undertake new projects or improve existing assets and take advantage of the private sector expertise to deliver sustainable solutions. Likewise, this is also an opportunity for private companies to do business while meeting environmental, social, and governance (ESG) goals.

The P3 model - a small but growing segment of U.S. public infrastructure financing accounting for only about 1-2% of infrastructure spending5- represents an alternative for delivering complex projects and ensuring their long-term performance. The P3 framework contains the foundation for the implementation of sustainable strategies (i.e. environmental impacts’ minimization and social benefits’ maximization) and converges with the current sustainability needs of infrastructure (i.e. long-term approach, project-specific solutions, innovation potential, Stakeholder-focus).

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4 Chao, A. and Farrier, J., “Public–Private Partnerships for Environmental, Social, and Governance Projects”, 102
Further to its financing feature, the value that the P3 model brings to projects is evidenced in relevant examples such as the Fargo-Moorhead flood diversion, a climate change mitigation project in which the P3 model allows for an accelerated and cost-effective delivery (10 years sooner, $330 million less) than if it was delivered under a traditional method; the Washington DC Streetlight project, a smart-city initiative to converting the streetlights to LED technology improving the District's sustainability (50% less of energy consumption and 38,000 tons of greenhouse gas (GHG) emissions eliminated each year) and installing wireless access points (WAPs) to enable a more widespread Wi-Fi connection in disadvantaged communities (239 WAPs in Wards where ~35% of households do not have internet service) and, the Port of Miami Tunnel, an economic opportunity project that improved the quality of life of downtown Miami residents by reducing traffic congestion and related emissions (diverting around 16,000 vehicles of daily traffic and removing 80% of the truck traffic), allowed for economic development (during construction 85% of workforce was local; diversity matched the area demographics; 36% of the investment ($320 million) was spent locally, and 50% of businesses involved were local) and boosted the operations and competitiveness of the port while also mitigating risks related to sea level rise and climate change and nowadays, with ongoing operations, is undertaking energy conservation initiatives.

In any case, the P3 model is far from perfect and there are challenges that need to be addressed in seeking sustainability. Accordingly, the model needs to improve and better accommodate the flexibility that these changing times require; this paper identifies such instances and suggests strategies to address them. Although reaching sustainability may be aspirational, there are opportunities for the P3 model to realize its potential and expand further.

1. Public-Private Partnership (P3) explained
   1.1. Definition

There is no single, internationally accepted definition of P3. The term is commonly used to describe several types of arrangements between public and private entities. Because this paper is aimed at demonstrating the link between high capital investment and strong performance commitments that go beyond an entity's best efforts towards a certain goal, the definitions by the World Bank and the United States (U.S.) Department of Transportation’s Federal Highway Administration (FHWA) will be utilized.

The World Bank defines Public-Private Partnership as “a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance”. In the context of U.S. infrastructure projects, the FHWA defines a P3 procurement as “procurement of a long-term contract for multiple elements that may include development (design and construction), operation and/or maintenance of a facility that involves a
From this perspective, management contracts, affermage contracts (i.e. contracts under which a government delegates management of a public service to a private company in return for a specified fee), design-build or turnkey contracts, and financial lease contracts are not included within this definition.

The P3 delivery model has been used in a wide range of sectors to procure different kinds of assets and services. P3 projects may consist of new or existing assets, projects in which the private party is paid entirely by service users, or in which a government agency makes some or all payments. In all cases, the P3 project contributes to the provision of public assets or services; and it involves long-life assets linked to the long-term nature of the P3 contract.

The fundament of the P3 model is that, although the functions transferred to the private party may vary from contract to contract, the private party is accountable for project performance and bears significant risk and management responsibility. The mantra of a P3 is to allocate each risk to the party that can best manage and handle it. Thus, the risk transfer to the private party is not the ultimate objective but a method for assigning management responsibility and for aligning public and private interests.

The P3 model for project delivery is intended to provide high-quality, cost-effective, reliable, and timely service at an affordable price. The success of this model depends on a good relationship between the public agency and the private entity, supplemented by a well-defined dispute resolution mechanism that, when conflicts arise, can help to provide a clear path for escalating and resolving them, leaving formal arbitration as the last resource.

Projects that are fundamentally difficult and complex, atypical for the owner/public party, or that require a skill set outside of its core mission, are often candidates for P3 project delivery. These types of projects tend to be the riskiest and most challenging to deliver on-time and on-budget if traditionally procured.

In the U.S. market, there is no minimum or maximum investment threshold for a project to be considered for a P3 delivery, however, due to the complexity of P3 agreements and the high transaction costs associated with procuring and managing a P3 project, the US DOT P3 Delivery Options Screening Checklist states that, generally, a project which cost exceeds $100 million is suitable for delivery via P3.

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10 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 10, 11
11 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 1, 7, 12
12 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 10-11
1.2. Features

The typical defining features of P3 contracts are further detailed as follows:

a) **Typology**: consisting of either new assets to be built ("greenfield projects") or existing assets transferred to a private company for rehabilitating/upgrading and managing them ("brownfield projects"). In either case, the assets or services provided are specified in terms of outputs rather than inputs- defining what is required rather than how it is to be done\(^{16}\).

b) **Scope**: a P3 contract bundles together multiple project phases or functions for which the private party is responsible such as Design (D), Build (B) or Rehabilitate (R), Finance (F), Maintain (M), and Operate (O)\(^{17}\). Thus, P3s may be structured as a design-build-finance (DBF), design-build-finance-maintain (DBFM), design-build-finance-operate-maintain (DBFOM), or any other delivery method that combines design, construction, operations, or maintenance functions with a private finance component\(^{18}\). For the provision of these services, the private party typically creates a dedicated company - a Special Purpose Vehicle (SPV or P3 company)- which allows for the segregation of all assets and liabilities related to the private delivery of services\(^{19}\).

c) **Contract Term**: the project type and policy considerations are the most important factors for determining the P3 contract's length. Most P3 projects present a contractual term between 20 and 30 years; others have shorter terms; and a few last longer than 30 years. Policymakers need to satisfy themselves that the demand for the services delivered by the project will be sustained over the whole life of the contract; the private party should be able to accept responsibility for service delivery over its term; and the procuring authority should be able to commit to the project for its term. The long-term investment horizon of P3s can help ensure that assets are maintained in a good, serviceable condition. The “whole-life” approach (i.e. considering whole-life costs and whole-life benefits) is essential in P3s; the contract term should always be long enough for the private party to have the incentive to integrate the service delivery considerations into the design phase of the project, including maintenance considerations and handback specifications (i.e. required assets conditions to be met by the end of the contract), in such a way that the trade-offs between initial capital investment and future O&M costs be optimized. Additionally, the availability of finance and its conditions may also influence the term of the P3 contract\(^{20}\); in all cases, the contract term must be long enough to allow projected revenues/payments to fund the repayment of debt plus a reasonable return on capital\(^{21}\). It is also important to highlight that in many cases, the contract term is subject to the applicable law, and statutory or constitutional limitations\(^{22}\).

d) **Payment mechanism** (Paymech): The private party can be paid by collecting fees from service users, by the government, or by a combination of the two—with the common, defining characteristic

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\(^{16}\) “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 6

\(^{17}\) “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 6


\(^{19}\) “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 8

\(^{20}\) “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 6, 30


\(^{22}\) “Successful Practices for P3s”, US DOT, 10
that payment is contingent on performance. From the public agency perspective, ensuring that the private partner meets its contracted level of performance requires three main components: (i) contractual criteria; (ii) a monitoring system, and (iii) financial incentives - all three should function together as a system. Typically, paymechs include penalty points, which can lead to payment deductions or retentions; sustained significant deviations from the intended performance levels should lead to increased oversight, remedial work by the public agency at the private party’s expense, and even suspension or contract cancellation, with termination payments designed so that quitting the project is never an easy solution for the private party. Additionally, paymechs can provide incentives to comply with contractual specifications, aligning the interests of the private and public parties as well as other stakeholders - aligning performance incentives through a payment mechanism has proved successful in P3s.23, 24

e) Contractual structure: Figure 1 shows the typical P3 contractual structure. The public party is the Government Contracting Authority; the Private Party is the Project Company or SPV, and the other entities are Stakeholders.

![Figure 1 – Typical P3 Structure (World Bank Group, 2017)](image)

The Project Company is often a newly created project-specific limited liability company (LLC) set up by Equity Investors for undertaking the project. Because LLCs are generally not well-capitalized, the public party may require guarantees from the LLC members (i.e. Equity Partners) or their parent companies. The Project Company will typically enter into major subcontracts for design-build services, acquisition of vehicles (if applicable in a transit project), and O&M services. The private party is supported by a team of multidisciplinary advisors (e.g. financial, legal, and technical, among others), and lenders (which engage also their own advisors).26

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23 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 6-8
24 “Successful Practices for P3s”, US DOT, 56, 60
25 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 41
1.3. Advantages and constraints

- **Access to capital:** One of the primary motivations for a P3 procurement is the ability to use private capital to implement much-needed projects in the absence (or delayed availability) of adequate public funding and/or future project revenues.

Although the terms funding and financing are often used analogously, there is a technical distinction that is important to understand. Financing refers to “Money required at project outset to begin implementation, primarily for asset construction” and funding refers to “Money required to meet repayment obligations and remunerate the project financiers, namely debt and equity holders.” Hence, it is important to highlight that “P3s do not provide project funding, they provide project financing—borrowed money that must be reimbursed, at a profit, to the lender,” therefore, P3 projects must include a reliable revenue stream.

Under the right circumstances, P3s can mobilize additional sources of funding and financing, for instance, by optimizing user fees or adding revenue streams (e.g. raising revenues from alternative uses of the infrastructure, or customizing the project to maximize utilization). In other words, “Innovative financing models can access new sources of borrowing and allow leveraging of public funds. But they don’t create new funding sources per se. P3s are a financing solution chasing a funding problem.”

While public funding may still be part of the plan of finance for the project (e.g. most U.S. P3 highway projects involve some level of public funding support), private equity and financing serve as critical sources to bridge gaps in available funding, enabling a project to be implemented and the resulting benefits to be realized sooner rather than later. In some cases, reducing the amount of private capital investment may also reduce the extent of risk transfer to the point where the alignment of incentives is insufficient to be effective; they may present fiscal costs or risks that the government is not willing to bear; they may exacerbate any political risk or risk of adverse government behavior; or making it easier for private entities to abandon the project if things go wrong. Nevertheless, the relevant reasons why governments may choose to provide finance for P3s include: avoiding excessive risk premiums charged by the private sector; mitigating the government risk of default (if this is assessed high by the private markets); improving bankability and lower the cost of the project; improving availability or reducing the cost of finance.

Public sector investment in infrastructure is funded through government-levied taxes and user fees, or through public borrowing (i.e. debt that must be repaid with interest with public funds generated by future tax or fee collections). The U.S. public finance industry employs long-dated, tax-exempt debt to meet a large part of the capital-raising needs of governments and non-profit agencies.

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28 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 21
31 Reinhardt, W., “The Role of Private Investment in Meeting U.S. Transportation Infrastructure Needs”, ARTBA-TDF, 9
33 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 49, 53
compared to the interest rates on the taxable debt used in P3s, there is a cost-of-capital advantage of 1% to 2% conferred on state and local borrowers by federal tax rules\textsuperscript{34}. Some of that advantage can be offset when P3s access special federal financing instruments that help to level the playing field. However, to further compete with the low cost of public borrowing, P3 projects must be closely managed to control expenses, meet schedules, deliver life-cycle cost savings, and foster efficiency gains, those benefits should outweigh the additional cost of private finance\textsuperscript{35, 36}.

P3s are financed using a blend of debt and equity under non-recourse project finance, this means that lenders can be paid only from the project company’s revenues without demanding compensation (beyond its equity contribution) from the private party. That is, the project company’s obligations are ring-fenced from those of the equity investors, and the debt is secured on the cash flows of the project. Project finance structures typically involve a large proportion of debt (ranging 70-95% of total finance) while the rest is covered by the private party’s equity investment. From the equity investors’ perspective, this helps manage risk by limiting exposure to a project, allowing them to undertake much larger projects than would otherwise be the case (or more projects). For lenders, this requires undertaking rigorous due diligence, focusing on the project cash flow and the contractual structure\textsuperscript{37}.

The ability of a project to raise financing is often called bankability, this means that a project can attract not only private equity finance but also the required amount of debt. For a project to be bankable, lenders need to be confident that the project company can service the debt. Under a project finance structure, this means operating cash flows need to be high enough to cover debt service plus an acceptable margin. It also means that the risk of variation to the cash flows must be highly likely to stay within the margin. Lenders therefore carefully assess project risks, and how these risks have been allocated between the parties to the contract. If too much risk has been allocated to the private party, lenders will reduce the amount they are prepared to lend until the margin of cash flow over debt service is acceptable. When this happens, more equity will be needed. At the same time, the project company needs to be expected to generate high enough returns to compensate the private party (equity holders) for their level of risk\textsuperscript{38}.

- **Risk Allocation:** The P3 model provides a mechanism to contractually allocate risks to the entity best suited to manage and mitigate them over an extended term that may include a post-construction O&M period\textsuperscript{39}.

Risks retained by the public party typically carry substantial and unvalued hidden costs, thus, allocating some risks to the private party, if it can better manage them, can reduce the project’s cost

\textsuperscript{34} Reinhardt, W. “The Role of Private Investment in Meeting U.S. Transportation Infrastructure Needs”, ARTBA-TDF, 9
\textsuperscript{35} Reinhardt, W. “The Role of Private Investment in Meeting U.S. Transportation Infrastructure Needs”, ARTBA-TDF, 10
\textsuperscript{36} “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 16
\textsuperscript{37} “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 41
\textsuperscript{38} “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 45
and minimize the risk to taxpayers\(^{40}\). Efficient and effective risk assessment and allocation are key for a successful P3 project. Ideally, the project risk assessment must begin well before the project delivery method is decided to allow for a more accurate business case analysis and serve as a parameter to determine and optimize project delivery alternatives. Should a P3 delivery method be decided, the risk assessment will assist in structuring the P3 contract ensuring that the risks are transferred to (or retained by) the party in the best position to handle them.

Typically, the P3 procurement process allows for the public party to (i) consider, evaluate, and seek industry feedback on major risks associated with the project, in greater detail than in the case of traditional procurement, and (ii) consider measures they can implement during the pre-award period to mitigate post-award risk. For instance, throughout the procurement process, the private party could find that bidders may be willing to take on additional risk in exchange for a greater reward or that undertaking additional preliminary studies (e.g. geotechnical testing) and making results available may get bidders comfortable enough to take certain risks. Risk allocation decisions often rely on the use of performance incentives as well as consideration of the private party’s responsibilities for project financing\(^{41}\).

- **Opportunities for innovation:** One of the major benefits of P3 delivery is that it offers significant opportunities for innovation by specifying outputs in a contract rather than prescribing inputs, allowing the private party the flexibility to develop efficient methods to meet specifications and achieve project goals which combined with incentives align both the private’s interests with the public interest\(^{42}\), \(^{43}\).

Output-based or functional performance specifications facilitate innovative solutions better than input-based or detailed performance specifications\(^{44}\), \(^{45}\). Across the P3 procurement process and while developing the contract documents, the public party should offer opportunities for innovation to the private party. By focusing on performance requirements, the public party allows private sector proposers to use their experience to develop potential alternatives that can meet project requirements and serve to protect the public party from inadvertently retaining risks or liabilities that may originate from prescriptive requirements\(^{46}\).

In this regard, it is a standard practice in U.S. P3 procurements to allow the development of Alternative Technical Concepts (ATC) and/or Alternative Financial Concepts. According to the FHWA, ATCs are: “A request by a proposer to modify a contract requirement, specifically for that proposer’s use in gaining competitive benefit during the bidding or proposal process… [and] must provide a solution that is equal to or better than the owner’s base design requirements in the invitation for bid (IFB for DBB) or request for proposal (RFP for DB) document”\(^{47}\). The private party’s primary reasons for allowing ATCs are: (i) to encourage

\(^{40}\) “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 18


\(^{43}\) “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 18

\(^{44}\) “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 18

\(^{45}\) “Successful Practices for P3s”, US DOT, 56, 57


innovation; (ii) to obtain Competitive Pricing for Innovations and, (iii) to reduce the public party’s Risk for Defective Design\(^48\).

Likewise, Alternative Financial Concepts are similarly structured to the ATCs and provide a mechanism to allow private sector proposers to submit for pre-approval, on a confidential basis, for financial concepts that deviate from the RFP requirements. The process is intended to allow bidders to incorporate financial innovation and creativity into their proposals\(^49\).

- **Environmental Impacts and Mitigation:** The process and compliance with environmental requirements for P3 projects are the same as for non-P3 projects\(^50\), however, because P3s are generally complex in nature, it is likely that these require most extensive reviews and community input\(^51\).

As part of the environmental review process typically the project sponsor (State or local agency) conducts early studies to identify the general environmental conditions, potential socio-economic issues, and other considerations involved in a proposed project and, in coordination with other applicable agencies, initiates the environmental review process required by the National Environmental Policy Act (NEPA)\(^52\). NEPA is a comprehensive law intended to protect the environment which requires all federal infrastructure and energy projects to undergo an environmental assessment (EA) and environmental impact study (EIS) for a project to be completed\(^53\). The NEPA process is designed to inform the public and decision-makers of the environmental and related consequences of the project as well as delineate the specific mitigation measures that become conditions for its approval\(^54\).

Because of the complexity of P3 projects, it is not uncommon that EIS are required. Under the EIS, all reasonable alternatives to the project are assessed and the selected solution is justified consistently with any environmental laws. This process incorporates public consultations and comment periods from other affected agencies and interested stakeholders that should be addressed - this includes comments on both the natural and human environment. The EIS also documents agency compliance with a myriad of other Federal applicable laws such as the Clean Water Act, the National Historic Preservation Act; the Endangered Species Act, and Environmental Justice considerations, among others\(^55\). In most EISs, completion of the Record Of Decision (ROD) is considered acceptance of the general project location and concepts but the project is generally described in

\(^{53}\) American Conservation Coalition. “NEPA Modernization 101.” C3 Solutions, n.d. Retrieved on 04/03/2023 from https://www.c3solutions.org/policy-paper/nepa-modernization-101/#text=The%20National%20Environmental%20Policy%20Act%20%7E%7E%28NEPA%7E%7E29%20is%20a%20law%20that%20requires%20the%20agency%20to%20consider%20all%20environmental%20impacts%20before%20proceeding%20with%20a%20project%20in%20order%20for%20the%20project%20to%20be%20completed.  
broad terms, giving the private party certain flexibility in the design of a new facility, however, any major changes post-NEPA may be subject to additional analyses and re-evaluation. According to a study developed by the U.S Council on Environmental Quality (CEQ) in 2018, a NEPA’s review process takes an average of 4.5 years and $4.2 million to complete. Advocates looking to streamline the process argue that NEPA slows down the process to deliver clean energy and infrastructure projects.

- **Service delivery and whole-life performance:** One of the key advantages of a P3 procurement structure is that it enables the public party to focus on desired performance outcomes of the asset to maximize public benefit while letting the private entity determine the most efficient means to achieve those outcomes.

The whole life performance of the asset is inherent to the P3s’ nature (i.e. design and construction with ongoing service delivery, operation, maintenance and refurbishment under the responsibility of one single party) which incentivizes the private party to complete each project phase (D, B, F, O&M) in a way that minimizes total costs and maximizes efficiency. Contractually, this is structured through the private party’s upfront fixed-price commitment (i.e. whole-of-life cost) which strengthens budgetary predictability over the life of the infrastructure, reducing the risks of funds not being available for maintenance after the project is constructed.

Furthermore, continuous performance is enforceable by tying Key Performance Indicators (KPIs) (i.e. metrics of performance) and output-based specifications to the private party’s revenue under the P3 contract. KPIs and output-based specifications describe the asset’s performance expectations and define what is needed to accomplish the objectives of the project. Thus, these should be tailored to project-specific circumstances and reflect public and community objectives. By establishing requirements based on the performance of the project, the public party transfers risks to the private party while providing measurable metrics to gauge performance. For instance, by incorporating performance requirements to be met during operations and specifying the asset’s conditions to be met upon handback, the public party ensures that the private party is incentivized to make the project perform over an extended period, both during the initial development phase and the ultimate operations phase.

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58 American Conservation Coalition. “NEPA Modernization 101.” C3 Solutions
60 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 18
61 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 18
62 “Successful Practices for P3s”, US DOT, 56, 57
• **Project Suitability:** Not every project is suited for a P3 delivery. Typically, P3s are best suited for large and complex projects with a high probability of strong revenue generation over many years.\(^{64}\)

According to the FHWA, the following project characteristics indicate the suitability of a project for P3 delivery:

- The project has strong political support
- There are opportunities for significant economies of scale
- Project involves significant interfaces with existing facilities or other planned projects
- Project complexity can better be managed through performance requirements than through regulated methods
- Expedited delivery will benefit the public and can be facilitated through innovative delivery methods
- There are opportunities for innovation in any aspect of DBFOM
- Project is unusual, technically challenging, complex and/or very large, and may therefore benefit from innovation
- Private investment would fulfill a critical financial need to advance and/or complete the project
- Significant Federal, State and/or local resources, which may include rights-of-way or air rights, are available to leverage with private investment
- Project is conducive to significant private investment
- Project is revenue positive, enabling access to new private capital to deliver other projects
- Project is consistent with State and local capital plans and has strong local support
- Project can benefit from risk transfer to the private sector
- If the agency is interested in an availability payment structure, the agency has access to revenues and financial strength sufficient to support the payments.

In determining suitability, the agency should be mindful of the ability of the project to attract financing and equity investor interest.\(^{65}\)

In the process of assessing P3 suitability for a project, it is a best practice for the public party to develop a business case analysis regarding the project scope, size, and complexity to determine whether a P3 delivers the best value to the public. In some cases, it may be readily apparent that P3 delivery is not appropriate for a particular project despite the existence of some of the above characteristics. For major projects, U.S. Federal law requires the agency to assess in its financial plan whether a P3 would be appropriate to deliver the project. The business case study typically includes a Value for Money (VfM) analysis comparing ways to deliver a project to determine which project delivery approach is most likely to meet the requirements and objectives for the lowest cost over the project’s life. VfM analyses typically rely on a “public sector comparator” (i.e. project life-cycle estimate of the cost of traditional project delivery plus the public party O&M costs) and either a “shadow bid” or actual bid to assist in assessing the pros and cons of a range of traditional and P3 delivery methods.

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\(^{64}\) Reinhardt, W. “The Role of Private Investment in Meeting U.S. Transportation Infrastructure Needs”, ARTBA-TDF, 10

delivery methods. A VfM analysis is a potential requirement if receiving Federal assistance. The business case can also be used as a tool in seeking political support and stakeholder consensus.

While the federal government can encourage private investment in infrastructure through favorable tax treatments and supplementary loans, typically P3 transportation projects are contracted with state and local governments or authorities. Therefore, analysis of State and local laws affecting the use of a P3 model is a crucial first step for considering using the P3 as a tool for project delivery. If the public party (i.e. the agency undertaking the procurement) does not have explicit P3 authority, it must determine whether it has the ability to proceed with a P3 procurement under existing legislative authority. The public party should also consider whether applicable laws (including case law as well as statutes, ordinances, and regulations) represent issues for a P3 that could be resolved through the legislative process.

In conclusion, although the P3 model can assist public parties to undertake large-scale complex projects through private participation, the public party may be exposed to unnecessary risk and costs if the contract is not structured correctly. Moreover, the fiscal costs and contractual inflexibility of P3s can exacerbate this situation. These limitations mean that P3s are not a panacea or a remedy for all infrastructure performance problems but a tool that the public sector should have available when considering ways to deliver major infrastructure.

1.3. Stakeholders

Because of their long-term and complex nature, P3 projects typically involve a great number of stakeholders within the public, the private and the civic sectors of society. The civic sector includes the infrastructure’s users, special interest groups and affected municipal governments, among others. Some of the stakeholders participate or influence the project in a particular phase and others remain for the entire term of the contract and the dominant stakeholder (i.e. the main influencer in the project and among stakeholders) varies across the P3 lifecycle phases. P3 stakeholders interact among each other formally via chains of interdependent transactions (e.g. contractual relationship between public and private parties), and informally through various associations (e.g. civic sector’s loose association with other sectors), across multiple phases of the project under high levels of uncertainty and risk. Stakeholders are dynamic (i.e. have different levels of power, legitimacy and urgency change across the P3 contract term) and often their goals do not align with one another, and in some cases are opposite. These factors lead to extreme governance challenges, therefore the identification, engagement, and management of P3 stakeholders are critical for the success of the project.

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69 “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 17
The private sector’s companies involved in P3 contracts are interdisciplinary and bring varied and extensive experience in managing projects. Thus, the inclusion of national, international as well as local companies is usual\textsuperscript{72}. Typical equity investors may be project developers, engineering or construction companies, infrastructure management companies, and private equity funds. Lenders to P3 projects include commercial banks, financial institutions, and institutional investors. The project company subcontracts firms to manage design and construction and O&M providers (on occasions these contractors may be affiliated with equity investors)\textsuperscript{73}. In many instances, all these companies receive support from consultants, suppliers, and other subcontractors and deal with labor unions, professional associations, and other third parties.

In contrast, public agencies may have limited experience with the delivery of certain types of projects (i.e. large, complex, and/or fast-paced projects that need financing) or be subject to staff constraints affecting their ability to effectively manage high-cost projects. Therefore, retaining advisors with P3 transaction experience is an established practice\textsuperscript{74}. Furthermore, almost every P3 project involves multiple Federal, local, and State-level government agencies with a stake in the project as well as policymakers and a number of additional third parties that somehow interfere with the project development such as affected utility owners, private landowners, the local community, the general public, among other third parties\textsuperscript{75}.

The appropriate management of third parties is the responsibility of both the public and the private party, depending on the nature of the stakeholder and the phase of the project, but the major and primary responsibility of identifying them falls within the public party’s scope as the entity implementing the P3 project\textsuperscript{76}.

Identifying stakeholders that may be affected by the project or have the ability to directly influence the project (e.g. end-users, homeowners, certain professionals, affected local community groups) is as critical as identifying those that have interests in the project but are not affected by it geospatially (e.g. political parties, trade unions, chambers of commerce, think tanks, community leaders, professional associations, or local and international civil society organization). Upon completing the identification and analysis of interests, the public party should then map key influencers and formulate context-specific engagement strategies for each of them in each phase of the project. In this process, finding the right level of public involvement can enrich the legitimacy of the P3 as a procurement tool, and contribute to good governance of the project\textsuperscript{77}.

The Appendix provides an example of the stakeholders involved in a typical U.S P3 transportation project delineating the phases where their participation has a major influence on the project.

\textsuperscript{73} “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 40
\textsuperscript{74} Smith, N. et al, “Public-Private Partnership (P3) Procurement: A Guide for Public Owners”, FHWA, 2, 3, 30
\textsuperscript{76} South, A., “STAKEHOLDER NETWORK DYNAMICS AND THE GOVERNANCE OF PUBLIC-PRIVATE PARTNERSHIPS”, 33, 38, 51
\textsuperscript{77} “PUBLIC-PRIVATE PARTNERSHIPS Reference Guide”, World Bank Group, 98-100
2. Sustainability and the P3 model

Sustainability is a comprehensive concept with multiple elements and is dependent upon a strong economy, inclusive society, and sound environment\(^78\). The U.S. is currently facing challenges associated with climate change, social inequalities, and infrastructure gaps. These challenges may sound distinct in nature but are closely interrelated since infrastructure profoundly impacts environmental and social conditions and, conversely, climate change poses a variety of threats to infrastructure\(^79\).

Consequently, there is a need to build resilient infrastructure, capable of “bending but not breaking, and recovering in what will likely be increasingly daunting conditions”\(^80\). Building structures that can adapt to climate change and resist its extremes will require innovation not only for designing and constructing new physical structures but also for developing the technology components required for adequate performance (e.g. sensors that indicate the current state of a structure, that could inform about strained conditions or could predict potential failures). Innovation will also play a role in mitigating the extent of climate change; the net-zero carbon goals will require many creative engineering achievements in carbon sequestration, direct carbon capture, and integrating renewables into the electrical grid, among other areas\(^81\).

For effectively tackling these challenges and responding to them with a sustainable approach, planning infrastructure enhancements emphasizing environmental impact minimization and social benefits maximization is necessary. To this effect, public entities should initiate infrastructure projects to improve climate resiliency, environmental justice, and economic opportunities and take advantage of the current Federal Administration’s climate change and economic stimulus plans. Similarly, the current infrastructure gap provides an opportunity for private entities to contribute with their unique set of capabilities and expertise and participate in projects that provide sustainable solutions while also meeting their long-term environmental, social, and governance (ESG) goals formulated to respond to its fiduciary responsibility\(^82\).

Even though the accomplishment of sustainability may be aspirational, the P3 model has the potential to respond to the needs of large-scale infrastructure projects in a sustainable manner. The following sections describe the motivations and convergences that serve this purpose.

2.1. Drivers and influences towards sustainability

Sustainability considerations are becoming imperative in practically every economic activity in the U.S. and infrastructure development is not an exception. Consequently, to a greater or lesser extent,


\(^79\) Chao, A. and Farrier, J., “Public–Private Partnerships for Environmental, Social, and Governance Projects”, 102


\(^82\) Chao, A. and Farrier, J., “Public–Private Partnerships for Environmental, Social, and Governance Projects”, 102, 103
P3 industry players are under a transformation process to become more sustainable. Some of the main large-scale drivers that are influencing this transformation are listed below:

- **Pledges and climate goals**

The global consensus that human-made climate change poses a very severe threat to development and inclusive growth in the medium and long term has mobilized countries to join treaties like the Paris Agreement (aiming to keep the global temperature increase to well below 2°C) and make commitments consistent with the United Nations Sustainable Development Goals (SDGs) (aimed at eliminating poverty and provide a better life for all with a strong and inclusive growth) have been also drivers in policy setting around the world. The U.S. committed to the SDG Goals 2030 adopted by United Nations in 2015 -while participation is voluntary and countries can address the SDGs that are most relevant and viable to them, there is a reporting and review process to check individual progress and maintain accountability. Also, the U.S. is part of The Group of Twenty (G20), “the premier forum for international economic cooperation which plays an important role in shaping and strengthening global architecture and governance on all major international economic issues” - since the G20 countries are contributors of roughly 80% of global energy and carbon dioxide (CO2) emissions, they are under pressure to implementing climate policy. Likewise, in 2021 the U.S. re-joined the Paris Climate Agreement, and the current Federal Administration under President Biden has issued plans to address climate change and social inequity. The country intends to reduce U.S. greenhouse gas (GHG) emissions by approximately 50% before 2030 (compared to 2005 levels) and achieve carbon neutrality by 2050.

Since 60% of global GHG emissions are attributed to energy and transport infrastructure designed to accommodate the fossil fuel economy and every dollar invested in infrastructure returns almost four times that amount in economic benefits, it makes sense that governments’ initiatives center around infrastructure. It should also be noted that there are 17 SDGs associated with infrastructure, which include Affordable and Clean Energy (SDG 7), Industry, Innovation, and Infrastructure (SDG 9), Sustainable Cities and Communities (SDG 11), and Climate Action (SDG 13). Ultimately, building better, smarter, and more sustainable infrastructure will allow countries to leverage innovation and continuously strengthen their National Determined Contributions (NDCs) (i.e. efforts to reduce national emissions and adapt to the impacts of climate change) in the next decade as required by the Paris Agreement, therefore, this triggers a sense of urgency and, in

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84 Chao, A. and Farrier, J., “Public–Private Partnerships for Environmental, Social, and Governance Projects”, 103


86 Bak, C., et. Al., “Toward a Comprehensive Approach to Climate Policy, Sustainable Infrastructure and Finance”, 1


88 Bak, C., et. Al., “Toward a Comprehensive Approach to Climate Policy, Sustainable Infrastructure and Finance”, 3

89 Chao, A. and Farrier, J., “Public–Private Partnerships for Environmental, Social, and Governance Projects”, 103

90 Bak, C., et. Al., “Toward a Comprehensive Approach to Climate Policy, Sustainable Infrastructure and Finance”, 3
addition to governments, private companies are also joining efforts (see Corporate ESG section below).

• **Relevant regulation and subsidies in the US**

To address climate change, social inequalities, and infrastructure needs, the U.S. Federal Administration has adopted important regulations and economic stimulus plans such as:

- The Infrastructure Investment and Jobs Act (IIJA) (also known as the “Bipartisan Infrastructure Law”) enacted in 2021 includes around $550 billion in new federal investment in roads and bridges, transit, water infrastructure, resiliency, internet, clean energy transmission, transportation electrification and related EV infrastructure and more. Most funds are designated for Federal highway programs with $350 billion of investments over a five-year period (fiscal years 2022 through 2026) which is distributed to States based on formulas specified in Federal law while also providing funding to state and local governments through a wide range of competitive grant programs (approximately $80 billion in grant opportunities predominately in the areas of cybersecurity, rail, and safety over the next five years). The law also designates substantial investment in EV charging aiming at forming a nationwide network of 500,000 EV chargers by 2030 that ensures a convenient, affordable, reliable, and equitable charging experience for all users. In this regard, the $5 billion National Electric Vehicle Infrastructure (NEVI) Formula Program will provide dedicated funding to States to strategically deploy EV charging infrastructure and establish an interconnected network to facilitate data collection, access, and reliability. Initially, funding under this program is directed to designated Alternative Fuel Corridors for electric vehicles to build out this national network, particularly along the Interstate Highway System. When the national network is fully built out, funding may be used on any public road or in other publicly accessible locations.

- The Inflation Reduction Act (IRA) signed into law in 2022 is considered the most significant action Congress has taken on clean energy and climate change in the nation’s history. IRA builds on the foundational climate and clean energy actions established in IIJA and includes $370 billion in investments to lower energy costs for families and small businesses, accelerate nationwide private investment in clean energy solutions in every sector of the economy, strengthen supply chains for everything from critical minerals to efficient electric appliances, and create good-paying jobs and new economic opportunities for workers. As part of this program, various initiatives aimed at addressing social inequalities were created, for instance, clean energy tax incentives are envisioned for projects located in economically distressed communities or traditional energy communities and for projects that meet requirements to pay

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93 Renner and Nulton, “2022 Public-Private Partnership Trends Report”, 2, 3

the prevailing wage and hire qualified registered apprentices. Moreover, the law also will advance
the President’s Justice40 Initiative, which commits to delivering 40% of the overall benefits of
climate, clean energy, and related federal investments to communities that are marginalized,
overburdened by pollution, and underserved by infrastructure and other basic services. The law
is also directed at ensuring that investments facilitate state and local contracting opportunities
for underserved small businesses. Further, grants for technical assistance for measuring,
reporting, and reducing embodied carbon and GHG emissions associated with the production,
use, and disposal of construction materials and products (steel, concrete, asphalt, and glass) are
considered.

The U.S. Department of Energy (DOE) estimates that the clean energy provisions of the IRA and
IIJA could collectively reduce emissions by more than 1,000 million metric tons of CO$_2$ in 2030,
this is equal to the combined annual emissions released from every home in the country$^{95,96}$.

Although the IIJA nor IRA did not make leveraging private capital a focus, the programs have the
potential to increase in P3s. This is because traditional infrastructure programs are set to receive
significantly more funding thus agencies will be able to develop a pipeline, but its staff is expected to
stretch given the number of projects in the pipeline and P3s may become more attractive as a way to
share more project risks and responsibilities with private partners. Also, given that the IIJA requires
projects with a value over $750 million that seek financing from federal programs to undergo a
Value for Money analysis (i.e. implying consideration to life-cycle costs) it is likely that a P3 solution
is considered. It is also worth noting the increased grants to local governments to build capacity to
identify, analyze, and plan potential P3 projects$^{97}$.

- **Climate reporting**

Another driver influencing the adoption of sustainable initiatives refers to disclosing and reporting
practices as investors have begun to see the financial risks associated with ESG performance and
demand information to evaluate a company’s value, risk, and long-term potential. Although
reporting risks does not necessarily imply an obligation to mitigate, disclosures of organizational
performance data (financial and now environmental disclosure) have long-term impacts on
corporate governance due to the internal organizational capacity that must be developed to manage
reporting and the potential scrutiny underperforming companies would be subject to by investors
and/or stakeholders. Thus, corporate managers will need to pay greater attention to the impact of
their company on people and the planet and likely set and meet meaningful ESG goals. In return,
ESG action and reporting can benefit businesses by assisting in the identification of new

$^{95}$ The White House, “Inflation Reduction Act Guidebook”.

$^{96}$ US EPA, “Inflation Reduction Act Programs to Fight Climate Change by Reducing Embodied Greenhouse Gas
Emissions of Construction Materials and Products”, US Government, April 10, 2023, Accessed 4/12/2023,

$^{97}$ Kline, S. “Five Reasons P3s Could See Big Growth Under the Bipartisan Infrastructure Bill”
opportunities and vulnerabilities, providing a competitive edge by getting ahead of regulations, improving employee retention and consumer loyalty, and controlling brand image.\textsuperscript{98, 99}

The European Union (EU) rules require large companies and listed companies to publish regular reports about the social and environmental risks they face, and about how their activities impact people and the environment. Early in 2023 the EU legislation, the Corporate Sustainability Reporting Directive (CSRD), entered into force modernizing and strengthening ESG reporting. A broader set of large companies, as well as listed SMEs, will now be required to report on sustainability (approximately 50,000 companies in total). The new rules will ensure that investors and other stakeholders have access to the information they need to assess investment risks arising from climate change and other sustainability issues. The rules will also create a culture of transparency about the impact of companies on people and the environment.\textsuperscript{100}

In the US it seems imminent that the Security and Exchange Commission (SEC) imposes regulation on listed companies to disclose standardized climate data;\textsuperscript{101} this would require reporting risks that are reasonably likely to have a material impact on the company’s business, results of operations, or financial condition, as well as information about its direct GHG emissions (Scope 1), its indirect emissions from purchased electricity or other forms of energy (Scope 2) and emissions from its value chain (Scope 3).\textsuperscript{102, 103} Despite controversy and complexity, it is almost certain that the SEC rule be promulgated this year - this means that disclosures that were once voluntary and ill-defined will soon be mandatory and specific.\textsuperscript{104, 105}

- **Insurance price and availability risk**

While no individual natural catastrophe can be directly attributed to climate change, extreme changes in temperature patterns create conditions that are more conducive to escalating the frequency and

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\textsuperscript{99} Chao and Farrier, “Public–Private Partnerships for Environmental, Social, and Governance Projects”, 109, 110.


\textsuperscript{101} Cohen, S., “The Growing Awareness and Prominence of Environmental Sustainability”.


\textsuperscript{103} A Managing Director at JLL, a global real estate services company, points out that “there is a debate about the [upcoming] SEC ruling [for company disclosures] regarding the potential double counting of renewable energy production for effects of [tax] credits. Also, the “SEC’s scope 3 requirement is complicated because it involves a mindset change for accounting for externalities [by companies]”. Interview by author, March 15, 2023.

\textsuperscript{104} Cohen, Steven. “The Growing Awareness and Prominence of Environmental Sustainability”

\textsuperscript{105} A Director at KPMG commented that in the construction industry “conversations around sustainability are emerging due to forthcoming [SEC] regulations and while the Federal government is incentivizing the adoption of sustainability initiatives, more progressive States are regulating”, adding that “now federal contractors need to disclose S1 and 2 emissions and intentions to decarbonize DOTs infrastructure - both highway portion and building portion – seems to be arising but slowly”. Interview by author, February 16, 2023.
severity of extreme weather-related events, globally. After a disaster or climate shock hits, insurers are essential players to make sure infrastructure is rebuilt in a low-carbon and climate-resilient way.

These events (e.g. wildfires in the US, record heat waves in Europe, or floods in Japan) have intensified climate change insurance risk and placed the insurance industry in the spotlight. With losses mounting, insurers can no longer avoid or postpone addressing the impact of changing climate on their underwriting, pricing, and investment decisions. Finding a balance between ensuring affordability and availability and managing financial stability may get tougher for insurers if extreme weather conditions continue to escalate therefore inaction should not be an option. As an industry whose core business is managing risk, (re)insurers are uniquely positioned to be able to create forward-thinking incentives and innovative products that can go a long way toward mitigating climate risk. Insurers have an opportunity to bridge the knowledge gap about climate change risk across both the underwriting and assets sides of their own industry and work towards ensuring exposure to climate risks is embedded into investment decisions. These instances are critical considerations in infrastructure planning and development, especially in times of substantial investments\(^\text{106}\), \(^\text{107}\).

Because climate disasters cost the US over $165 billion in 2022\(^\text{108}\), US regulators and lawmakers are watching the implications of climate-related risks very carefully and are becoming increasingly concerned about the insurance industry’s response to climate-change-related events. This could shift the government’s approach to allocating disaster management funds since currently 88% are allocated towards post-event response with only 13% allotted to pre-event risk reduction and prevention - this process is not sustainable, and the insurance industry is a powerful player to help shift this narrative for society, not only as a responsible sector but also with a view to secure the viability of its own business model\(^\text{109}\).

- **Corporate ESG**

ESG refers to factors related to environmental, social, and governance aspects by which an organization’s performance, risk, and values may be evaluated; these factors are ultimately interrelated since corporate governance directs a company’s environmental impacts which then contribute to local social impacts\(^\text{110}\). The effects of the COVID-19 pandemic and major climate


\(^{110}\) Chao, A. and Farrier, J., “Public–Private Partnerships for Environmental, Social, and Governance Projects”, 104
events have increased the private sector’s focus on health and sustainability and, consequently, ESG considerations in corporate policies and strategies are being adopted (or amplified) in every industry\(^\text{111}\). By either voluntarily adopting sustainable practices or positioning themselves to comply with upcoming regulations, corporations are moving from a simple measure of corporate responsibility to an investment proposition, given that studies show there is a financial risk implied in case of ESG underperformance and a correlation between a strong ESG proposition and higher equity returns\(^\text{112, 113}\).

Accordingly, companies are increasingly implementing a strategy, policies and/or programs around ESG (e.g. out of 1250 companies surveyed by NAVEX Global in 2020, 88% of publicly traded companies, 79% of venture and private equity-backed companies, and 67% of privately-owned companies had ESG initiatives in place\(^\text{114}\)); setting ESG goals, measuring results and impacts, and disclosing and reporting (e.g. as per S&P, in 2019 80% of the world’s largest companies reported exposure to physical or market transition risks associated with climate change, and a similar share is engaging in reducing corporate emissions); and forming industry alliances pledging to climate goals (e.g. in 2019 the U.N. introduced the Asset Owners Net Zero Alliance, a group of asset managers overseeing a collective $2.4 trillion that have pledged to align their portfolios to meet net-zero greenhouse-gas emissions by 2050, and the Principles for Responsible Banking in which one-third of the world’s banking sector -that is, 130 banks holding $47 trillion in assets- signed on commitments to plan for climate risks and environmental challenges in driving sustainable economies\(^\text{115}\)). Some companies are also becoming vocal advocates for sustainability, promoting best practices and even requesting their supply chain comply with certain minimum sustainability standards (e.g. the “Big Three” asset managers BlackRock, Vanguard and State Street\(^\text{116}\)).

Although it is clear that Europe is ahead of the US on formal ESG programs, studies suggest that the US may be catching up (e.g. NAVEX’s survey results indicate that 67% of respondents in the US and the U.K. said their companies would increase their focus on ESG factors in 2021, compared to 62% in France and 58% in Germany)\(^\text{117}\).


\(^{115}\) Mattison, R., “Accounting for Climate: The Next Frontier in ESG”.


\(^{117}\) NAVEX Inc. “Global Survey Finds Businesses Increasing ESG Commitments, Spending”. 
2.2. Convergences between Sustainability and the P3 model in the US

The relevant convergences between the P3 framework and current infrastructure needs around sustainability are as follows:

- P3s can cover a diverse and negotiable variety of projects ranging from improvements in existing infrastructure (e.g. roads, bridges, dams, etc.) to investments in renewable energy infrastructure, urban greening and remediation solutions which are critical in reducing contributions to climate change, improving climate resiliency and advancing environmental justice\(^{118}\);
- P3 contracts are project-specific, thus, the level of detail of sustainability/ ESG provisions in the contract can be adjusted depending on the range of aspects covered by other means within the applicable legal framework. Contracts can be tailored to project-specific circumstances, and respond to concerns that are specific to the local environment and the communities affected by the project\(^{119}\);
- P3s’ long-term horizon suits the extended duration of sustainability strategies since such impacts are envisioned to be achieved in the long-term;
- P3s can leverage private funding and expertise to develop innovative and sustainable infrastructure\(^{120}\);
- P3s’ innovation potential can be advanced to develop resilient infrastructure and building structures that can adapt to climate change and tolerate its extremes as well as implementing strategies to mitigating the extent of climate change\(^{121}\);
- P3s can facilitate the inclusion of Stakeholders’ concerns in the project development process, this is particularly important because the harmful impacts of climate change are not being distributed equally, thus, including the voices of people from disproportionately affected locations in discussions about responses to climate change, as well as strengthening education for the future generations so that can be part of the discussions and the solutions when they grow up\(^{122}\).

Additionally, it is worth noting that the P3 model already contains the foundation for the implementation of sustainable strategies aimed at achieving ESG objectives. Some relevant instances are as follows:

- In large-scale P3s the substantial environmental review process needed for obtaining the necessary approvals, permits and federal lending and grants ensures the minimization of negative environmental impacts and the inclusion of key stakeholders’ views in the selection

\(^{118}\) Chao, A. and Farrier, J., “Public–Private Partnerships for Environmental, Social, and Governance Projects”, 103

\(^{119}\) Brauch, M. D., “Contracts for Sustainable Infrastructure: Ensuring the Economic, Social and Environmental Co-Benefits of Infrastructure Investment Projects”, 6

\(^{120}\) Chao, A. and Farrier, J., “Public–Private Partnerships for Environmental, Social, and Governance Projects”, 103


of the project solution (see section 1.3. Advantages and constraints, Environmental Impacts and Mitigation).

- Addressing stakeholders’ concerns is a best practice in P3s. Typically during the project development phase the project sponsor, which manages the communications with and among stakeholders, develops a public outreach plan implementing several instances for the local community and key stakeholders to get involved by providing their views on the project and even taking advantage of opportunities to participate in the project delivery. On the latter, it is notable that contractual requirements may be imposed on the private party to integrate local and Disadvantaged Business Enterprise (DBE)’s participation in the construction of the infrastructure and subsequent operational period. DBEs include Small Disadvantage Business (SDB), Minorities Business Enterprise (MBE), Women-owned Business Enterprises (WBE). Subject to the applicable law and agency and project goals, the DBE participation targets can be contractual requirements and/or good efforts and may include a separate goal addressing a race-neutral projection or a race-concious projection - these targets also depend on the Federal Funding involved, EPA statutes and may vary across the project’s stages (e.g. targets for construction may differ to those for operation period). These measures while primarily aimed at ensuring public support for the project, can also positively impact the social fabric of the local community and promote social equity, and although not exclusive, these are already very well established in P3 procurements.

- Also, addressing Safety considerations is a key aspect in P3 deals (especially in facilities that include complex structures): a Safety Plan and strategy may be required as part of the concept design, and a Project Management Plan (PMP) -including a comprehensive description of safety measures they will take during construction and operation of the facility including life safety response issues as part of their preliminary O&M plans- should be required to the private party. In P3 contracts, Safety should also form a part of the performance requirements.

Furthermore, the public and private actors participating in the DBFOM scope of a P3 are subject to pressures and influences for adopting sustainability practices (see section 2.1) and the industries to which they belong are already immersed in sustainability-related trends. For instance, although currently there is no universal approach for ESG in construction and development it is true that the industry has had some sustainability-oriented initiatives in its repertoire for years, in any case, new practices, programs, and metrics are emerging.

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124 “Successful Practices for P3s”, US DOT, 34
127 “Successful Practices for P3s”, US DOT, 34
129 According to a Vice President, Design Services at MTA, the NYC metropolitan transportation authority, “being in code is not enough; the MTA has used sustainable best practices -such as LEED or Envision- over the last 20 years” Interview by author, March 6, 2023.
The applicable ESG matters and metrics typically change depending on the nature of the P3 project (e.g., a new build versus retrofit), the stage of the project (e.g., design versus construction versus operation and maintenance), and whether it is the producers, or the product being considered (e.g., the team running the project versus the materials involved). However, some commonalities among projects’ ESG priorities are observed; these primarily refer to energy efficiency/consumption reduction, reduction of waste and water, and annual emissions footprint. Although these measures are aimed at reducing the operational carbon of assets, recently, attention is being given to reducing the embodied carbon (i.e. emissions from construction material extraction, manufacturing, transportation, and construction processes) by putting greater focus on the use of sustainable materials (e.g. recycled materials, Mass Timber) and management of the impact of their use on the environment (e.g. low-carbon concrete production). In the US the main industry initiatives influencing and certifying environmentally focused construction and operations are (i) Leadership in Energy and Environmental Design or LEED (used for green building rating) and, (ii) ENVISION (sustainability rating for civil infrastructure assets).

Another example is the project finance industry. For financial institutions, ESG considerations make sense because sustainable operations are linked with better economic performance. Banks are therefore concerned not only with their own ESG footprint and compliance in light of the new regulations but also with the ESG risks and opportunities they are facing as a lender. Combined stakeholder-led factors such as the broad societal interest in better outcomes, lender efforts to create a more sustainable portfolio, demand for investors to support sustainability, and ESG commitments made by investors, have caused a rise in the number of sustainable debt instruments over the last few years (i.e. according to BloombergNEF, more than US$1.6 trillion in sustainable debt instruments were issued in 2021). For instance, labeled as green, social, sustainability-linked or ESG lending (among other names), bonds and loans are issued presuming some sort of connection with sustainability outcomes- typically tying the margin to the borrower’s achievement of predetermined sustainability targets; if the targets are met, the borrower receives a small discount on its loan pricing, and if not met, there is often a premium added. This niche market is currently under a process of

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130 A Senior Project Manager at NYSERDA, indicated that “NYSERDA’s recent focus in embodied carbon is due to advocates asking for solving the emissions problem by taking care of products used in new buildings and better rehabilitating existing buildings. There is no regulation yet for embodied carbon in buildings in NY State, however, a wave of regulation may be coming, it has started with some regulation of low-embodied carbon concrete for new public projects”. Interview by author, March 6, 2023. 


standardization and regulation but given the large influence of stakeholder-led factors, it is expected that sustainability and ESG keep shaping lending practices. Likewise, P3 investors are becoming more conscious and increasingly integrating ESG commitments into their corporate policy (see section 2.1 Corporate ESG); undertaking exclusionary screening practices and targeting investments with a maximized impact perspective.

2.3. Emerging Challenges and Opportunities

While P3s represent an alternative for sustainably delivering complex infrastructure, the P3 model need to improve and adapt to better accommodate the flexibility that these changing times demand. This section of the paper aims to identify those areas of improvement and actions needed to further advance the model toward impact creation.

- **Allowing for more flexibility**

The urgency to address climate change requires a more proactive attitude from both the public and private sectors and the contracts need to include more flexibility to ease and encourage the inclusion of components to achieve sustainability goals. Therefore, it is necessary to move on from precedent project development practices and develop infrastructure strategies that integrate key concepts, such as the protection of biodiversity, circularity, and respect for human rights. These concepts (and their financial considerations) should be embedded throughout the infrastructure lifecycle and across the investment chain, including the government, investors, lenders, project developers, and the supply chain. The focus should be placed on mandating that meaningful stakeholder engagement is at the heart of the development of new infrastructure – for example, seeking collaboration on just transition plans with workers and communities reliant on the fossil fuel sector, or ensuring the equitable participation of indigenous groups and/or disadvantaged communities.

For seeking-sustainability-P3s to thrive in a changing environment, the public and private parties should collaborate much sooner in the planning process and considerations to a Progressive P3 procurement (i.e. a variation of a P3 where the private partner is selected based on qualifications and collaborates earlier in the project solution development allowing for a more expedite and transparent process than regular P3s) should be considered for “projects that need to move quickly but require more scope

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A SVP at EY, a firm that provides financial consultancy services to public and private sectors, said that “some developers and investors are more conscious to pursue projects aligned to ESG goals”. To this effect, a Business Development Manager at Meridiam, an infrastructure investor, mentioned that “focus on sustainability and making a positive impact for people and the planet is at Meridiam’s mission... our new funds are dedicated to supporting small business involved in a transition economy, urban resilient infrastructure, and waste & water projects”. Similarly, an SVP at Plenary Americas commented that “sustainability is planned since the beginning of the projects, our experience shows that it has an impact in NPV and make the projects more competitive, that is why it is part of our strategy... we have an exclusionary investment policy for gas or fossil-fuel related projects and one of its sustainability goals is to prove the most benefit to the community the projects are at.. all buildings in the portfolio have LEED certification of some type”. Interviews by author, February 16, 9, and 13, 2023 (respectively).

Principles of Responsible Investment. “Policy Briefing: Sustainable Infrastructure”, 5
definition, exploration of various alternatives, environmental/entitlement permitting, and/or significant stakeholder input in the design, or that are at risk for major changes during the procurement, are well suited to progressive procurements."137

- **Aligning interests to a long-term view**

Too often, there is a lack of alignment between different stakeholders on what, and how, sustainability goals are to be prioritized and achieved. Upfront cost concerns or restrained operating budgets are often seen as an obstacle to embedding strong sustainability outcomes in infrastructure assets. These short-term views blur the vision to a long-term approach upon which sustainability and P3s are based, it is also important to keep in mind that investments over the full infrastructure lifecycle can lead to better long-term financial outcomes138. In this regard, it is critical that while considering integrating sustainable solutions and ESG initiatives in a P3, the public party verifies the return value for money through side-by-side tests139, assigning economic value to the sustainability benefits (or damages) implied in each of the alternatives140.

In addition to new projects, there is a need to also integrate sustainability strategies into existing P3s that did not consider them in the first place due to either, recent technology advancements that were unknown at the time of award or new needs (or risks) the project developed pots-award due to climate change, or ESG strategies/goals. The challenge basically resides in the budget-constrained status that the fixed-price contract entails. Thus, the contract provisions would dictate the mechanism to apply depending on the nature of the change or risk involved in the initiative. For instance, if the initiative responds to voluntary changes by the public sector or to a change in law, generally, the public sector is liable for covering such associated costs; while if the initiative is borne by the private sector, this is liable to cover the costs but needs the approval of the private sector anyways141. Consequently, given that there is no financial incentive, typically neither of the parties is interested in pursuing a voluntary initiative. Fortunately, there are some exceptions when sustainability initiatives are indeed cost-effective, for instance, conversion of lighting to LED technology results in energy savings in the long term so, there is a financial incentive to undertake this type of change in operating projects.

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139 Bak, C., et. Al., “Toward a Comprehensive Approach to Climate Policy, Sustainable Infrastructure and Finance”, 5

140 A Managing Director of Advisory at KPMG, a consultancy firm providing financial consultancy services to public and private sectors, says that “cost-effectiveness is key in the analysis of implementing sustainable components to projects as their clients’ affordability limits may be constrained. LEED standards or energy targets may improve as a result of sustainable alternatives [in a project] but there is the need to run the numbers to know the lifecycle payback, an example is the case for green cement or biofuels” Interview by author, February 16, 2023.

For sustainable initiatives that do not result cost-effective and require an investment to mitigate the associated risks, public and private parties must align on how they consider and price risk. The P3 parties should not only collaborate in an end-to-end risk-managements process in the planning and structuring phase, but to apply and continuously develop those processes through the project lifecycle, these results useful when implementing initiatives to address sustainability related risks is necessary. In this process, the public sector should not seek to transfer all the risks to the private sector and expect it to manage them for free, nor the private sector should charge an excessive premium for managing risks. Both parties need to work together to find the optimal level of risk transfer to the private sector and benefit the project from the public sector’s ability to take a long-term view and ability to absorb risks without fear of bankruptcy.

- Battling Complacency

Because the P3 model already provides some basis to provide sustainable outcomes in a project, the parties often tend to stick to current practices and ignore (or avoid seeking) opportunities to further minimize environmental impacts beyond what the review process establishes while also may miss opportunities to maximize the social impacts outside what the law (or project goal) requires.

From an Environmental standpoint, while the NEPA process provides the parties with relative comfort in the assessment of project sustainability, there is a risk of the parties falling into complacency and do not seek to implement additional sustainable practices into projects. A related threat is a potential discouragement to the use of alternatives looking to optimize the project (e.g. ATCs) if they imply a revisit to the NEPA documents as this may infer a delay in the schedule of the project. Likewise, the use of very prescriptive technical requirements (in lieu of performance requirements) may disincentivize bidders to implement additional sustainable project components. Consequently, it is necessary that governments implement measures to incentivize grantors (i.e. public party) to go beyond the established environmental review practices; this can be done through the setting of climate or sustainability goals for agencies, conditioning subsidies based on impact, and requiring the agencies to identify and account for the value of sustainability factors in the project by its inclusion in cost estimations and Value for Money analysis.

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143 Brauch, M. D., “Contracts for Sustainable Infrastructure: Ensuring the Economic, Social and Environmental Co-Benefits of Infrastructure Investment Projects.”, 7

144 A Vice President of National Program Delivery at HNTB (an engineering firm leader in P3 technical advisory to public sector agencies), indicates that “in the civil engineering field, DOTs typically do not have sustainability at the top of their agenda nor are particularly engaged in implementing major sustainability initiatives beyond of what is stipulated in the NEPA documents...and although DOTs are open to consider additional sustainable solutions as part of the projects, those are not mandatory, for instance, some DOTs are including specifications that allow for the use of recycled construction materials, mainly when they are economically advantageous, however this is not a requirement but an authorization”. Interview by author, March 30, 2023.

145 A Vice President at Plenary (an infrastructure fund as asset manager) who led the DC Streetlight project during the procurement stage commented that “the project scope and requirements were very specific so there was no flexibility from the client to deviate”. Interview by author, March 10, 2023.
From a Social standpoint, while P3 contracts typically include provisions for the private party to integrate local and DBE participation in the delivery of the infrastructure, these provisions must be enforced and become obligations rather than best efforts. Further, project labor agreements (PLA), also known as community workforce agreements (i.e. pre-hiring agreements negotiated by unions and contractors to set terms and conditions of employment) should be further encouraged or even mandatory, and community benefits agreement (CBA) (i.e. voluntary agreements undertaken by developers to support the local community) should be legally bound, extend across all project phases and be part of incentives offered by the public party.\(^{146, 147}\)

- **Facing macroeconomics**

While the IIJA and IRA represent probably the most notable developments for the infrastructure investment field in decades, the new laws are being implemented against an unpredictable backdrop of economic, financial, and geopolitical factors. For the first time in a generation, inflation rates have soared, and the supply chain challenges that emerged during the pandemic have yet to be resolved. This situation is exacerbated by labor and equipment shortages and geopolitical tensions. Thus, although available funding for projects will inevitably rise, so too will input costs, at least in the short-to-intermediate term.\(^{148}\)

For instance, the inflation in construction materials rose to 23.1% in 2021\(^{149}\) and 14.1% in 2022 and remains volatile in 2023\(^{150}\); this has had a major effect on the construction industry and consequently on the P3 pipeline as public agencies focus on short-term budgets control rather than long-term sustainability.\(^{151}\)

Additionally, the interest rate rise in the US is challenging the economics of P3s given that its private financing component may compromise cost-competitiveness against an available publicly financed alternative, thus, new P3s are compelled to reinforce their advantages and prove their added-value.

- **Opportunities**

Despite the challenges, the nation’s commitment to solve the infrastructure problems is producing opportunities for private investments for traditional infrastructure (i.e. roads, bridges, ports, flood diversion, etc.) but also for other types of projects aimed to address climate change, clean air and

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\(^{146}\) Renner and Nulton, “2022 Public-Private Partnership Trends Report”, 12, 13  
\(^{147}\) Renner and Nulton, “2022 Public-Private Partnership Trends Report”, 13  
\(^{151}\) A VP at HNTB stated that “At this moment, DOTs are concerned with construction costs because the inflation in the construction industry has increased project costs up to 30% or even 50% from the original budget, and they are just desperate to deliver something”. Interview by author, March 30, 2023.
water, and smart-city infrastructure, among other areas\textsuperscript{152}. The potential opportunities for P3s linked to sustainability/ESG outcomes are identified as follows:

Investments in traditional infrastructure addressing environmental considerations and fostering economic growth have been typical over the last few years. P3s such as the Port of Miami Tunnel (see case study in section 3.3) have demonstrated the private sector’s ability to contribute to sustainable development, support the local economy and improve the quality of life of residents. In instances where these types of accomplishments could be replicated, P3s may emerge\textsuperscript{153}.

Although debatable, another example is the use of P3s for managed lanes projects, these refer to “highway facilities or a set of lanes in which operational strategies are implemented and managed (in real-time) in response to changing conditions”\textsuperscript{154} and that claim to be a sustainable strategy for traffic flow and safety, given that these allow for increasing a road section’s capacity without making significant infrastructural interventions, minimizing the economic and environmental impact. Whether these are the most sustainable solution for mobility is questionable, but the point is that traffic time reduction decreases emissions and improves the quality of life of users. These types of deals are expected to be a continuing opportunity in the P3 space\textsuperscript{155}.

Recently, the P3 model has been proven useful for solutions that respond to climate change resiliency needs. A relevant example is the Fargo-Moorhead flood diversion project (see case study in section 3.1) which, being only the first of a three-project pilot program, served as a proof of concept for efforts by USACE to explore ways to expedite project delivery and use alternative financing mechanisms\textsuperscript{156}. This project sets a precedent for future similar projects and, given the increasing frequency of catastrophic events related to climate change, it is likely that more agencies will become interested in pursuing P3s for developing resiliency infrastructure\textsuperscript{157}.

Also lately, there has been an increased interest in energy transition projects\textsuperscript{158} and decarbonization as a service, giving the P3 model an opportunity to expand. Clear examples are the energy-related

\textsuperscript{152} Renner and Nulton, “2022 Public-Private Partnership Trends Report”, 1
\textsuperscript{155} A Vice President of National Program Delivery at HNTB mentioned that “managed lanes P3s are in the pipeline” and “can be characterized as sustainable because relieve congestion and minimize GHG emissions but were actually primarily aimed to ensure travel time reliability in peak periods”, Interview by author, February 16, 2023.
\textsuperscript{158} A Managing Director- Clean Energy & Infrastructure at JLL, points out that “the number of advisory commitments for energy transition projects is increasing”. Interview by author, March 15, 2023.
projects in the higher-education space that are using sort of P3s with the goal of bringing down energy costs on campus; providing dependable and well-maintained infrastructure; meeting ambitious sustainability and resiliency objectives and, most importantly, allowing universities to focus on their primary mission. Though each campus energy P3 deal has its own scope, the collective share many common characteristics, including institutional control and ownership of the assets, utilizing and/or refurbishing existing assets, upfront payments to the institutions by the private party, a combination of bank and bond financing, and a complex “utility fee” paid periodically to the private party to cover the ongoing maintenance of the asset. It is fair to mention that this deal structure is still to prove its value as there are controversies around the integrity of the risk allocation mechanism, considering an ongoing lawsuit in the University of Iowa P3, that puts all similar transactions under scrutiny. However, there may be possibilities for this deal structure to scale to other sectors given the potential of tax credits a taxable entity can benefit from (e.g. P3 company), as opposed to a non-profit entity.

A growing space with sustainability roots is telecommunications whereas P3s are expected to be an important tool in project delivery for broadband, as demonstrated in the Washington DC Streetlighting project (see case study in section 3.2). For this sector, the Federal stimulus plans may play a role when it comes to emerging P3 opportunities. Because the business case for broadband networks in rural areas and underserved census tracts is less strong than that for more affluent markets; the IJJA dedicates $65 billion ($40 billion going directly to states) to these broadband initiatives and adds broadband as a project type to which tax-exempt private activity bonds (PABs) can be applied. This law greatly increases the options available to government entities in how to approach the financing and operation of broadband projects and has the potential to persuade more

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160 An EVP- Public Institutions and Higher Education at JLL, a global real estate services company, indicated that there seems to be a trend for “universities adopting P3-type structures for undertaking energy management and transition projects... the drivers depend on each university and deal but in many cases, the “motivation is financial and taking advantage of the private sector expertise... Another Driver is out-of-balance-sheet financing...Access to capital is also a driver because they cannot afford to make the improvements when needed or they may not have the bonding capacity.” Interview by author, March 20, 2023.


162 Renner and Nulton, “2022 Public-Private Partnership Trends Report, 6,7


164 An SVP – Infrastructure Advisory at EY, expects “continuous growth in energy and decarbonization as a service that would lead to a new model”, given that “the tax equity provided by IRA (IRS tax-credit taxed entities benefit from) opens the door for universities to deliver DBOM and DBFM projects if done through a developer. The universities are starting to understand that, although the IRS has not issued full guidance yet... [Following this trend] perhaps State and local governments may be interested in implementing the model to other types of entities that own and operate energy systems such as hospitals, stadiums, or other taxable institutions”. Interview by author, February 16, 2023.
private-sector partners to get off the sidelines and into the game, and P3s can play a valuable role in extending the reach of available capital.\footnote{Renner and Nulton, “2022 Public-Private Partnership Trends Report, 9}

In addition, an IIJA funding program the P3 industry is focusing on is the National Electric Vehicle Infrastructure (NEVI) program\footnote{An SVP – Infrastructure Advisory at EY, commented that “IIJA and IRA together show clear federal framework to provide resources to public, private to advance electrification of transportation and the greening of the grid” and “as it comes to EVs, “the IIJA’s NEVI funding is incentivizing States that what to own and operate EV [charging stations] or maybe are in a position to subsidizing [these assets]”, Interview by author, February 16, 2023.}, which gives state and local governments a powerful tool to shape charging infrastructure and covers up to 80% of a project’s eligible costs, while the remaining 20% is likely to come from public or private sources. The multiple benefits of spending on EV equipment include local job creation, related workforce development, lower carbon emissions, and planning for the electric grid aligned with Justice40 equity outcomes. Also, EV equipment deployment is expected to bring social benefits since the policy goals of the program include assigning 40% of the investments to disadvantaged communities and installing EV chargers every 50 miles in corridors, thus, ensuring the inclusiveness of rural areas.\footnote{Rousakis, T., and Marc C. “How NEVI Funding Can Transform EV Charging Stations and EV Adoption,” October 19, 2022. Accessed 4/11/2023, https://www.ey.com/en_us/government-public-sector/strategy-consulting/nevi-funding-can-transform-ev-infrastructure.}

Nevertheless, there are also opportunities to improve the existing infrastructure via P3s to make it more sustainable. A relevant example is the Washington DC Streetlighting project (see case study in section 3.2) that brings energy consumption savings while contributing to emissions reduction and social benefits. Even more, there are also opportunities to improve sustainability in existing P3s that have been operating for years, that is the case of the Port of Miami Tunnel (see case study in section 3.3) which is undertaking energy conservation initiatives and evaluating alternatives for the use of clean energy.

3. Case Studies

Selected P3 projects with sustainability/ ESG relevance, as highlighted in the previous section, are described in more detail in the following section:

- The Fargo-Moorhead flood diversion, as a relevant climate change mitigation and resiliency project
- The Washington DC Streetlight, as an example of an ESG integration retrofitting project
- The Port of Miami Tunnel, as a sustainable development project delivered and operated contemplating ESG performance.
3.1. CASE STUDY PROJECT: Fargo-Moorhead (FM) flood diversion

BACKGROUND: Located at Fargo, ND, and Moorhead, MN., the Red River Valley is one of the most flood-prone areas in the U.S. given its increased extreme precipitation frequency since 1990 that has worsened further since 2015. The FM project grew out of studies following the historic flood of 1997 which devastating damages amounted to $3.5bn (over $6.4bn when adjusted for inflation) in Grand Forks, ND and East Grand Forks, MN\(^{168}\). In 2016 the Metro Flood Diversion Authority (MFDA) was formed as the local authority to oversee flood-protection efforts and, in conjunction with the U.S. Army Corps of Engineers (USACE), developed the FM project\(^{169}\). With a cost estimate of $2.75bn, it consists of four major components undertaken through a split delivery approach\(^{170}\), as follows:

i. The **Stormwater Diversion Channel and Associated Infrastructure (SWDCAI)** includes a 30-mile stormwater diversion channel, a diversion outlet, aqueducts on the Maple and Sheyenne Rivers, 14 drainage inlets, 3 railroad crossings, 2 interstate crossings, and 12 county road crossings (See figure 3 – P3 Project Map). Delivered by Red River Valley Alliance (RRVA), an SPV formed by Acciona, Shikun & Binui USA and North American Construction Group, through a P3 contract with the MFDA.

ii. The **Southern Embankment and Associated Infrastructure (SEAI)** includes a 20-mile earthen embankment and 3 gated control structures. Delivered by USACE and contractors.

iii. **Mitigation Projects** which include an upstream mitigation area, levees, and other wetland and flood-mitigation projects. Delivered by USACE, MFDA, city and county governments.

iv. **Local Entity Flood Protection & Associated Infrastructure (LFPAI)** consists of in-town protection measures such as levees and floodwalls, stormwater lift stations, and road improvements and grade raises. Delivered by city and county governments\(^{171}\).

SUSTAINABILITY FEATURES: The FM diversion canal is a **climate change mitigation project** intended to protect over $12 billion of property value and remove flood insurance requirements for residents. It is designed to address the threat of so-called 100-year floods and to provide resiliency in the event of a 500-year flood. Once completed, it will protect more than 235,000 people in major population centers between Fargo and Moorhead from catastrophic flooding and loss of property (completion scheduled by 2027)\(^{172}\).

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170 Healey, A., “Flood Diversion Unites P3 and ESG”, *PFI*.
171 MDFA, “Project Components”, Accessed on 04/23/2023, [https://fmdiversion.gov/about/project-components/](https://fmdiversion.gov/about/project-components/).
172 Healey, A., “Flood Diversion Unites P3 and ESG”. 
FUNDING AND FINANCING: Although typically the federal government funds 65% of the civil works projects undertaken by USACE and local sponsors provide 35%, in the FM project the local sponsors and state funding cover approximately 70% of the overall project cost, demonstrating the local parties’ urgency for permanent flood protection. Funding sources include $750m from the federal government ($437m through IRA funding); $1.5bn from local tax revenues (financed through a $569m WIFIA loan, a $55m revolving loan, and $280m in PABs); $850m from North Dakota and $86m from Minnesota. A multifaceted financing backed the P3 contract comprising a green financing framework of $296m of tax-exempt senior revenue green bonds; a $198 private placement facility; a revolving credit of $634m and an equity contribution of $51m.

DESCRIPTION OF THE P3 CONTRACT

TYPE: Greenfield.
SCOPE: DBFOM
CONTRACT TERM: 34 years (2021-2055)
STATUS: Under construction
CAPEX: $763 million
PAYMENT MECHANISM: Milestones and availability payments

RELEVANT FACTS:
- First P3 flood management project in North America and first-ever P3 involving USACE
- First US green finance initiative designed for climate change adaptation
- First transaction in the US to combine tax-exempt private activity bonds and a private placement for long-term debt financing
- FM serves as a precedent for future projects with an environmental component under a split delivery process
- Due to the split delivery and the associated P3, the project is expected to cost $330 million less and be completed 10 years sooner than if it were delivered by USACE via its standard design-bid-build process
- The MFDA also gets the benefit of a 30-year design warranty because RRVA maintains the project features for 30 years after completion of construction as part of its bid
- The project agreement established a “Resilience Program” which was aimed at implementing the Institute for Sustainable Infrastructure ENVISION framework (see section 2.2).

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173 Landers, J. “P3 Improves US Army Corps’ Midwest Flood-Diversion Project” Metro Flood Diversion Authority.
175 Healey, A., “Flood Diversion Unites P3 and ESG”
176 Landers, J. “P3 Improves US Army Corps’ Midwest Flood-Diversion Project”
3.2. CASE STUDY PROJECT: Washington D.C. Smart Streetlighting

BACKGROUND: In an effort to optimize the streetlights of the District of Columbia to improve human and wildlife health and safety, the District Department of Transportation (DDOT) and the Office of Public-Private Partnerships (OP3) issued a P3 solicitation in 2017 for the rehabilitation of the 75,000 street and alley lights by converting them to energy-efficient light-emitting diode (LED) technology with remote monitoring and control capabilities, allowing for quick notification and resolution of outages. The project also includes the installation of 239 wireless access points to enable a more widespread Wi-Fi connection. After a years-long procurement, the project was awarded in 2022 to Plenary Infrastructure DC (PIDC), a consortium formed by Plenary Americas US Holding, Kiewit Development Company, and Phoenix Infrastructure Group.178 179

The rehabilitation work is scheduled to be completed by May 2024 and it is being handled sequentially per group of Wards (i.e. firstly the wards in green, the red will be second, and the blue will be third, as per Fig. 4 - Project location map)180.

DESCRIPTION OF THE P3 CONTRACT

TYPE: Brownfield
SCOPE: DBFOM
CONTRACT TERM: 15 years (2022-2037)
STATUS: Under rehabilitation
CAPEX: $309million
PAYMENT MECHANISM: Availability payments
RELEVANT FACTS:
- District’s first-ever P3
- It is the nation’s largest urban streetlight modernization P3 project
- In addition to providing the financing, PIDC is responsible for the existing streetlight network (the old network) as well as the new LED network throughout the contract term
- The payments are subject to deductions if PIDC fails to satisfy the contractual performance metrics which include timely response to service requests, preventative maintenance and repair standards, continual monitoring and maintenance of streetlights, and unplanned disruptions to district commuting patterns such as roadways, bicycle paths, and pedestrian walkaways181

The contract includes an Energy Savings Performance under which PIDC is liable for energy consumption expenses that exceed the scheduled consumption set in the bid\(^\text{182}\).

**SUSTAINABILITY FEATURES:**

- Replacing the fixtures with LED technology will reduce energy consumption by more than 50% and eliminate 38,000 tons of greenhouse gas emissions each year. LEDs also use less energy to produce light, reducing their carbon footprint. In addition, LED fixtures have a lifespan of 5 to 15 times the current fixtures such as metal halide, incandescent, and high-pressure sodium. This means there will be far fewer burned-out fixtures headed to a landfill. In fact, the LED fixtures will have a warranted life of over 20 years of performance. Modernized street lighting will greatly improve safety for pedestrians, cyclists, and motorists\(^\text{183}\).

- In addition, 239 Wireless Access Points (WAPs) in Wards 7 and 8 (where approximately 35% of households are without access to broadband internet service) will be installed. This will improve residents’ ability to access the internet and digital tools which are important for securing employment, starting and expanding businesses, and learning in remote environments.

- As it relates to Minority Participation, while only Disadvantage Business Enterprise (DBE) was contractually required (for both Design and Construction as well as Asset Management), PIDC also heavily sourced Certified Business Enterprise (CBE) and Small Business Enterprise (SBE) partners, including a local- and minority owned equity partner, Phoenix Infrastructure\(^\text{184}\).

**FUNDING AND FINANCING:**

The project is funded by the District of Columbia. The financing consisted of $160 million of tax-exempt, private activity bonds (PABs) issued by the District of Columbia and loaned to PIDC which will use the proceeds to complete the streetlight project. In addition to being an innovative public infrastructure tax-exempt bond structure that reduces the costs of financing, the bonds were designated as Green Bonds based on the Green Bond Principles. The project qualified for green bonds based on its key purpose of improving the District’s sustainability, and because of the social benefits of expanding wireless access points\(^\text{185}\). The green-bond designation attracted environmentally and socially conscious investors and many were sold to ESG Funds\(^\text{186}\).

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\(^{182}\) Ballard, A. “DC Smart Street Lighting”, March 6, 2023, *E-mail*, https://mail.google.com/mail/u/1/#search/alese.ballard@plenarygroup.com/ FMfcgzGrsvhKPRkDtrgpJTldNFqpdD.


\(^{184}\) Ballard, A. “DC Smart Street Lighting”, March 6, 2023, *E-mail*, https://mail.google.com/mail/u/1/#search/alese.ballard@plenarygroup.com/ FMfcgzGrsvhKPRkDtrgpJTldNFqpdD.

\(^{185}\) “District of Columbia’s Inaugural Public-Private Partnership Project: DC Smart Street Lighting”, Orrick, May 24, 2022, Accessed on 05/02/2023 District of Columbia’s Inaugural Public-Private Partnership Project: DC Smart Street Lighting (orrick.com)

\(^{186}\) A Vice President at Plenary commented that Plenary ended up differentiating from others by offering a green bond financing solution relied on the climate nature of the project (conversion of streetlights to LED technology); its impact of wildlife (selected type of light considered better for animals than city lights) and the associated social benefits (scope include wireless access points to reach lower-income communities within D.C.). In addition, a member of Plenary’s project finance team added that “because of the green designation, the bonds attracted a specific pool of investors looking for sustainable investments such as green investments’ lenders and ESG funds, thus, the solution ended up being like a marketing piece resulting in an incredible response from the marketplace that helped the pricing and provided further competitiveness to the solution. This was particularly remarkable given that currently, the general conditions of the bond market are not so good”, Interview by author, March 10, 2023.
3.3. CASE STUDY PROJECT: Port of Miami Tunnel

BACKGROUND: The need for improved access to the Port of Miami on Dodge Island, FL developed as truck and bus routes restricted the port’s ability to grow, drove up costs for port users, presented safety hazards and limited redevelopment of the northern portion of Miami’s Central Business District. While in the 1996 Draft EIS an immersed-tube tunnel was the preferred alternative to solve the problem, concerns about potential environmental impacts to Biscayne Bay and the disruptions of the port’s operations during construction, changed the solution to a bored tunnel\(^{187}\) in the final environmental approval (EA/FONSI) issued in 2000. The Project consists of three components: (i) widening of the MacArthur Causeway Bridge; (ii) a twin-tunnel connection between Watson Island and the port (each 3,900 feet long and 41 feet in diameter, reaching a depth of 120 feet below the water); and (iii) connections to the port’s roadway system. Pre-construction activities started for a new tolled tunnel but concerns about the potential impact on the cruise ship industry and on traffic diversions arose and the toll as a revenue source was dropped and then replaced by public funding in 2003.

A P3 procurement for the project was initiated in 2006 and in 2009 the contract was awarded to MAT Concessionaire (an SPV formed by Meridiam and Bouygues). The infrastructure opened to traffic on schedule and under budget in 2014, diverting around 16,000 vehicles of daily traffic and removing 80% of the truck traffic from downtown Miami (ca. 1.5 million trucks a year) so reducing congestion, improving quality of life and aiding future development in the area while boosting the operations and competitiveness of the port\(^{188,189}\).

DESCRIPTION OF THE P3 CONTRACT

TYPE: Greenfield.

SCOPE: DBFOM

CONTRACT TERM: 35 years (2009-2044)

STATUS: Under operations

CONTRACT VALUE: $900 million

PAYMENT MECHANISM: Completion and Availability payments

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\(^{187}\) “Bored tunnels are likely to pass beneath the channel with no noticeable signs of construction activity. Immersed tube tunnels will have an impact on the shoreline and marine environment”- James, Simon, and Chris Dulake. “Comparison of Other Tunnels and Bridges.” Information Note. Faber Maunsell/ AECOM, November 2007. [https://www.transport.gov.scot/media/40811/frcs-comparison-other-bridges-tunnels-info-note.pdf](https://www.transport.gov.scot/media/40811/frcs-comparison-other-bridges-tunnels-info-note.pdf), 12


RELEVANT FACTS:
- First P3 tunnel in North America\textsuperscript{190}.
- The project followed a rigorous noise impact control program where constructions noise levels were mitigated, measured, and reported. The contract established allowable noise limits which triggered penalties/deductions to MAT Concessionaire in case of non-compliance events\textsuperscript{191}.

SUSTAINABILITY FEATURES:
The project features flood gates that protect the tunnel against flooding which \textbf{mitigates risks related to sea level rise and climate change}\textsuperscript{192}.

The project demonstrated the ability to \textbf{overturn a negative public opinion by integrating a sustainable approach for local recruitment and business participation} during the construction which resulted in the achievement of a majority local (85\%) and diverse workforce matching the area demographics (approximately 51\% Hispanic, 22\% African-American, and 11\% white Caucasian), and exceeding the targets of 26\% employment from communities of color (achieved 62\%) and the goal of spending 8\% of the construction investment on DBEs (36\% of the investment was spent locally, 50\% of businesses involved were local). The MAT Concessionaire’s commitment to the local community is still ongoing; while only 34 people are directly employed, the O&M contractor is still hiring locally. Also, the project staff is frequently hosting community groups on tours of the tunnel, including officials from the Client, Port as well as local school children and engineering students\textsuperscript{193}.

Furthermore, \textbf{energy conservation initiatives are ongoing}. As part of the LED Lighting transition program, the building driveway and parking lot lighting was converted to LED in 2020 and the tunnel roadway’s in 2021. The Project Company is also evaluating the use of clean energy\textsuperscript{194}.

FUNDING AND FINANCING:
The Funding came from several sources: while FDOT contributed 50\% of capital cost, Miami-Dade County contributed $402.5 million; and the City of Miami $50 million. FDOT is fully funding the O&M costs from the statewide maintenance fund. On the other hand, MAP Concessionaire arranged the financing through a $341.5 million Bank Debt, $381.1 million TIFIA Loan (including accrued interest), and $80.3 million of Equity contribution. Milestone Payments during Construction were $97.5 million\textsuperscript{195}.

4. Conclusion

Currently, issues around climate change and social equity are globally acknowledged as areas of vulnerability. With an increasing public awareness, many countries are focusing regulations and sustainability goals around them, and private companies are, by response or anticipation, establishing ESG goals and initiatives to contribute to a more sustainable future.

In the U.S., a long trend of infrastructure underinvestment is profoundly linked to these pressing issues. In recognition that in addition to economic growth, infrastructure investments can also foster sustainable development with both environmental and social positive effects, the U.S. federal government has passed stimulus plans to invest in infrastructure.

The P3 model, as a contracting infrastructure delivery method, is an alternative for undertaking large-scale and complex projects and ensuring long-term performance. P3s are equipped to address sustainability needs and demonstrate that private investment in infrastructure can produce mutually beneficial results for the owner, the private entity, and the local community. Mutual benefits are greater when both private and public parties have aligned interests and appreciate the long-term spectrum of an infrastructure asset, and when aspirations for sustainability outweigh the comfort in the status quo and motivate the implementation of continuous improvement strategies.

In any case, economic, financial, and geopolitical factors are proving to be a challenge for infrastructure investments and the P3 model is required to improve and accommodate flexibility to adapt to a changing environment. With a spectrum of possibilities ahead, P3s can assist to stimulating the economy while constructing and maintaining resilient, sustainable, and inclusive infrastructure.

Acknowledgments

Thanks to – industry professionals at EY, HNTB, JLL, KPMG, Meridiam, MTA, NYSERDA, and Plenary Americas for their insightful comments during the interviews in the research process.

Special Thanks to Lynnette Widder (Associate Professor of Practice at Columbia University) who served as Faculty Advisor for this paper, for her guidance and valuable advice in the research and development of this paper.
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Administration (FHWA), March 2019.  


https://www.fhwa.dot.gov/environment/nevi/.


## Appendix

Stakeholders involvement mapping across the different phases of a typical U.S. P3 transportation project

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### COLUMBIA UNIVERSITY NYC_ SUMA_ AREA 3 INDEPENDENT STUDY _SPRING 2023
Liliana Ortega (lo2383)

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**Notes:**

(1) Technical Advisor, Environmental Consultant, Utilities Advisor, Traffic Advisor
(2) Technical Advisor, Legal Advisor

**Sources:**

South, A., “STAKEHOLDER NETWORK DYNAMICS AND THE GOVERNANCE OF PUBLIC-PRIVATE PARTNERSHIPS”, 4, 30-35

“Successful Practices for P3s”, US DOT, 34

**Disclaimer:** This list is presented as example only for illustration purposes and therefore is indicative. The actual identification of Stakeholders and their participation should be done in a project-specific basis.