



Reference Guide for Optimal Risk Allocation in PPP Projects



**Infrastructure Finance Secretariat
Department of Economic Affairs
Ministry of Finance
Government of India**



सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA

Reference Guide for Optimal Risk Allocation Framework for PPP Projects

Infrastructure Finance Secretariat
Department of Economic Affairs
Ministry of Finance
Government of India

अनुराधा ठाकुर, भा. प्र. से.
सचिव
Anuradha Thakur, I.A.S.
Secretary



आर्थिक कार्य विभाग
वित्त मंत्रालय
भारत सरकार
Department of Economic Affairs
Ministry of Finance
Government of India
July 21, 2025

FOREWORD

Infrastructure is the cornerstone of economic development, serving as a critical enabler of productivity, connectivity, and inclusive growth, thereby playing a vital role in meeting the rising aspirations of our nation during *Amrit Kaal*. The Government of India has consistently prioritised infrastructure through targeted policy reforms and fiscal support. However, the sheer magnitude and complexity of modern infrastructure needs—spanning transport, urban services, energy, and digital networks—far exceed the capacities of the public sector alone. In this context, Public-Private Partnerships (PPPs) are vital for harnessing private sector capital, innovation and efficiency in infrastructure development, while preserving public purpose.

As we aim to scale up infrastructure investment, accelerating the adoption of well-structured PPPs is critical. Yet, PPPs are inherently complex. Long concession periods, large upfront investments, and the transfer of public assets to private hands bring significant risk and demand rigorous structuring. Among the most decisive factors in determining project success is the allocation and management of risks.

Risk is inevitable in infrastructure projects—but when allocated optimally, PPPs can achieve greater financial viability, attract high-quality private partners, and ensure better service outcomes. Misallocated risk, by contrast, often leads to delays, disputes, or project failures. When risks are optimally allocated, PPPs not only thrive but also generate better value for both the public and private partners while ensuring the delivery of vital infrastructure services.

It is in this context that the ***Reference Guide for Optimal Risk Allocation and Mitigation Strategies in PPP Projects*** becomes particularly valuable, for augmenting the understanding of risk allocation among all PPP stakeholders. Developed by the Infrastructure Finance Secretariat under the Department of Economic Affairs, this guide provides a comprehensive framework for understanding, allocating, and mitigating the risks that are inherent to PPP projects.

I hope this guide will serve as a practical tool for government officials, developers, advisors, and financiers—supporting informed decision-making and fostering a shared understanding of risk-sharing principles. I would like to acknowledge the efforts of **Shri B. Purushartha, Joint Secretary Infrastructure**, and his team for bringing this initiative to fruition.

(Anuradha Thakur)

बी पुरुषार्थ, भा.प्र.से.
संयुक्त सचिव

B Purushartha, IAS
Joint Secretary



भारत सरकार
वित्त मंत्रालय
आर्थिक कार्य विभाग
Government of India
Ministry of Finance
Department of Economic Affairs



July 21, 2025

FOREWORD

Public-Private Partnerships (PPPs) have become a key strategy in driving infrastructure development. PPP projects are complex, involving both the public and private party working together to achieve project objectives by leveraging the expertise and strengths of each other. The intricate nature of PPPs stems from several factors: high initial capital investments, long concession periods, the transfer of public assets to private entities, and the challenge of balancing diverse interests and risks. The complexity of designing and managing a PPP arrangement cannot be overstated. Achieving success requires a deep understanding of risk allocation mechanisms to effectively structure the project, design institutional frameworks, finalize financial packages, and establish terms within the contractual agreement between the Project Sponsoring Authority (PSA) and the private partner.

Optimal risk allocation is critical to ensure that PPP projects not only align with the intended strategic goals but also remain financially viable over the long term. A well-calibrated balance of risks can prevent disputes, foster collaboration, and enhance the overall sustainability of the project.

The 'Private Investment Unit' under the Infrastructure Finance Secretariat (IFS) has developed this 'Reference Guide for Optimal Risk Allocation and Mitigation Strategies in PPP Projects' to support Project Sponsoring Authorities and other key stakeholders in structuring PPP projects by adopting appropriate risk management and mitigation strategies.

Proper risk management is the cornerstone of successful PPP projects. By mitigating risks and aligning objectives effectively, we can ensure that projects deliver better value for money and contribute significantly to the country's infrastructure development. I hope that all stakeholders in the PPP journey will find this guide useful for project planning and risk mitigation.

(B. Purushartha)

Disclaimer

This Reference Guide has been prepared based on the documents and practices of multilaterals, international agencies and existing project risk related documents detailed in the bibliography. An attempt has also been made to provide Indian context to issues concerning risk in PPP projects.

The risk identification, allocation and mitigation related points provided in this document do not in any way restrict or relieve the Project sponsoring authorities from any responsibility of conducting a thorough and effective analysis of a PPP Project. This Reference Guide only seeks to enhance the knowledge of the PPP project appraisal authorities about the theory and practice of risk identification, allocation and mitigation. The IFS cannot be held responsible in any manner for any failure of a project or development of contingent liability on the PSA or any other government instrumentality or any other materiality for any reason whatsoever.

While due care has been taken in preparation of this Reference Guide, however, any inadvertent error is regretted.

This Reference Guide is prepared by the IFS and all rights of this document reside with the IFS. E-Version of this document is accessible at www.pppinindia.gov.in.

© IFS, 2025

Table of Contents

CHAPTER 1: Introduction 11

CHAPTER 2: PPP as a Vehicle for Optimal Risk Sharing..... 15

2.1. Definition of PPPs 16

2.2. Roles and Responsibilities of the Parties to a PPP 17

2.3. PPPs Vis-à -vis Traditional/Conventional Project 17

2.4. PPP Structures..... 20

2.5. Major Risks assessed for classification of PPP models 22

2.6. Prevalent PPP models..... 22

CHAPTER 3: Understanding Risks in PPP Projects 29

3.1 What is Project Risk? 29

3.2 Characteristics of Risk 30

3.3 Indicative list of Project Risks in a Project Lifecycle..... 30

3.4 Risk Management..... 36

3.5 Risk Management in PPP Project Life Cycle 38

CHAPTER 4: Risk Identification 39

4.1 Principles of Risk Identification..... 39

CHAPTER 5: Risk Allocation 41

5.1 Principles of Risk Allocation..... 41

5.2 Allocation of Risk 42

CHAPTER 6: Project Risk Mitigation..... 46

6.1 Principles of Risk Mitigation 46

6.2 Risk Mitigation measures for Project 47

CHAPTER 7: Mitigating Project Risk through VFM analysis..... 71

7.1 Qualitative Analysis 71

7.2 Quantitative Analysis..... 72

7.2.1 Public Sector Comparator..... 73

7.2.2 Shadow Bid / PPP reference bid 75

7.3 Estimating Value for Money..... 76

7.4 VFM Toolkit..... 76

7.5 VFM Test 77

Bibliography:..... 79

Annexure - I..... 80

List of Figures

Figure 1 Principal roles for the Private partner and PSA	17
Figure 2: Various models of PPPs for undertaking an infrastructure project	21
Figure 3 The pros and cons of integrated Project Development and Operation Opportunities models	25
Figure 4 The pros and cons of Partnership Project Development and Investment Opportunities models	26
Figure 5 Categorization of PPP Models	28
Figure 6 Risk Management Process	37
Figure 7 Placement of Risk Identification, Allocation & Mitigation in the PPP Life Cycle	38
Figure 8 Types of VFM Analysis	71
Figure 9 Steps involved in VFM Analysis	72
Figure 10 Steps of estimating Competitive neutrality	74
Figure 11 Steps involved in quantifying the risks	74
Figure 12: Key steps for estimating the costs to public entity in case of PPP	75
Figure 13 Visualizing VFM	76
Figure 14 Suitability Filter	77
Figure 15 VFM Test	78

List of Tables

Table 1 Definition of PPP by Government Agencies and Multilaterals	16
Table 2 Comparative of Traditional Procurement v/s PPP	18
Table 3: The pros and cons of limited Private Participation models	24
Table 4 Type of PPP Modes: Some of the prevalent PPP model along with associated activity, risks, and concession period.	27
Table 5 Definitions of risk	29
Table 6 Different categories and description of Project risks	31
Table 7 General Risk Matrix and Allocation in a PPP Project	43

List of Equations

Equation 1 Estimated Net Cost of PSC	75
--------------------------------------	----

CHAPTER 1: Introduction

Infrastructure development is a strong catalyst for sustainable economic growth. The Government of India is committed to advancing infrastructure development through both policy and fiscal interventions, administered through a programmatic approach to infrastructure. For the first time in India, in 2019, a national level pipeline of infrastructure projects of over Rs. 100-lakh crore was created in form of the National Infrastructure Pipeline (NIP). Two years later, in 2021, the National Monetization Pipeline was launched for ushering in private sector efficiencies as well as private investment in de-risked brownfield infrastructure projects. Recognising the need for a master-planning approach to infrastructure, the PM GatiShakti Master Plan was conceptualized and launched in 2022, setting a new direction for infrastructure planning, implementation, and monitoring through coordinated execution.

To accord greater thrust to the infrastructure development and investment, the “Infrastructure Finance Secretariat” (IFS), has been established within the Department of Economic Affairs, to address gaps in the infrastructure policy value chain through consistent stakeholder consultation and resolution of policy bottlenecks.

Role of PPPs in Infrastructure

PPPs offer numerous advantages for the public sector, including access to additional financing, improved efficiency in construction and operations, enhanced quality of infrastructure services, and faster project delivery. These benefits are particularly appealing to all levels of government—central, state, and local. With enormous financing needs, a substantial funding gap, and the demand for efficient public services, the growing market stability and privatization trends have created a conducive environment for private investment in infrastructure.

India’s extensive experience with private participation in sectors such as roads, power, airports, and ports has fostered the understanding that Public-Private Partnership (PPP) arrangements can be an effective tool for meeting infrastructure needs across a broad range of sectors. These sectors span from traditional economic areas like roads to emerging social sectors such as health and education.

However, PPP projects are inherently complex. The substantial initial investments, long concession periods, transfer of public assets to private entities, and the challenge of balancing divergent interests and risks make designing and managing PPP arrangements difficult. Given the high level of unpredictability associated with these projects, Public Sector Agencies (PSAs) must focus on balancing and mitigating various risks inherent in each project while ensuring its financial viability.

Additionally, disputes arising from the terms of the project could result in significant financial liabilities for the government.

Project risk and their optimum allocation (between the Project Sponsoring Authority and the Private partner) plays a significant role in successful development and operation of a project on PPP mode. If risks emerge and are not managed properly, a project can become distressed, potentially derailing the entire effort and leading to the freezing of investments worth thousands of crores, bringing the project to a standstill.

Therefore, identifying risks at the outset of the project and efficiently allocating them to the appropriate parties within the agreement is essential. Ineffective or inequitable risk allocation in PPPs can be a significant factor in the failure of projects, ultimately compromising the delivery of public service.

Risk-sharing and allocation are central to any PPP arrangement. A deep understanding of how risks are distributed is necessary to structure the project, design institutional frameworks, finalize the financial package and closure, and define the terms of the contractual agreement between the PSA and the private partner.

The advantages of sound risk allocation in PPP projects cannot be overstated. In the delicate balancing act between public and private stakeholders—where the public sector aims to leverage private-sector efficiency and innovation, and the private sector seeks to mitigate risk—the benefits of proficient risk management are numerous and compelling.

Here are some benefits of effective risk allocation in PPP projects:

- a) **Reduction in transaction time & cost:** Standardizing risk allocation reduces the transaction time and costs during the transactional stage of the PPP project. Also, in most cases, the additional cost associated with customizing risk allocation during the early stages of the project is easily offset by the greater VFM achieved throughout the life of the project. VFM has been explained in detail in Chapter 7 of this document.
- b) **Optimized Resource Deployment:** Effective risk allocation ensures that the right parties shoulder the right burdens. This, in turn, leads to an efficient allocation of resources, saving precious time and capital that might otherwise be wasted navigating risks outside of one's expertise.
- c) **Enhanced project feasibility and financing:** PPP projects require substantial investments and risk allocation plays a significant role in attracting private investors and lenders. Rational risk allocation inherently enhances the attractiveness of PPP projects to private investors. When risks are appropriately distributed, stakeholders have greater confidence in the project's viability. It facilitates financing and make the project more feasible ensuring maximum participation.
- d) **Innovation and efficiency incentives:** Proper risk allocation enables the private sector to take

advantage of its expertise and access to resources fostering innovation and efficiency. The private sector is incentivized to optimize project design construction and operation to minimize risks and maximize returns.

- e) **Timely delivery and quality outcomes:** Clear risk allocation can help streamline decision-making processes and project implementation. By assigning risks to the party best positioned to handle them, the potential delays and conflicts can be minimized. This can lead to the timely delivery of infrastructure projects and ensure the quality of outcomes. Timely delivery of the project also ensures that all ancillary development in the project in the vicinity starts on time leading to overall economic development.
- f) **Financial discipline and predictability:** A well-structured risk allocation framework provides financial predictability for both the public and private sectors. By identifying and quantifying risks upfront, both parties can plan and budget accordingly reducing uncertainties and cost overruns. When the party responsible for a risk is also financially liable for it, interests are aligned, and risks are diligently managed. This can lead to the efficient allocation of capital and a stronger project outcome.
- g) **Innovation Incentives:** A well-structured risk allocation framework is conducive to fostering innovation. When private partners clearly understand the risks and rewards associated with their role, they are more motivated to innovate and find novel solutions.
- h) **Reduced Probability of Disputes & Increased Transparency:** Clarity in risk allocation reinforces transparency and accountability. Each party knows its responsibilities, reducing the likelihood of disputes and establishing a robust governance structure that bolsters project oversight.
- i) **Public Welfare:** Ultimately, the public reaps the rewards of well-executed PPP projects, including superior infrastructure, cost savings, and improved public services, fostering economic growth and social well-being.

The Kelkar Committee Report on Revisiting and Revitalizing the PPP Model of infrastructure prepared in year 2015 has also emphasized on importance of risk identification at the project formulation stage and its allocation between the parties. The Report states that inefficient and inequitable allocation of risk in PPPs can be a major factor in PPP failures and PPP projects can become distressed when risk emerges that may not have contemplated at the time of project award.

In light of this, IFS, DEA has published documents that can help PSAs understand PPP and its inherent risks, such as the Reference Guide for PPP Project Appraisal and Reference Guide Project Implementation Mode Selection-Waterfall Framework. These documents have not only elaborated on the various nuances around PPP projects but also highlighted the importance of risk handling during the entire value-chain of a PPP project from structuring to appraisal, to project mode selection to final implementation. Even with these knowledge resources, there was a demand from PSAs and States to provide a detailed framework for optimal risk allocation and possible risk mitigation in PPP projects.

Recognizing the above challenges of risk identifications, allocation and their mitigations in the PPP projects, Infrastructure Finance Secretariat, Department of Economic Affairs, Ministry of Finance Government of India has come out with a '**Reference Guide for Optimal Risk Allocation and Mitigation Strategies in PPP Projects**'.

This Reference Guide may be used by Project Sponsoring Authorities, Consultants, and other relevant stakeholders involved in PPP project formulation to work out optimal allocation of risks in PPP projects and adopt appropriate risk mitigation measures.

CHAPTER 2: PPP as a Vehicle for Optimal Risk Sharing

A PPP is a partnership between the public sector and the private sector for the purpose of delivering a project or a service which is traditionally provided by the public sector (Multiple definitions of PPPs provided by different agencies are included in Annexure 4.). PPP recognizes that both parties have certain advantages relative to the other in the performance of specific tasks. The fundamental characteristic of PPP is that each party is obligated to do what it does best and thereby maximizes utility of public services and infrastructure delivery in the economically most efficient manner.

Such collaborations where public and private sector join forces for a shared objective of infrastructure development are termed as Public Private Partnership or PPP. Depending on the model of PPP, the private player may be required to arrange the finance, mobilize resources for the project, improve the effectiveness, efficiencies and quality standards of infrastructure project, etc.

The overall aim of PPP is therefore to structure the relationship between the parties in such a way that risks are borne by the respective party best able to manage them and increased value is achieved through the exploitation of private sector skills and competencies. Thus, the main characteristics of PPPs include sharing rights and duties along with risk and reward between both public and private players. PPPs also act as an important channel to improve service delivery and innovation in infrastructure sectors.

PPPs are undertaken in multifarious forms such as DBFOT, BOT (HAM), BOT (Annuity), etc. according to the nature and requirement of the project. As compared to the traditional public procurement contracts, PPPs are complex in nature and therefore, necessitate careful design, structuring and implementation of the project. Despite the prevalence of multiple definitions, some common features are common to PPPs:

- Partnership between the public and the private sector for the purpose of delivering a project or service,
- Involve bestowing of concession which may include a set of rights to design, develop, build, operate and collect user charges, to the private party for a fixed period of time with pre-determined KPIs,
- Under PPP mode, either the user or the Government (tax-payers) or the future generation pays for the services provided by the private party,
- One of the main characteristics of PPPs is sharing of risks, rewards, rights and duties optimally between the parties to the arrangement.

2.1. Definition of PPPs

While there are many definitions of PPPs, some of the prominent definitions provided by different agencies are as follows:

Table 1: Definition of PPP by Government Agencies and Multilaterals

Agency	Definition
Department of Economic Affairs	Public Private Partnership or “PPP” is a form of fixed-term contractual arrangement between a public entity on one side and a private entity on the other, for the provision of public assets and/or public services through investments being made and/or management being undertaken by the private entity, may or may not require payment of fee by users, for a specified period of time, where there is well defined allocation of risk between the private entity and the public entity and the private entity’s performance is contractually obligated to conform (or are benchmarked) to specified and pre-determined performance standards
Manual for Procurement of Goods, 2017, Department of Expenditure	PPP means an arrangement between the central, a statutory entity or any other Government-owned entity, on one side, and a private sector entity, on the other, for the provision of public assets or public services or both, or a combination thereof, through investments being made or management being undertaken by the private sector entity, for a specified period of time, where there is predefined allocation of risk between the private sector and the public entity and the private entity receives performance linked payments based on performance standards.
Asian Development Bank	PPPs broadly refer to long-term, contractual partnerships between the public and private sector agencies, specially targeted towards financing, designing, implementing and operating infrastructure facilities and services that are traditionally provided by the public sector.
World Bank	PPPs are a mechanism for government to procure and implement public infrastructure and/or services using the resources and expertise of the private sector. Where governments are facing ageing or lack of infrastructure and require more efficient services, private sector partnership can help foster new solutions & bring finance.

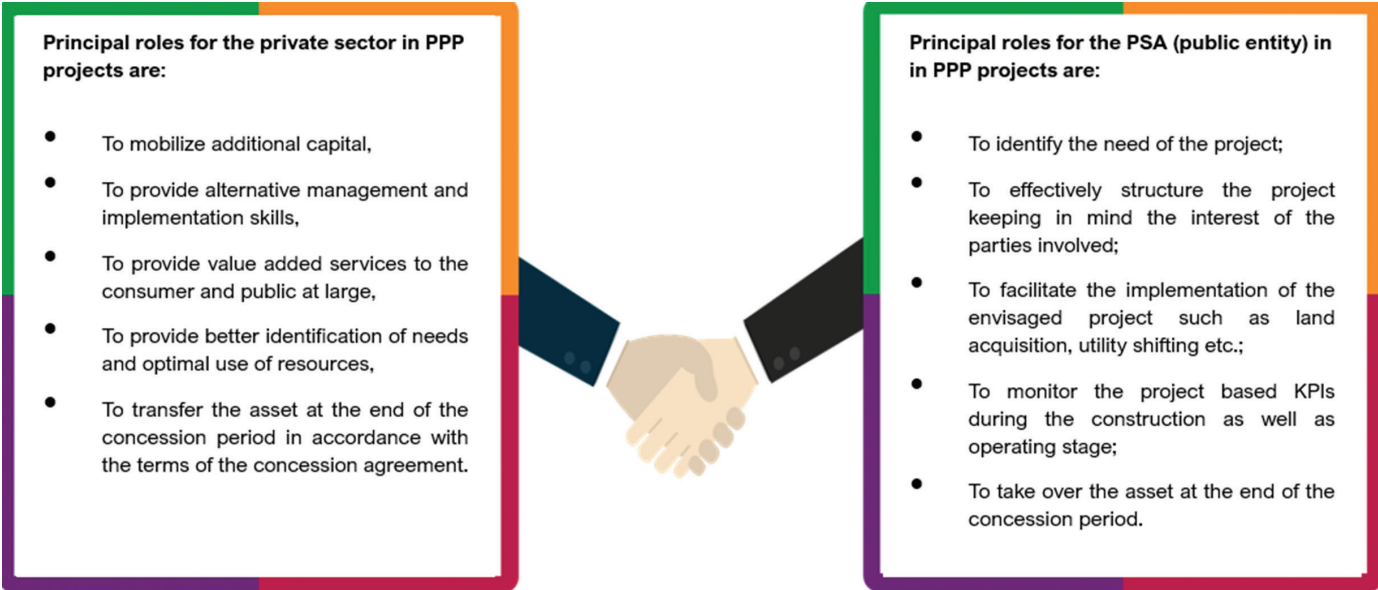
Agency	Definition
International Finance Corporation	PPPs are a tool that help governments leverage the expertise and efficiency of the private sector, raise capital, and spur development. They also help allocate risk across the public and private sectors to where it can best be managed and ensure that resources are wisely distributed in addressing the most urgent development needs.

Source: Compiled from respective websites of the agencies

2.2. Roles and Responsibilities of the Parties to a PPP

The two parties involved in PPP projects are the public and the private player. For the success of PPPs, roles and responsibilities of the two parties are to be clearly defined. The principal roles of the parties are enumerated below:

Figure 1: Principal roles for the Private partner and PSA



It is important to note here that the roles and responsibilities of the two parties involved in a PPP project may be designed as per contours and requirements of the project.

2.3. PPPs Vis-à-vis Traditional/Conventional Project

A PPP project is significantly different from a conventional project:

- Mechanisms of project development, implementation, and management differ among PPP and EPC projects.
- Unlike conventional projects which are publicly funded, where viability of the project is not a success criterion, a PPP project is possible only when a robust business model with reasonable return on investment can be developed.

- Unlike conventional projects which focus primarily on asset development, the focus of a PPP project is on delivering specified infrastructure services at defined quantity, quality and levels.
- Unlike conventional projects wherein entire risk is borne by the government entity, the risk allocation between the public – private partners are at the heart of any PPP and this makes execution of a PPP much more complex than a conventional project.
- While conventional projects are construction oriented with limited life span and little or no interaction between government entity and private sector, PPPs have much longer tenure making management of the relationship between the PSA and the private party vital for its success.

Table 2: Comparative of Traditional Procurement v/s PPP

S.N.	Particulars	Traditional Procurement	PPP
1	Investment for Project Development	Entire Investment by Govt. Authority through budgetary sources for project development	Investment (entire/ partial) by Private Partner for project development as well as its operation, maintenance, and management (depending on model) for the specified project period Govt. Authority may contribute in form of viability gap funding for the project development and/or its Operations & Maintenance (O&M) depending on model chosen.
2	O&M of the Project	Operated by Govt. Authority OR through separate O&M Contractor	Operated, maintained, and managed by Private Operator at its own cost for the specified project period.
3	Primary objective	Primary objective is to get cost-efficient building of asset	Primary objective is enabling efficient and improved service delivery. The output specifications are clearly set out in the bid documents which the Private Partner is expected to accomplish as a result of the project.
4.	Service Delivery	Public sector directly responsible for service delivery to the users.	Private Partner directly responsible for service delivery to the users.

S.N.	Particulars	Traditional Procurement	PPP
5.	Construction Parameters	Input-based standards and specifications (including quality and quantity of construction materials) are defined by the Govt. Authority which are required to be adhered by the Private contractor for construction.	Govt. Authority defines output-oriented performance parameters, and the Private Partner is generally given liberty to design the project as per the applicable bylaws, rules & regulations.
6.	Payments	Govt. Authority makes frequent and short-term payments to the Contractor linked to pre-defined construction milestones.	Generally, Private Partner makes investment in the Project through their own sources and recovers its investment through user fee/ any other measures as defined by the Authority in the Concession Agreements. Payment by Govt. is limited to the Viability Gap Funding, if any.
7.	Prevalent Models of Contracting	• Item Rate (BOQ) Contracts • Engineering, Procurement and Construction (EPC) Contracts	• Service Contract • Operation and Management • Leasing • Build-Operate- Transfer • Design-Build-Finance -Operate- Transfer (DBFOT) • Operation, Management & Development (OMDA) Agreement • Design-Build-Finance -Own- Operate (DBFOO)

S.N.	Particulars	Traditional Procurement	PPP
8.	Risks	Govt. Authority bears almost all the risks associated with the project.	PPPs involve the allocation of the risk to the party who is best suited to handle or mitigate the risks. Generally private partner bears majority of the risk especially the finance risk, construction risk, O&M risk, revenue risk, demand risk, etc.

If structured appropriately, PPPs can generate substantial benefits for consumers and governments. The scope of potential benefit will, however, depend on the type of the project being undertaken and the exact terms of the contract governing the PPP.

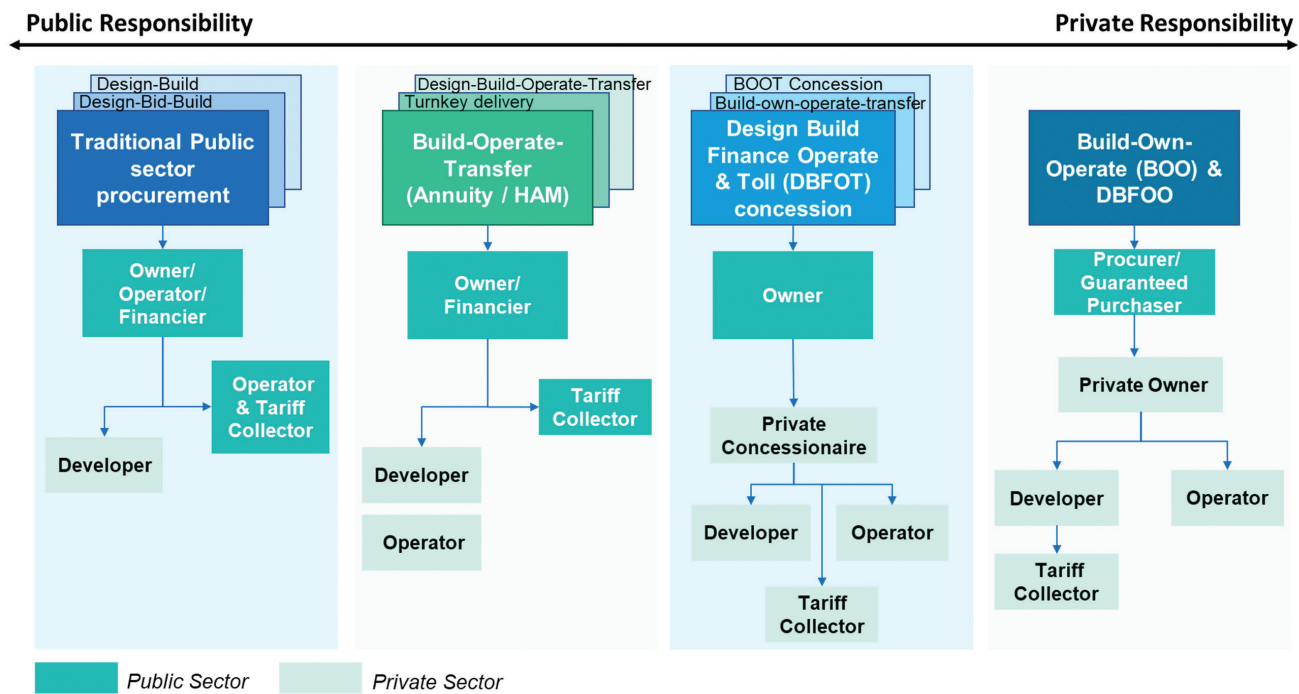
Therefore, a good PPP project is one which -

- 1. Ensures implementation by proper designing and structuring,
- 2. Has scope clarity and unambiguously defines roles & responsibilities of both parties
- 3. Defines quantifiable and verifiable project output to be attained,
- 4. Upholds/restores the confidence of an investor,
- 5. Brings value to the public at large.

2.4. PPP Structures

In the substantially large number of possible and prevalent infrastructure implementation structures including PPPs, the main defining feature is the degree of private control over the assets and involvement in financing. At the same time, many of the individual components used to design and structure specific partnerships (i.e., contract terms, in-kind contributions, financing facilities, or grants) can be used with a number of different approaches. There can, therefore, be no generic or ‘best’ model of PPP for infra project structuring. Below is a diagram showing various models of PPPs for undertaking an infrastructure project with allied responsibilities:

Figure 2: Various models of PPPs for undertaking an infrastructure project



It is also essential to recognize that the nomenclature used to describe the partnership process has not been standardized. There are several terms often used interchangeably – turnkey and build-operate-transfer (BOT), for example. There are also single terms that are used loosely and can be applied to situations that are fundamentally different. For example, BOT can be used to describe procurements that involve private financing, as well as those that do not. As such, it is necessary for PPP practitioners to delve beyond the terms and concepts and become familiar with the way in which the partnership process itself works.

The principal criterion for distinguishing PPP structures is the extent of risk transferred to the private party. This criterion also allows each type of PPPs to be defined and related to the relevant modes of engaging private parties. While the choice of PPP structures is limitless in terms of financial and operational forms, all PPPs can be defined in relation to the roles and risks assigned to the public and private parties.

While it is not possible to define all possible types of PPPs, it is important for PPP sponsors to develop a detailed understanding of the PPP structure before selecting a particular arrangement. The following sections provide a bird's eye view of the various forms of PPP relationships – models of PPPs - moving from minimal to maximal private sector involvement, based on internationally recognized nomenclature. However, unlike a 'legalistic' definition of PPP or procurement derived from the procurement manuals etc., the nomenclature of PPP models is based on conventions of the extent of risk and responsibility transfer to the private party.

The suitability of PPP structures for a project depends on multiple factors, with each structure possessing distinct strengths and weaknesses. It's crucial to evaluate their relevance within

the project's context. The chosen structure should offer clear benefits, potentially adaptable to sectoral and project-specific needs for optimal impact.

2.5. Major Risks assessed for classification of PPP models

A wide spectrum of PPP models has emerged over the years. However, the underlying connotation of each PPP model is the type and extent of major risk borne by either party. Basis the devolvement and the degree of the major risks, various PPP models can be broadly categorized. It may be understood that though there are myriad risks in PPPs, the classification of PPP models is suggested here basis varying degrees of the following major risks identified as the 'Four Cardinal Risks':

- **Ownership Risk** – Risks associated with the ownership of asset;
- **Finance Risk** – Risks associated with the ability of the project to provide reasonable return on its investment (equity and debt). This covers both, ability to raise inexpensive project finance and earn revenues sufficient service debt and provide return on equity;
- **Design/Construction Risk** – Risk associated with the design meeting the KPIs and risk of time and cost overrun during construction phase.
- **Operation Risk** - Risk associated with the operation and maintenance of the asset during the concession period so that the KPIs are met.

The other risks are an offshoot/variation of these basic Cardinal Risks. Basis the above '**Four Cardinal Risks**', the PPP models can be classified into the following three broad categories in order of increasing involvement and assumption of risks by the private sector vis-à-vis the PSA.

2.6. Prevalent PPP models

A wide spectrum of PPP structures has emerged over the years. However, broadly, they are but a variant of the following distinct models. These distinct PPP models are structured basis their relative characteristics with respect to the respective Cardinal Risks being assumed by either the PSA or the private sector. These are:

1. **Limited Private Participation** - Traditionally, governments have relied on public procurement to develop their infrastructure systems, often through government agencies that elaborate plans prioritizing needs and then arrange for financing, design, and construction of individual projects. Once a project is completed, it is then operated and maintained by the agency. Under this traditional model, there is still scope for utilising the services of the private sector for well-defined tasks with limited responsibility. Three approaches for outsourcing public functions to the private sector are shown below¹.

¹Detailed Description of Project Types may be referred in Reference Guide Project Implementation Mode Selection-Waterfall Framework

- a) **Service Contract** – A service contract is a legally binding agreement between the public authority and private sector, outlining the terms and conditions of specific services to be rendered. Often, these service contracts are well suited for operational requirements including some or all of tasks such as toll collection, installation and maintenance of assets.

Service contracts are time-bound allowing the public sector to leverage a particular technical expertise of the private sector, manage staffing issues, and achieve potential cost savings. Nonetheless, with service contracts, management and investment responsibilities remain strictly with the public sector. Despite certain benefits, service contracts cannot address underlying management or cost issues affecting inefficiently-managed organizations.

- b) **Operation and Management (O&M) Contracts** - Public operating agencies utilize management contracts to transfer responsibility for asset operation and management to the private sector, for enhanced efficiencies and technological sophistication. Despite being of short-duration, these are often longer than service agreements. Contractors can be paid either on a fixed fee basis or on an incentive basis where they receive premiums for meeting specified service levels or performance targets.

O&M contracts may be used to transfer specific responsibilities or may be broader involving the management of a series of facilities. Nonetheless, responsibility for investment decisions remains with the public authority. Thus, while these contracts can help improve service quality, they cannot be expected to improve service coverage or encourage tariff reform.

- c) **Leasing** - Leases offer private firms the opportunity to purchase income streams generated by publicly owned assets in exchange of upfront payments, fixed lease payments, or revenue sharing, along with the responsibility for asset operation and maintenance. The distinction between affermage and lease lies primarily in technicalities. In a lease, the operator retains revenue and pays lease fees to the Public Sector Authority (PSA), whereas in affermage, revenue is shared. Unlike operations and management contracts, leases transfer commercial risk to the private partner, linking profit to cost reduction while maintaining service levels. Capital improvements and network expansion are still the public sector's responsibility, although the lessor may handle specified repairs and rehabilitation in some cases. In certain conditions, private party may also make targeted capital investment to develop infrastructure facility, improve operating efficiencies and profit levels. However, responsibility for planning and financing overall investment and expansion programs remains with the public sector. Lease is often suitable for brownfield infrastructure that generate independent revenue streams.

The pros and cons of limited Private Participation models are as follows:

Table 3: *The pros and cons of limited Private Participation models*

Cons	Pros
▪ In the absence of a development agreement, there is little incentive for attracting private investment ▪ Not applicable for greenfield, generally used for brownfield ▪ Considerable regulatory oversight required to ensure that envisaged outcomes accrue.	▪ Can be implemented in a short time ▪ Less complex and easy to implement ▪ Significant private investment possible with development agreement ▪ An accepted model for asset monetisation.

2. **Integrated Project Development and Operation Opportunities** – In Limited Private Participation models, there is a limitation to the potential benefits that the public sector can derive from its partnership with the private sector. On the other hand, Integrated Partnerships involve transferring responsibility for the design, construction, and operation of a single asset or group of assets to a private sector partner. This project delivery approach is known by a number of different names, including “turnkey” procurement and the “build-operate-transfer” (BOT) system. From design through operation, BOT contracts can extend for periods of up to 15-20 years. In India generally, it has taken two modes: BoT Annuity and BoT HAM.

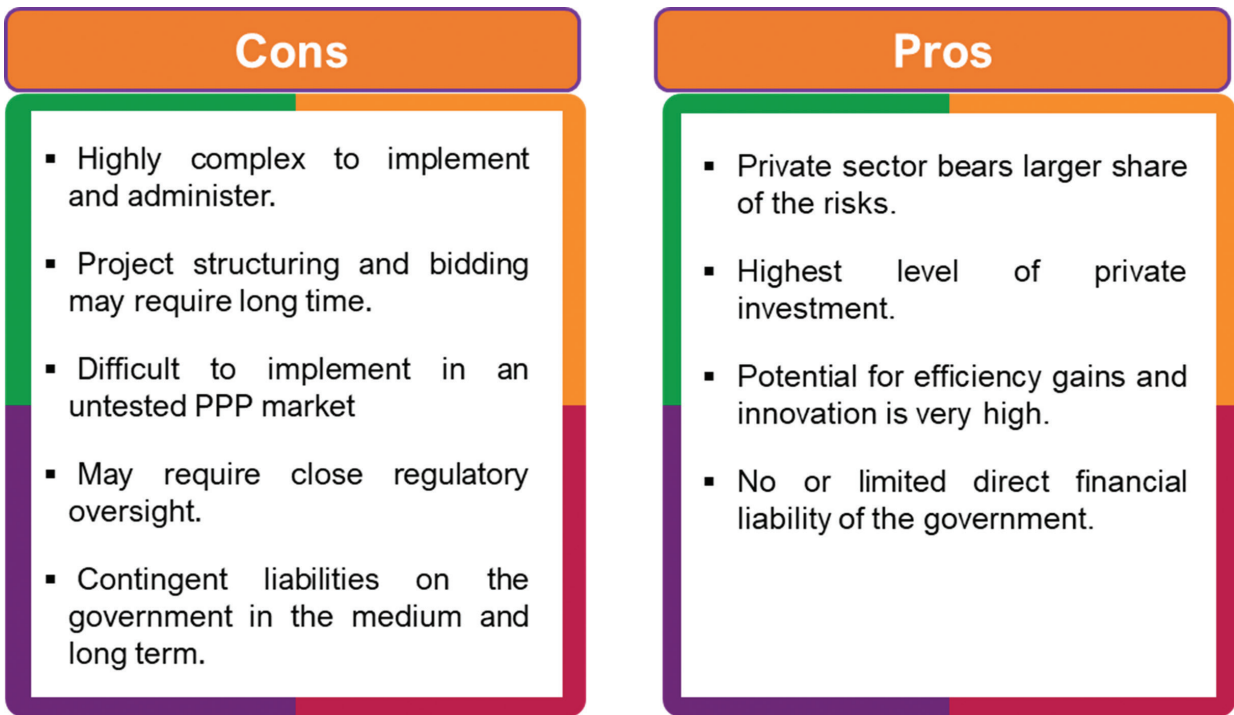
The advantage of the BOT approach is that it combines responsibility of – design, construction, and maintenance – functions under one single entity. This allows the partners to take advantage of a number of efficiencies. First of all, the project design can be tailored to the construction equipment and materials that will be used. In addition, the contractor is also required to establish a long-term maintenance program up front, together with estimates of the associated costs. The contractor’s detailed knowledge of the project design and the materials utilized allows it to develop a tailored maintenance plan over the project life that anticipates, and addresses needs as they occur, thereby reducing the risk that issues will go unnoticed or unattended and then deteriorate into much more costly problems.

The benefits of this “life cycle costing” are particularly important as infrastructure owners may spend more money maintaining the systems than on development. In addition, the life-cycle approach removes important maintenance issues from the vagaries affecting many public maintenance budgets, with owners often not knowing how much funding will be available to them from year to year. In such cases they are often forced to spend

what money they do have on the most pressing maintenance needs rather than adopting a more rational and cost-effective preventive approach.

While the potential exists to reap substantial rewards by utilizing the integrated BOT approach, project sponsors must take great care to specify all standards to which they want their facilities designed, constructed, and maintained - unless needs are identified up front as overall project specifications, they will not generally be met. It should also be noted that an integrated BOT approach alone does not relieve public sector owners of the burden of financing the related infrastructure improvements. Pros and cons of the integrated Project Development and Operation Opportunities models are”

Figure 3: *The pros and cons of integrated Project Development and Operation Opportunities models*



3. **Partnership Project Development and Investment Opportunities** - The structures described above provide opportunities for the private sector to perform tasks that would otherwise be undertaken by the public sector. However, PPP arrangements can also involve private sector financing for projects that would otherwise be fully financed by the public authority. These types of PPP arrangements are particularly attractive for the public authority as they afford all the implementation and operation and maintenance efficiencies described above, in addition to the private investment. Access to additional sources of capital allows public authority to implement important projects sooner by avoiding the need to wait for future government budget cycles for funding. These agreements enable a private investment partner to finance, construct, and operate revenue generating infrastructure improvement in exchange for the right to collect the associated revenues for a specified duration.

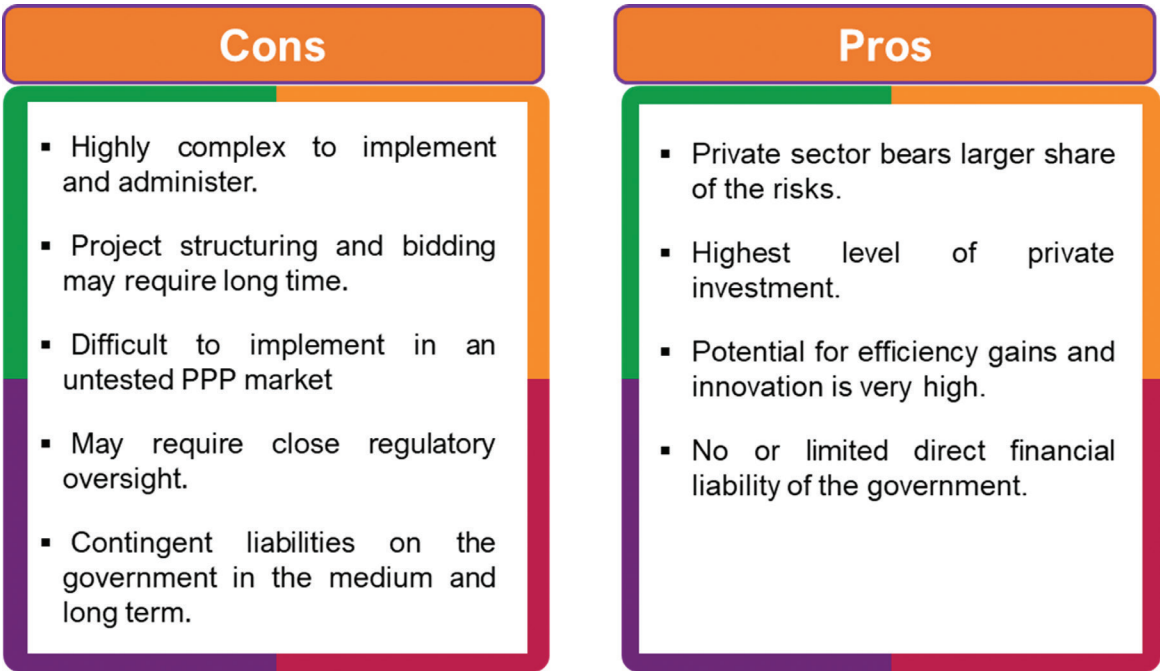
Such partnership can be structured for the construction of a new asset or for the

modernization, upgrade, or expansion of an existing facility (OMDA model, i.e, lease with developmental rights). While concessions often extend for a period of 30 years, or longer, ownership of all assets, both existing and new, remains with the public sector (DBFOT Model). It is the private party’s responsibility to ensure that the assets are properly used and maintained during the concession period and returned in good condition after concession ends. However, in certain cases the ownership of the assets may be retained with the private party (DBFOO model).

Such projects are generally awarded based on different criteria like:

- o The end price offered to users (user fee or tariff)
- o The level of financial support required from the government (VGF)
- o Upfront or recurring revenue sharing with the government (premium)
- o Payment by the government for providing infrastructure facilities and services (availability payment, fixed charges, etc.)

Figure 4: *The pros and cons of Partnership Project Development and Investment Opportunities models*

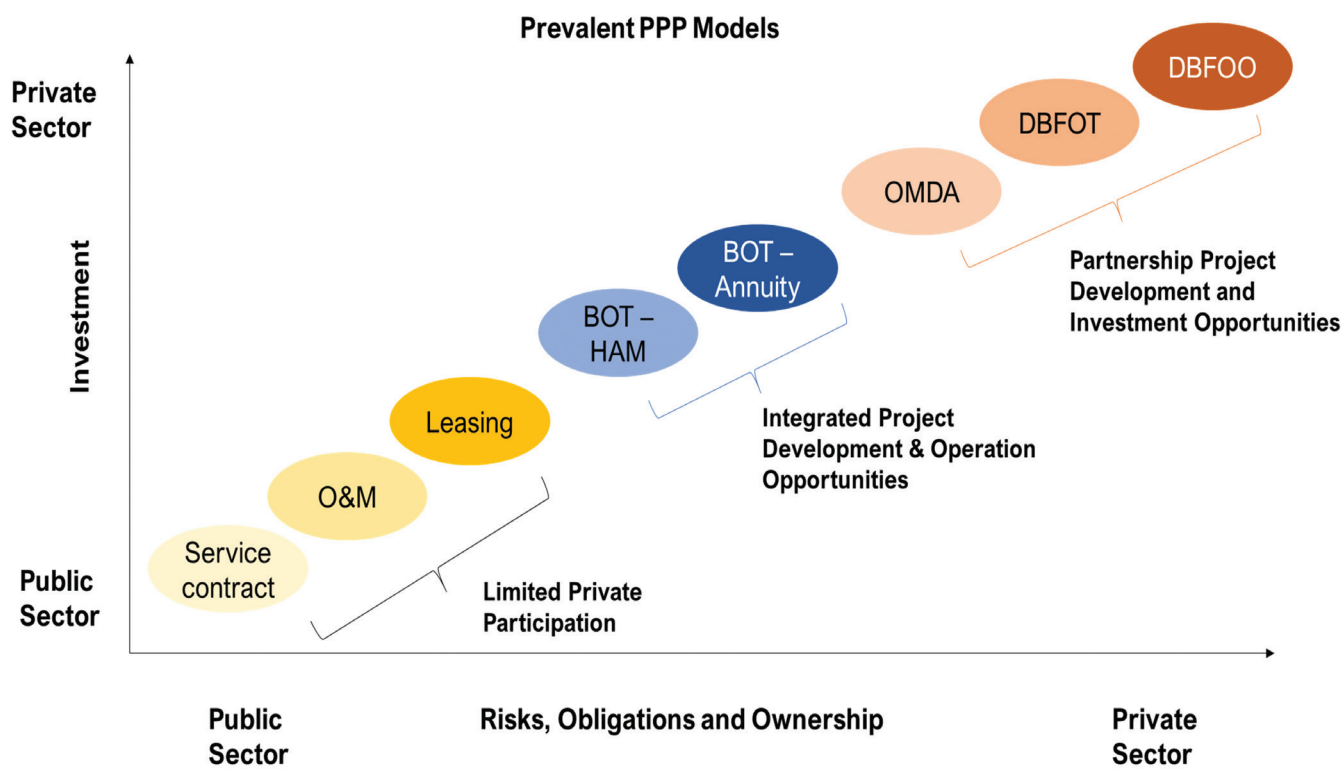


The diagram and table given below show various structures of the PPP partnership process with allied responsibilities.

Table 4: Type of PPP Modes: Some of the prevalent PPP model along with associated activity, risks, and concession period.

Type	Sub Type	Main Activity	Ownership Risk	Design/ Construction risk	Finance risk	Operation risk	Indicative Concession period (years)
Limited Private Participation	Service Contract	Performing specific work	Public	Public	Public	Private	Few months - few years
	O&M Contracts	Operation and Maintenance	Public	Public	Public	Private	3 to 5
	Lease	Operation and Maintenance	Public	Public	Shared	Private	5-15
Integrated Project Development and Operation Opportunities	BOT-Annuity	Build, Operate and Transfer	Public	Private	Public	Private	15-20
	BOT- HAM		Public	Private	Public	Private	15-20
Partnership Project Development and Investment Opportunities	OMDA	O&M plus Development/ Expansion	Public	Shared	Shared	Private	30-50
	DBFOT	Design, Build, Finance Operate and Transfer	Public	Private	Private	Private	30-45
	DBFOO	Design, Build, Finance Operate and Own	Private	Private	Private	Private	30-45

Figure 5: Categorization of PPP Models



Thus, there is, therefore, no generic ‘one size fits all’ or ‘best’ PPP model, nor does this Guide seek to make recommendations² as to the suitability of PPP model for a particular project type or sector.

²Project implementation mode selection is further explained in detail in the Reference Guide for Project Implementation Mode Selection – Waterfall Framework.

CHAPTER 3: Understanding Risks in PPP Projects

PPP Projects, involving collaboration between the Public and Private sector, are beneficial because they leverage the best strengths of both parties, leading to better financial and operational efficiency in the projects. However, for an effective PPP arrangement, there is a need to carefully assess and manage its inherent risks to prevent the cascading effects of unforeseen risks down the implementation path. At times, large-scale PPP projects are seen to suffer from issues around construction delays, regulatory clearances, operational cost overruns, etc. that have arisen due to wholly unanticipated events/ risks which were not identified at the project planning stage. Thus, it becomes imperative to manage the risks from a project life cycle perspective, in which risks are identified, assessed and mitigated at the earliest possible project stage, and allocated to parties which is in the best position to manage them. Hence, proper management of risk is the foundational principle for ensuring long-term success of PPP projects.

3.1 What is Project Risk?

Project risk may be defined as a variation that may alter, threaten or affect the successful implementation of a project in terms of timelines, deliverables, budget, quality, achievement of revenue estimates and continuity of project operations. The key element of risk is ‘variation’, which if it occurs, can have a positive or negative effect on a project’s objectives. There are also different definitions of risk in the context of infrastructural projects issued or used by different agencies and institutions.

Table 5: Definitions of risk

Agency / Institution	Definition
PMBOK Guide by Project Management Institute	An uncertain event or condition, that if it occurs, has a positive or negative effect on a project’s objective.
United Kingdoms’ Orange Book, 2023	Risk is the effect of uncertainty on objectives. Risk is usually expressed in terms of causes, potential events, and their consequences
PPP Reference Guide 3.0 (World Bank)	A risk is an unpredictable variation in the project’s value—from the point of view of some or all stakeholders—arising from a given underlying risk factor.

Agency / Institution	Definition
PPP Guide for Practitioners, DEA	A risk is defined as any factor, event or influence that could threaten the successful implementation of a project in terms of time, cost, achievement of revenue estimates, and quality
Risk Management and Contractual Issues, Partnerships Victoria	Risk is the chance of an event occurring which would cause actual project circumstances to differ from those assumed when forecasting project benefits and costs

* PMBOK - Project Management Body of Knowledge

3.2 Characteristics of Risk

- a) **Probability and Impact:** Risks have varying probabilities of occurrence and of potential impact on project objectives. Some risks are more likely to occur and have a greater potential impact while others are less likely and have a lower impact.
- b) **Interdependence:** Risks can be interconnected and have a cascading effect on other risks and on project implementation. One risk event can trigger other risks or exacerbate their impacts. Understanding the interdependencies between risks helps in developing effective risk mitigation strategies.
- c) **Time Sensitivity:** Risks can have a time component meaning their occurrence or impact may be time-bound. Some risks are more critical during specific project phases or have different implications depending on the project timeline.
- d) **Unpredictability:** Risks may emerge or evolve throughout the project lifecycle. New risks can arise as the project progresses or existing risks can change in nature or severity. It is essential to continuously monitor and reassess risks throughout the project.
- e) **Potential Losses:** Risks imply potential losses. These losses can manifest as financial setbacks, delays, quality issues, resource constraints, reputational damage or failure to achieve project objectives. The magnitude of potential losses varies depending on the risk.
- f) **Stakeholder Engagement:** Risks can affect various project stakeholders including clients project team members suppliers and end-users. Engaging stakeholders in risk identification and mitigation allows for a more comprehensive understanding of potential risks and collaborative efforts to manage them.

3.3 Indicative list of Project Risks in a Project Lifecycle

Each stage in the project development process carries certain risks. Different categories and description of Project risks at different stages of PPP Project are given below. It is also to be noted that indicative risks stated below may vary from Project to Project depending on the mode of implementation and type of sector.

Table 6: *Different categories and description of Project risks*

S. N.	Risk Type		Description	Project Stage
	Category	Sub-Category		
1.	Delay in Land Acquisition and in providing Access to Site Risk	Provision of required land	Refers to the risk that the project site will be unavailable or unable to be used within the required time, or in the manner or the cost anticipated, or the site will generate unanticipated liabilities due to existing encumbrances	Pre-Construction
		Timing of provision of required land	Risk associated with completing the process of land acquisition before the contract is awarded	Pre-Construction
		Suitability of land	The risk that the land is not suitable may be shared as the PSA may be able to secure the availability of the site, but the suitability of the site may be dependent on the Private Partner’s design and construction plan.	Pre-Construction
		Access to the site and associated infrastructure	Refers to the risk that adequate and timely connectivity to the project site is not available, which may impact the commencement of construction and the overall pace of development of the project	Pre-Construction
		Site security	Refers to the Risk with respect to site security due to opposition of the project and lapse of law and order in and around the vicinity of the site	Pre-Construction
		Utilities and installations	Refers to the risk associated with relocation/diversion of utilities at the site resulting in additional costs or delays	Pre-Construction
		Site condition	Refers to risk due to inaccurate geotechnical and ground/soil surveys during the feasibility stage (if not already publicly available) and disclosure of such information as part of the bidding process.	Pre-Construction
		Existing asset condition	Refers to risk when there are existing assets proposed to be used in the project, where practical they should be fully surveyed	Pre-Construction

S. N.	Risk Type		Description	Project Stage
	Category	Sub-Category		
2.	Planning Risk	Key planning consents	Refers to the risk that the pre-development studies (technical, legal, financial, and others) conducted are inadequate or not robust enough resulting in possible deviations from the planned or expected outcomes in the PPP project development.	Pre-Construction
3.	Design Risk	Suitability of design	Refers to the risk that the proposed design will not meet the performance and service requirements in the output specification. It can result in additional costs for modification and redesign	Pre-Construction
		Approval of designs	Refers to risk associated with obtaining design approvals	Pre-Construction
		Changes to design	The risk associated with changes in design after execution of the agreement	Pre-Construction
4.	Construction Risk	Cost increases	Refers to the risk that the construction of the assets required for the project will not be completed on time, within budget, or to specification. It may lead to additional raw materials and labour costs, an increase in the cost of maintaining existing infrastructure or providing a temporary alternative solution due to a delay in the provision of the service.	Construction Stage
		Works completion delays	Refers to risk associated with delays in delivering the infrastructure by the relevant scheduled completion date due to variety of causes, such as unavailability of construction materials, delays in shipping, variations and mistakes in programme scheduling, as well as weather events, civil unrest or industrial action and actions (or inaction) of the PSA or government	Construction Stage

S. N.	Risk Type		Description	Project Stage
	Category	Sub-Category		
		Project management and interface with other works/facilities	Refers to risk associated with integrating complex works in the project and also with Interdependence with other projects that may affect contract obligations and risk allocation.	Construction Stage
		Quality assurance and other construction regulatory standards	Refers to risk associated with meeting relevant quality standards	Construction Stage
		Liability for death, personal injury, property damage and third-party liability	Risk associated with personal injury, death and property damage in the PPP Project	Construction Stage
5.	Approval Risk	Subsequent planning approvals	Refers to the risk that necessary permits, authorisations, and approvals required before the start of construction is not obtained in a timely fashion, resulting in delays to construction and project as a whole.	Pre-Construction
6.	Operations and maintenance risk	Increased operating costs and affected performance	Refers to risk associated with mistakes in maintenance cost estimates or variations to extreme weather events.	Operational Stage
		Performance/price risk	Risk associated with meeting the performance specifications under the agreement	Operational Stage
		Operational resources or input risk	Refers to risk due to interruption of supply of resources for the project such as utilities, maintenance equipment and materials, and specialist vehicles	Operational Stage
		Intellectual property	Refers to the risk of obtaining all relevant licenses for the construction and operation of the PPP project and for intellectual property infringement except to the extent that the PSA imposes certain design or other technology solutions on the Private Partner, in which case the corresponding risk may be shared or borne by the PSA	Operational Stage

S. N.	Risk Type		Description	Project Stage
	Category	Sub-Category		
		Liability for death, personal injury, property damage and third- party liability	Refers to risk due to personal injury, death and property damage or due to third parties arising due to any construction issues/ defects and on-going maintenance/repair services.	Operational Stage
		Maintenance standards	Refers to the risk due to non-compliance with maintenance requirements in a PPP project.	Operational Stage
		Adjacent Projects impact	Refers the risk due to the impact of other adjacent or connecting projects (such as port, airport, industry, etc.) which can affect demand and pricing.	Operational Stage
		Government support measures	Refers to the risk shared by PSA by offering incentives, grant or minimum guarantees	Operational Stage
7.	Financial Closure Risk	Concessionaire's ability to secure Project finance	Refers to the risk that sufficient finance will not be available for the project at a reasonable cost (e.g., because of changes in market conditions or credit availability) resulting in delays in the financial closure of a project.	Pre-Construction
8.	Demand Risk	Variation in the projected demand	Refers to the risk that demand for service will vary from initially projected, such that the total revenue derived from the project over the project term will vary from initial expectations. This risk is not present in annuity contracts.	Operational Stage
9.	Revenue Risk		Refers to the uncertainty associated with revenue generation, particularly due to either demand fluctuations or due to collection inefficiency.	Operational Stage
10.	Financial Market risk	Refinancing	Refers to the risk that the private sector over stresses a project by inappropriate financial structuring. It can result in additional funding costs.	Operational Stage
		Inflation	Refers to risk due to inflation assumptions at multiple stages in a project.	Construction / Operational Stage

S. N.	Risk Type		Description	Project Stage
	Category	Sub-Category		
		Exchange rate fluctuation	Refers to the risk due to change in exchange rate between bid and financial close of the PPP Project.	Pre-Construction stage
		Interest rate fluctuation	Refers to the risk due to change in interest rate between bid and financial close of the PPP Project.	Pre-Construction stage
		Unavailability of insurance	It refers to the risk due to non-availability of the insurance or only available at a cost which exceeds a minimum level of return on investment expected by Private Partner.	Operational Stage
11.	Technology risk		Refers to the risk that the technology used will be unexpectedly superseded during the term of the project and will not be able to satisfy the requirements in the output specifications. It would result in increased costs of replacement technology.	Operational Stage
12.	Handover risk		Refers to the risk that the concessionaire will deviate from the minimum quality/value of the asset that needs to be handed back to the public entity.	Operational Stage
13.	Force Majeure risk		Refers to the risk that occurs due to events beyond the control of either party, resulting in a material adverse impact on either party's ability to perform its obligations under the PPP contract. eg, pandemics, strikes, act of war.	Pre-Construction, Construction and Operational Stage
14.	Concessionaire event of default		Refers to the risk that the private entity will not fulfil its contractual obligations and that the Public Sponsoring Authority will be unable to either enforce those obligations against the sponsors or recover some form of compensation or remedy from the sponsors for any loss sustained by it as a result of the breach or the private partner will prove to be inappropriate or unsuitable for delivery of the project.	Pre-Construction, Construction and Operational Stage

S. N.	Risk Type		Description	Project Stage
	Category	Sub-Category		
15.	Authority event of default		Refers to the risk that the PSA will not fulfil its contractual obligations and that the Concessionaire will be unable to either enforce those obligations against the Authority or recover some form of compensation or remedy from the Authority for any loss sustained by it as a result of the breach.	Pre-Construction, Construction and Operational Stage
16.	Social Risk		Risk associated with project impact on adjacent properties and affected people including public protest and unrest); resettlement; indigenous land rights; and industrial action.	Pre-Construction, Construction and Operational Stage
17.	Environmental Risk		The risk associated with preexisting conditions; obtaining consent; compliance with laws; conditions caused by the project; external events; and climate change.	Construction and Operational Stage
18.	Variations Risk		The risk of changes requested by either party to the service which affect construction or operation, including expansion of the network.	Construction and Operational Stage
19.	Change in law		Refers to the risk that the current legal/regulatory regime will change, having a material adverse impact on the project.	Construction and Operational Stage

Effective risk identification in a PPP project is essential for achieving project success and ensuring that risks are appropriately managed, shared, or mitigated among the project stakeholders. It should be an ongoing and collaborative process that adapts to the evolving nature of the project.

3.4 Risk Management

Risk management is a continuous process wherein risks are identified, allocated, and mitigated at various stages of the project (Fig 6).

Canons of Risk Management:

- a) Stakeholder-Inclusivity: For PPP to be successful, key stakeholders involved in the implementation of the project must be involved and their knowledge and views considered. Risk management should also have transparency and accountability.

- b) Best available information. Risk mitigation efforts must be based on the best and most current information available to stakeholders. However, PSA must also acknowledge that they will never have all of the information needed and that unanticipated risks will always exist.
- c) Human and cultural factors: Human behaviour and cultural factors influence how an individual or department perceive and respond to risks as well as how they collaborate and make decisions.
- d) Continual improvement: It involves adopting the principles of continuous improvement to ensure that the project's risk mitigation efforts improve over time.
- e) Structured and comprehensive: Projects should have a comprehensive risk mitigation strategy that addresses all known risks as the conceptualization stage of the project.
- f) Customized: Because every project is unique, the concepts of risk management mitigation strategies should be custom-tailored to ensure success.

Risk Management has three important stages:

- a) Risk identification: Identification of risk is the first step in the risk management process. It refers to defining all potential risk events, grouped according to project cycle, and then estimating their impact on the project outcome should they occur. Besides analysis of comparable projects, they can also be identified through stakeholder consultation.
- b) Risk allocation: Allocation of risk primarily means deciding which party in the PPP concession agreement will bear the cost of a change in project outcomes arising from each risk factor. Allocation of risk is the first step in achieving better value for money through PPP mode of execution.
- c) Risk Mitigation: After identification and allocations of project risks, Risk mitigation process starts. It involves taking steps to minimize or prevent risks from occurring or to reduce their potential impact.

Figure 6: Risk Management Process



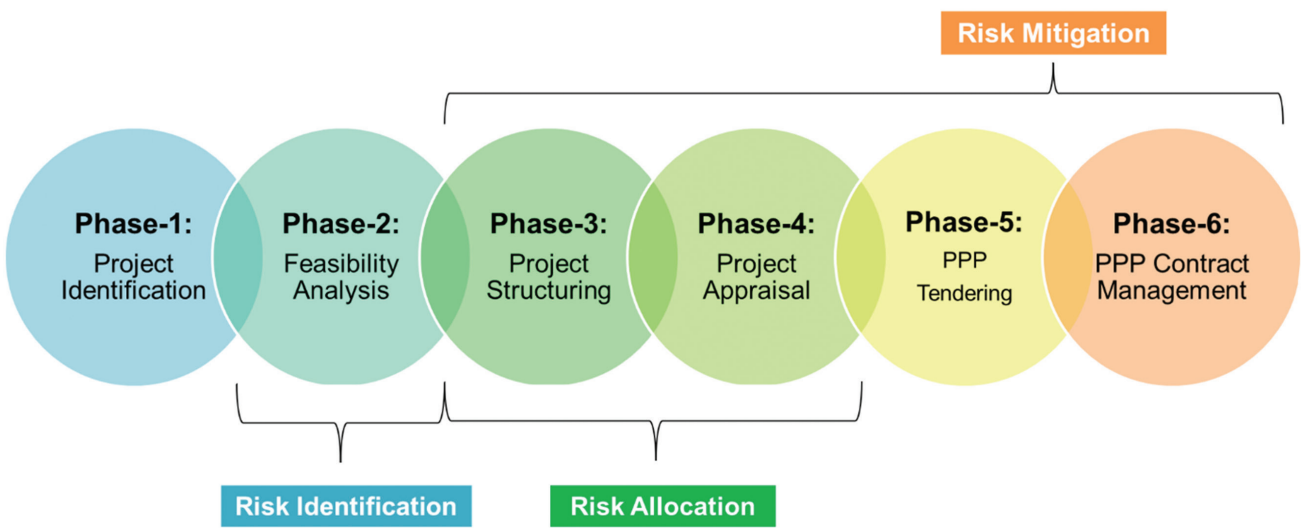
A PPP arrangement primarily involves two entities: 1. Project Sponsoring Authority (PSA) (**Public Partner**) and 2. Concessionaire (**Private Partner**). In a PPP arrangement, the Private Partner should be also willing to accept various risks where it has the ability to control/ mitigate them, and thereby earn profit as a reward for managing such risks more effectively and efficiently.

Risk identification and allocation between the PSA and the Private Partner is the critical element in PPP transaction and is the center of the PPP contract drafting process. Risk can become a key point of friction/ dispute in PPP transactions if not identified, allocated and mitigated optimally between the parties to the Agreement.

3.5 Risk Management in PPP Project Life Cycle

The PPPs are complex contractual arrangements with six broadly distinct phases over the project life. Each of the phases have their own nuances and impacts on the overall success or failure of the project. In an ideal situation, the stages of risk management – **identification, allocation and mitigation** - should be undertaken in a systematic manner during the lifecycle of a PPP Project. The first stage of risk management - **Risk Identification** - should take place in the feasibility stage. The second stage of risk management - **Risk Allocation** - should be done during the project structuring stage, when all risk identified for the project are allocated to the party best suitable to handle it at then minimum cost. The last stage in risk management process – **Risk Mitigation** – is primarily undertaken during the project appraisal, tendering and contract management stage when specific measures are undertaken to mitigate or minimize the impact of various risks arising from the project. The next three chapters detail each of these three stages of Risk Identification, Risk Allocation and Risk Mitigation in detail.

Figure 7: Placement of Risk Identification, Allocation & Mitigation in the PPP Life Cycle



CHAPTER 4: Risk Identification

4.1 Principles of Risk Identification

The principles of risk identification in a PPP project can be used to effectively identify potential risks associated with a project. These principles are essential for comprehensive risk management and can vary based on sector or project structure. However here are some general principles of risk identification:

- a) **Proactive and Systematic Approach:** Risk identification should be proactive and systematic rather than reactive. It involves following a structured methodology, that can identify risks across PPP lifecycle, reducing the chances of overlooking critical areas. This must begin at the project's conceptual stage and continue throughout the project lifecycle. The project can be compared to similar PPP projects in terms of risk profiles. Benchmarking can help identify common risks and develop best practices for risk management.
- b) **Comprehensive Stakeholder Involvement:** All relevant stakeholders, including the public sector, private sector, and project users, need to be involved in the risk identification process. Each party brings a unique perspective on potential risks and their impacts.
- c) **Maintenance of Risk Register and regular Risk Categorisation:** A comprehensive risk register must be maintained to document all identified risks. The register should include the risk description, potential impact, likelihood, and proposed risk response strategies. Also, risks must be categorised into various groups, such as financial, legal, operational, and construction risks and across project lifecycle. Historical data must be analysed from similar PPP projects to identify recurring risks and lessons learned. Risks can evolve over time, so it's essential to update the risk register regularly, especially with a special attention to regulatory and legal risks, as they can have a significant impact on PPP projects. Changes in laws or regulations can introduce new risks or alter the risk landscape.
- d) **Quantification and Qualification of Risks:** Probability and potential impact of each identified risk is to be assessed for understanding the severity of risk and its impact on the project. Tools like risk matrices can be used to categorize risks as high, medium, or low priority. It must be kept in mind that the benefit accrued from mitigating risk should outweigh the cost of bearing the risk.
- e) **Scenario Analysis with an emphasis on identifying risk interdependencies:** Scenario analysis can be performed to explore various risk scenarios and their potential outcomes. This can help in planning for contingencies. Since risks are often interconnected. There is

a need to analyse how one risk may trigger or exacerbate another, and plan accordingly. Sensitivity analysis can then be used to assess how changes in key variables, such as revenue projections or construction costs, can impact the project's overall risk profile.

- f) **Risk Tolerance and Allocation be undertaken diligently:** Risk tolerance levels must be defined for the public and private sectors, and accordingly risks need to be allocated based on their respective abilities to manage them. This is a critical aspect of structuring PPP agreements and will be dealt with in detail in chapter 6.

CHAPTER 5: Risk Allocation

The objective of the Reference Guide is to provide starting points for understanding risks commonly arising in PPP projects and their allocation. PSA/ their Consultants and Private Partners are expected to undertake detailed feasibility studies, commercial viability assessments, etc. to identify, assess and mitigate the sector specific risks.

5.1 Principles of Risk Allocation

The underlying principle of risk allocation is that each risk should be allocated to that party in the agreement which can manage it best. World bank's document on Allocating and Valuing Risk in Privately Financed Infrastructure Projects lays down the fundamental principle of risk allocation more precisely. It states that each risk should be allocated, along with rights to make related decisions, so as to maximize total project value. The Principles of Risk Allocation are as follows:

- a) **Risk allocated to the party that has influence over the corresponding factor:** Risk should be allocated to that party in a PPP project which can take action to improve or worsen the risk outcome. For example, the private party is usually in charge of project construction because it has the most expertise in that area. This also means it should bear the cost of construction over-runs or delays.
- b) **Emphasis on Balanced Risk Sharing:** Neither party should be overly burdened with the majority of the risks. There should be a well-balanced distribution of risks that considers each party's risk tolerance and its capacity to manage them. The allocation should be fair and reasonable, reflecting the financial capabilities of both public and private partners. A comprehensive assessment is required to understand the core competencies of a party to manage a particular risk. For instance, the private sector is often better suited to managing operational and maintenance risks, while the public sector may be better equipped to handle political and regulatory risks.
- c) **Influence or control the impact of the risk on project outcomes:** Party's ability to influence the sensitivity of the value of the project is also one of the ways to allocate risk in PPP Project. For example, while no party can control the risk of an earthquake, if the private firm is responsible for project design, it could use techniques to reduce the damage should an earthquake occur. If the risk is thus anticipated and allocated based on impact influence, the value of the project is made less sensitive to the risk factor.

- d) **Absorb the risk at low cost:** There will be times when no one can influence, anticipate, or respond to a risk factor in a way that changes the project’s value. At such times, the risk should be allocated to the party that can absorb the risk at the lowest cost. For example, the ability of governments to spread risk among taxpayers means they may have lower risk-bearing cost than private firms, whose ultimate risk-bearers are their shareholders.

- e) **Transparency and Accountability in Risk Allocation:** Both parties should have a clear understanding of their responsibilities and obligations. Early warning systems and clear dispute resolution procedures should be built in to address issues as they arise. This can help prevent disputes from escalating and disrupting the project. Periodic review and assessment of the risk allocation throughout the project’s lifecycle, especially when there are material changes in project conditions, should be undertaken. The risk allocation framework should be clearly documented within the PPP agreement. This ensures that all parties have a shared understanding of the allocation of risks and responsibilities.

- f) **Collaborative approach to Risk Management along with Flexibility for Changing Circumstances:** Flexibility in risk allocation to be allowed to accommodate changing circumstances or unforeseen events, while ensuring that changes are made through transparent and fair processes. Effective risk allocation in PPP projects requires a collaborative and well-thought-out approach to balance the interests of both public and private partners while maximizing the chances of project success. Tailoring the risk allocation to the specific characteristics of the project is essential.

5.2 Allocation of Risk

Risk allocation between PSA and Public partner is at the heart of every PPP transaction. A General Risk Matrix and Allocation in a PPP Project is given in the table below, whereby their mitigation measures are detailed in chapter 6.

Table 7: General Risk Matrix and Allocation in a PPP Project

S. No.	Risk Type		Risk Allocation			Sensitivity to project success	Period during which risk may precipitate	Remark
	Category	Sub-Category	PSA (Public Partner)	Private Partner	Shared			
Design and Construction Risk								
1.	Delay in Land Acquisition and in providing Access to Site Risk	Provision of required land	1			High	0-5 years	In certain PPP modes, the ownership of the assets including land is retained with the private partner. For eg. DBFOO model
		Timing of provision of required land	1			High	0-5 years	
		Suitability of land			1	High	0-5 years	
		Access to the site and associated infrastructure	1			Low	0-5 years	
		Site security			1	Low	0-5 years	
		Utilities and installations			1	Low	0-5 years	
		Site condition		1		High	0-5 years	
		Existing asset condition		1		Medium	0-5 years	
2.	Planning Risk	Key planning consents	1			High	0-5 years	
3.	Design Risk	Suitability of design		1		Medium	0-5 years	In limited Participation type of contracts (Service, O&M, lease), the Design risk is undertaken by Public Partner
		Approval of designs		1				
		Changes to design		1				
4.	Construction Risk	Cost increases		1		Medium	0-5 years	In limited Participation type of contracts (Service, O&M, lease), the Construction risk is undertaken by Public Partner
		Works completion delays		1		Medium	0-5 years	
		Project management and interface with other works/facilities		1		Medium	0-5 years	

Table 7: General Risk Matrix and Allocation in a PPP Project								
S. No.	Risk Type		Risk Allocation			Sensitivity to project success	Period during which risk may precipitate	Remark
	Category	Sub-Category	PSA (Public Partner)	Private Partner	Shared			
		Quality assurance and other construction regulatory standards			1	Medium	0-5 years	
		Liability for death, personal injury, property damage and third-party liability.		1		Medium	0-5 years	
5.	Approval Risk	Subsequent planning approvals			1	Low	0-5 years	
6.	Operations and maintenance risk	Increased operating costs and affected performance		1		Medium	Throughout	
		Performance/price risk		1		Medium	Throughout	
		Operational resources or input risk				Medium	Throughout	
		Intellectual property				Low	Throughout	
		Liability for death, personal injury, property damage and third-party liability				Medium	Throughout	
		Maintenance standards				Medium	Throughout	
7.	Demand Risk	Variation in the projected demand		1		High	Throughout	In certain PPP modes like Hybrid Annuity Mode and BOT-Annuity, the Demand risk is taken by PSA
		Adjacent Projects impact	1			High	Throughout	
		Government support measures	1			High	Throughout	

Table 7: General Risk Matrix and Allocation in a PPP Project								
S. No.	Risk Type		Risk Allocation			Sensitivity to project success	Period during which risk may precipitate	Remark
	Category	Sub-Category	PSA (Public Partner)	Private Partner	Shared			
8.	Revenue Risk			1		High	Throughout	
9.	Financial Closure Risk	Concessionaire’s ability to secure Project finance		1		Medium	0-5 years	
10.	Financial Market risk	Refinancing		1		Medium	Throughout	
		Inflation		1		Medium	Throughout	
		Exchange rate fluctuation		1		Low	Throughout	
		Interest rate fluctuation		1		Medium	Throughout	
		Unavailability of insurance		1		Low	Throughout	
11.	Technology risk			1		Low	Throughout	
12.	Handover risk			1		Medium	Penultimate 3 years	
13.	Force Majeure risk					High	Throughout	
14.	Concessionaire event of default					Medium	Throughout	
15.	Authority event of default		1			Medium	Throughout	
16.	Social Risk		1			Low	0-5 years	
17.	Environmental Risk		1			Low	0-5 years	
18.	Variations Risk		1			Low	Throughout	
19.	Change in law		1			Low	Throughout	

CHAPTER 6: Project Risk Mitigation

Projects Risk Mitigation refers to a plan or a course of action designed to reduce or eliminate potential threats that may impact successful implementation of a Project. It further involves taking steps to prevent risks from occurring or to reduce their likelihood or potential impact.

6.1 Principles of Risk Mitigation

Here are some principles typically followed in Project risk mitigation:

- a) **Cost of Risk Mitigation:** The cost of risk mitigation should not be more than the cost of risk itself. In simpler terms, the cost incurred by the PSA for mitigating a risk should be less than the cost expected to be incurred due to the risk if no mitigation measures would have been adopted. This principle should be applied at the time of feasibility assessment of the project.
- b) **Risk Prioritization:** Not all risks are equal in terms of their potential impact. Risks must be prioritized based on their severity and likelihood, focusing efforts on the most critical risks that could have a significant impact on your objectives.
- c) **Prevention / Impact reduction:** The best way to mitigate risks is to prevent them from occurring in the first place. This can involve implementing safety procedures, best practices and collecting historical data of similar projects to reduce the likelihood of a risk event. In case the risk can't be avoided or prevented, it may be more appropriate to transfer or share the risk between PSA and concessionaire. This can be done through identifying an ideal PPP mode of implementation and suitably incorporating changes in agreements executed for project implementation.
- d) **Ensuring Technical and Financial Expertise of the Private Partner:** It must be ensured that the private sector partner possesses the necessary technical expertise to design, construct, and operate the project effectively. This minimizes construction and operational risks. Financial due diligence of the project and the private partner must be done to prevent financial risks.
- e) **Regular Monitoring and Contingency Planning:** The risk landscape needs to be continuously monitored and reassessed as circumstances change. New risks may emerge, and the severity or likelihood of existing risks may be shifted. Project must have a comprehensive contingency plan for high-impact risks. These plans should outline how the project will respond to and recover from unforeseen events.

6.2 Risk Mitigation measures for Project

In this chapter, each risk will be detailed along with a mitigating approach for both the private partner as well as the PSA.

6.2.1 Delay in Land Acquisition and in providing Access to Site Risk

Land availability with clear title, free from encumbrances and hindrances with reasonable and clear access is the first and foremost requirement of a PPP project. Majority of projects in India get stuck or delayed due to lack of timely availability of the entire parcel of land promised.

471st Flash Report³ on Central Sector projects (Rs. 150 Crore and above) – Feb 2025 issued by Infrastructure and Project Monitoring Division, Ministry of Statistics and Programme Implementation, Government of India

Out of 1,719 projects (worth Rs 25.94 lakh cr), 46 projects are ahead of schedule, 498 on schedule, **771 have reported time overruns and 461 projects have cost overrun**. 263 projects have both time and cost overruns. Major reasons for overruns include delays in **land acquisition**, delay in obtaining forest/ environmental clearance, inadequate infrastructure support and linkages, encroachments, etc.

Some of the factors contributing to the risk associated with land availability/ land acquisition are:

- Inheritance rights/ ownership issues related with the project site
- Procedural delays in obtaining requisite approvals/ permissions under statutory acts/ laws (e.g., The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation And Resettlement Act, 2013)
- Delay in providing access to the Site due to regulatory issues (forest/ environmental clearances)
- Agitation by farmers/ residents occupying the land/ project site
- Site conditions/ suitability of site for the Project
- Delay in removal of encroachment/ encumbrances attached to Project Site/ROW
- Delay in resettlement/ rehabilitation of the residents occupying the project site/ ROW

PSA (Public Partner) typically bears the risk of availing and acquiring the land/ right of way (ROW) for the project as the Authority is the most competent and empowered to acquire

³<https://uatipm.mospi.gov.in/Content/pdf/FlashReportJanuary.pdf>

land/right of way (ROW)/ project corridor with clear title for the project through various legal means (e.g., land acquisition act), also the project land is expected to return to the PSA upon expiry or termination of the Project. However, in case of DBFOO, where land acquisition is to be undertaken by private partner, the risk is also shifted to the private partner

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Public Partner
	O&M Contracts	Public Partner
	Lease	Public Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Public Partner
	BOT- HAM	Public Partner
Partnership Project Development and Investment Opportunities	OMDA	Public Partner
	DBFOT	Public Partner
	DBFOO	Private Partner

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Condition Precedent	Land Acquisition: • <i>Concessionaire shall satisfy himself about the availability of minimum 90% of the Construction Zone as per joint memorandum signed in accordance with clause 10.3.1 and 10.3.2, subject to the condition that the available Construction Zone shall be sufficient for achievement of COD before the Appointed Date.</i>⁴ <i>Reference clause for illustration purpose</i>^{5 6}

⁴As per Model Concession Agreement for PPP in BOT – Toll Model by MORTH - Condition Precedent - Clause 4.1.3 (i)

⁵“The Authority, prior to the Appointed Date, shall have granted vacant access and Right of Way for construction of Project to the extent of **at least 80% of the length** thereof.”

Source:- Model Concession Agreement for PPP in Hybrid Annuity Model by MORTH -[Condition Precedent - Clause 4.1.2 (a) and Obligations of the Concessionaire – Clause 10.3.2]

⁶“The Authority on or prior to the Appointed Date, shall have granted [vacant access and Right of Way such that the **Appendix shall not include more than [10% (ten per cent)] of the total area of the Project Site** required and necessary for the Resort and Project Infrastructure]. For avoidance of doubt, the Authority acknowledges and agrees that the **Appendix shall not include any land which may prevent the development of the Resort and Project Infrastructure.**”

Source:- Concession Agreement - Guiding Principles for PPP in Development & Operation of Eco-Tourism Resort and Supporting Infrastructure by NITI Ayog -[Condition Precedent - Clause 4.1.2 (a) and Obligations of the Concessionaire – Clause 10.3.3]

Section of Agreement	Contractual Provision
	<i>In case the Authority fails to fulfill the condition precedent with respect to procurement of land/ ROW it shall be considered breach of Agreement by the Authority making it liable to pay damages to the Concessionaire including termination of the Agreement.</i> Site Access: <i>The concession granted shall entitle the concessionaire (Private Partner) to access and license to the Site for the purpose of and to the extent conferred by the provisions of Agreement.</i>
Obligations of the Concessionaire (Private Partner)	Site Security: <i>During Construction Period and Operation Period, the Concessionaire shall protect the Project Site/ ROW from any and all occupations, encroachments or Encumbrances, and shall not place or create nor permit any Contractor or other person claiming through or under the Concessionaire to place or create any Encumbrance or security interest over all or any part of the Project Site/ROW or under this Agreement, save and except as otherwise expressly set forth in the Agreement.</i>

Note:- Clause(s) for the above contractual provision should be incorporated suitably in the Agreement with appropriate legal language with due legal vetting.

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
- Procure issuance of statutory notification under Applicable Laws for vesting of land for the project - Complete the process of land acquisition in accordance with applicable laws - Conduct detailed assessment of ownership status of land and ensure that the title of land is in favor of Authority before initiating the tendering process - Resolve inheritance/litigations issues, if any, related with the project site - Remove encroachment/ encumbrances (if any) before handing over the land to the private partner - Include the site access under the Obligations of the Authority - Assess the site conditions and its connectivity(s). - Consortium of Lenders may be a better option than the individual lender to ensure continuity of disbursement of funds - Ensure that the disbursement schedule mentioned in the Financing Agreement is aligning with capex phasing	Conduct all the due diligence related to the site by due site visit before bidding for the project

State Government as a stakeholder in Infrastructure Projects

State governments play a pivotal role in implementing infrastructure projects in India, particularly due to their responsibilities in land acquisition and granting necessary clearances. Land acquisition is a state subject under the Constitution, making state governments indispensable in ensuring the smooth availability of land for projects. Furthermore, states are responsible for issuing environmental, forest, and other regulatory clearances required for project implementation. Their active support is also essential in de-bottlenecking project implementation especially in areas such of recovering land from from encroachments, protection of key areas that have significant animal and bird habitat, provision of additional incentives as additional FSIs in nearby areas, etc. Thus, the cooperation and efficiency of state governments directly impact project timelines, costs, and overall success.

6.2.2 Planning Risk

It refers to the risk that the pre-development studies (technical, legal, financial, and others) conducted are inadequate or are not robust enough resulting in possible deviations from the planned or expected outcomes in the PPP project development.

Since planning is done during project conceptualization phase, mitigation through contract provisions is not applicable for this risk. Also, it may be noted that irrespective of the PPP mode, the planning risk is borne by public partner only as it is addressed during pre-development phase of the project.

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
• The Authority should appoint a diligent transaction advisor to ensure technical, legal, financial due diligence in the project including site visit and verification of information in the RFP. • Projects with limited capex may be bundled to sizeable capex to attract long term commitment of private sector.	• Private Partner should conduct their own financial & technical analysis of the project before submitting bid for the project

6.2.3 Financial Closure Risk

Once the Contracting Authority and the selected Bidder have signed the Concession Agreement, they are contractually committed to implement the project. Arranging finance for the implementation of the project, is the upmost hurdle which the Concessionaire has to arrange. Financial close means when the finance for the project is arranged and occurs when all the project agreements as well as financing agreement have been signed. The provisions herein enable flow of funds (debt, equity, grant etc.) so that the implementation of the project may start with immediate effect. In simple words, financial close means that the funds for the project have been arranged.

In a PPP project agreement, Private Partner is obligated to make investment (equity and debt) in the Project therefore responsibility of the arranging finances for the project is vested with the Private Partner and such risk shall be borne by the Operator only except viability gap funding (VGF) commitment by Authority, if any. Irrespective of the PPP mode, the financial closure risk is borne by public partner only.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	N/A
	O&M Contracts	N/A
	Lease	N/A
Integrated Project Development and Operation Opportunities	BOT-Annuity	Private Partner
	BOT- HAM	Private Partner
Partnership Project Development and Investment Opportunities	OMDA	Private Partner
	DBFOT	Private Partner
	DBFOO	Private Partner

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Condition Precedent of the Concessionaire	Concessionaire shall have executed and procured the Financing Agreement, Escrow Agreement and Substitution Agreement. Reference Clause for illustration purpose⁷

Note:- Clause(s) for the above contractual provision should be incorporated suitably in the Agreement with appropriate legal language with due legal vetting.

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
Include the Financial Closure along with Substitution Agreement and Escrow Agreement under the Condition Precedent of the Concessionaire	- Assess the financial soundness the Lender(s). - Consortium of Lenders may be a better option than the individual lender to ensure continuity of disbursement of funds - Ensure that the disbursement schedule mentioned in the Financing Agreement is aligning with capex phasing

⁷As per Model Concession Agreement for PPP in BOT – Toll Model by MORTH - Condition Precedent - Clause 4.1.3

6.2.4 Design Risk

PSA usually concerned with output parameters which satisfies the minimum performance standards/ specifications, ensure compliance with applicable legal requirements and good industry practices and Private Partner is allowed to innovate and bring efficiency gains while designing the project therefore the prime responsibility for adequacy of project design (including its approval from competent authorities) is vested with the Private Partner.

As the Private Partner is given freedom to design the project, Private Partner will bear the risk of obtaining design approvals as it will have principal responsibility for preparing the detailed design and obtaining relevant approvals from the competent authorities. However, if the Private Partner has complied with all relevant conditions required for design approval and the competent authority does not approve the designs then the PSA will share this risk to the extent the relevant authority does not act properly or within approval process deadlines. In addition to that construction at the Project site as per the approved design is solely vested with the Private Partner.

In case limited private participation types of PPP projects like service contract, O&M contracts and lease the design and construction risk is undertaken by Public Partner.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Public Partner
	O&M Contracts	Public Partner
	Lease	Public Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Private Partner
	BOT- HAM	Private Partner
Partnership Project Development and Investment Opportunities	OMDA	Shared
	DBFOT	Private Partner
	DBFOO	Private Partner

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Obligations of the Concessionaire	• Prepare the design & drawings of the project complying with the project specifications outlined in the Agreement. • Obtain approval of the PSA, Independent Engineer appointed for the Project, design & drawings approval authority. • Ensure and be solely responsible for any defect and/or deficiency in the Designs and Drawings relating to the Project or any part thereof and accordingly the Concessionaire shall at all times remain responsible for its obligations under the Agreement.

Note:- As per Model concession agreement - 2021 of Port sector [Clause(s) for the above contractual provision should be incorporated suitably in the Agreement with appropriate legal language with due legal vetting.]

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
- Clearly specify the output specifications/ performance parameters desired from the Private Partner. - Appoint an independent engineer to ensure the project is executed as per the approved drawings & designs - Authority should also make Independent engineer liable for submitted design and drawings	- Conduct site survey, detailed geo technical investigations of the site, demand assessment, comply with rules & regulations of the competent authorities/ regulatory bodies, performance parameters mentioned in the tender document, etc. for designing the Project. - Set-up an efficient project monitoring mechanism to ensure that the project is executed as per the approved drawings & designs.

6.2.5 Construction Risk

In a PPP project, responsibility of the construction of the project in accordance with the approved design and drawings and the performance specification specified in Concession Agreement is solely vested with the Private Partner.

A typical PPP project primarily involves time and construction cost overrun risk under the category of construction risk which may arise due to following reasons:

- Delay in availability of land for the project (land acquisition, encroachment/ encumbrances attached to Project Site, uninterrupted access to the site, rehabilitation/ resettlement of occupants of the project site, etc.)
- Delay in resettlement/ rehabilitation of the residents occupying the project site/ ROW
- Delay in shifting of utilities/ infrastructure from the project site
- Site conditions and suitability of the site for undertaking construction works
- Poor quality of survey and geo-technical investigations of the site
- Constrained supply of construction materials, equipment, plants & machinery
- Stoppage of works at project site/ part of project site due to archeological findings, minerals
- Sudden escalation in price of construction materials
- Accidents at the site including natural calamities e.g., excessive rain, cyclone
- Defective and poor-quality works at the site
- Infringement of intellectual property rights/ licenses related with the construction activities
- Force majeure event, events of default of the PSA/ Private Partner

Responsibility of construction risk is solely vested with the Private Partner to the extent such risks are not caused by the force majeure, change in law, change in scope of works, PSA’s event of default. In case limited private participation types of PPP projects like service contract, O&M contracts and lease the construction risk is undertaken by Public Partner.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Public Partner
	O&M Contracts	Public Partner
	Lease	Public Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Private Partner
	BOT- HAM	Private Partner
Partnership Project Development and Investment Opportunities	OMDA	Shared
	DBFOT	Private Partner
	DBFOO	Private Partner

Risk Mitigation Measures from Project / Contract Perspective:

As discussed above, Private Partner is responsible for construction risk, however the following provisions should be incorporated in the Concession Agreement to safeguard the interest of the Authority with respect to Private Partner’s obligation:

Section of Agreement	Contractual Provision
Obligations of the Concessionaire	Delay in Construction of the Project:⁸ • The Concessionaire shall construct the Project in accordance with the Project Completion Schedule set forth in the Concession Agreement. In the event that the Concessionaire fails to achieve any Project Milestone within specified period from the date set forth for such Project Milestone, unless such failure has occurred due to Force Majeure or for reasons solely attributable to the Authority, Concessionaire shall pay Damages to the Authority in a sum calculated at the rate of 0.1% (zero point one per cent) of the amount of Performance Security for delay of each day until such Project Milestone is achieved. • In the event, Project is not completed on the Scheduled Project Completion date, unless the delay is on account of reasons solely attributable to the Authority or due to Force Majeure, the Authority shall be entitled to terminate this Agreement. Liability for Death, Personal Injury, and third-Party Liability:⁹ • Concessionaire, shall during Concession Period, procure and maintain insurance cover for loss, damages or destruction of project assets; comprehensive third party liability insurance including injury to or death of personnel caused by the project; liability to third parties for goods or property damages; workmen’s compensation insurance; any other insurance that may be necessary to protect Project, Concessionaire and Authority for the events which are insurable at commercially reasonable premiums.

⁸As per Model Concession Agreement for PPP in BOT – Toll Model by MORTH - [Four-Laning] of the Project Highway - Clause 12.4

⁹As per Guiding principles in Concession Agreement for Medical education by Niti Aayog – Insurance cover – insurance cover – clause 33.2

Section of Agreement	Contractual Provision
	IPR/Licenses: • Concessionaire shall during the construction and operation of the project, procure, as required, the appropriate proprietary rights, licenses, agreements and permissions for materials, methods, processes, and systems used or incorporated into the Project;¹⁰

Note:- Clause(s) for the above contractual provision should be incorporated suitably in the Agreement with appropriate legal language with due legal vetting.

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
• Delay in construction due to Interdependence with other projects may result in delay of the Project. PSA should ensure that there is no delay due to carrying out a particular work or making available an existing facility to the private partner.	Cost Increase Risk: • Include contingency pricing in cost estimates to cover-up the cost overruns • In-place robust project monitoring mechanism to check the cost overruns • Obtain performance security/guarantee from sub-contractors to mitigate their non-performance risk Project Completion Delays: • Strict enforcement of construction deadlines internally as well as the with the sub-contractors • Separate the major tasks/works in the construction plan and monitor them separately Health & Safety Compliance: • Ensure strict compliance with applicable health & safety standards issued by competent authorities for construction and operation works Liability for Death, Personal Injury, and third-Party Liability: • Obtain appropriate insurance cover for potential third-party liabilities and indemnify the PSA. Intellectual Property Rights/ Licenses • Obtain valid licenses for use of patented/ IPR as may be required to use for construction of the project

¹⁰As per Guiding principles in Concession Agreement for Medical education by Niti Aayog – General obligations – clause 5.1. (i)

6.2.6 Approval Risk

At the preparatory stage, project may require approvals (in-principle/ final) within the Government system which may include approval of cabinet, empowered committee/ high powered committee/ Public Private Partnership Appraisal Committee (PPPAC)/Standing Finance Committee (SFC), etc.

A project may also require clearances from Ministry of Environment, Forest & Climate; India Railways, Coastal Zone Management Authority, felling of trees etc. Ideally PSA and Concessionaire should divide the applicable permits and required clearances based on best-suited basis, irrespective of the PPP mode stated in table below, which is only an indicative guidance.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Shared
	O&M Contracts	Shared
	Lease	Shared
Integrated Project Development and Operation Opportunities	BOT-Annuity	Shared
	BOT- HAM	Shared
Partnership Project Development and Investment Opportunities	OMDA	Shared
	DBFOT	Shared
	DBFOO	Shared

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Condition Precedent	Pre-award Clearances: • Authority shall have procured all Applicable Permits relating to environmental protection & conservation, forest clearances, Indian Railways clearances (as applicable) in respect of the land forming part of the project site/ROW/project corridor. • The Concessionaire shall construct, upgrade, install and establish the Project Facilities, including the basic and detailed design, completion, testing and commissioning in accordance with the provisions of this Agreement, including the Project Completion Schedule, the Specifications and Standards, Applicable Laws including the applicable architectural controls, building byelaws and zoning requirements, terms of Applicable Permit and Good Industry Practice¹¹

Note:- Clause(s) for the above contractual provision should be incorporated suitably in the Agreement with appropriate legal language with due legal vetting.

¹¹As per Model Concession Agreement for PPP in Hybrid Annuity Model by MORTH -[Condition Precedent - Clause 4.1.2 (b) (c) (d) and Obligations of the Concessionaire – Clause 10.3.2]

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
- PSA should Identify all requisite pre-award clearances/ approvals at the feasibility/ DPR stage and obtain it before award of the Project - PSA should facilitate in procuring applicable permits assigned to concessionaire	Private Partner should have a clear timeline required for the approvals and Permits required in a Projects to prevent any construction delay

6.2.7 Technology Risk

In a PPP project, PSA usually specifies output-oriented performance parameters, and the Private Partner has contractual obligation to adopt the suitable technology as per requirement to deliver those outputs therefore all risks related with technology upgradation/ modernization are to be borne by the Private Partner.

Usually, technology interventions and its upgradation are expected to bring-in operational efficiencies and increased revenue for Private Partner. Irrespective of the PPP mode, technology risk is borne by Private Partner.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Private Partner
	O&M Contracts	Private Partner
	Lease	Private Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Private Partner
	BOT- HAM	Private Partner
Partnership Project Development and Investment Opportunities	OMDA	Private Partner
	DBFOT	Private Partner
	DBFOO	Private Partner

Risk Mitigation measures for Project through Partner’s perspective

Section of Agreement	Contractual Provision
CHANGE IN SPECIFICATION AND TEHNOLOGICAL UPGRADATION	The Concessionaire shall implement at its own cost, a technology watch throughout the Concession Period so as to allow the Project to benefit from technical advancement and/or technology upgrades in connection with the equipment for rendering the Services ¹²

Note:- The above clause is indictive only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

¹²As per Guiding principles in Concession Agreement for Medical education by Niti Aayog – Technology watch– clause 18.7

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
PSA should clearly specify in Tender document and agreement that the Private Partner shall be liable to introduce technology up-gradation during project period to bring-in efficiencies in operations and improve performance standards to the next level and cost of such technology up-gradation shall be borne by the Private Partner solely.	Private Partner should be vigilant for the technological upgradations taking shape in industry and keep adopting newer technologies for performance improvement

6.2.8 Operation and Maintenance Risk

In a PPP project, project is usually operated by Private Partner completely own its own as per the terms of the Agreement therefore the operating risks e.g. increase cost of operation beyond the projected cost, project performance standards, health & safety, maintenance standards, etc. are vested with the Private Partner.

Irrespective of the PPP mode, O&M risk is borne by Private Partner.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Private Partner
	O&M Contracts	Private Partner
	Lease	Private Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Private Partner
	BOT- HAM	Private Partner
Partnership Project Development and Investment Opportunities	OMDA	Private Partner
	DBFOT	Private Partner
	DBFOO	Private Partner

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Role and functions of the Independent Engineer	<i>Review, inspection and monitoring of operation and maintenance as set forth in the concession agreement¹³</i>
Operation and Maintenance	O&M Obligation of Concessionaire and PSA should be clearly defined.

Note:- The above clause is indicative only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

¹³As per Model Concession Agreement for PPP in BOT – Toll Model by MORTH, Schedule-Q - Terms of Reference for Independent Engineer

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
PSA should ensure that there is robust performance monitoring mechanism in place for the project to receive early warning of matters requiring improvement or remediation.	- Include contingency pricing in O&M estimates to cover-up the cost overruns - In-place robust project monitoring mechanism to check the cost recurring cost & expenditure overrun - Look for additional revenue streams to offset the increased O&M cost Intellectual Property Rights: - Obtain all requisite licenses in valid and legal manner as may be required for O&M of the project Health & Safety Compliance: - Ensure strict compliance with appliance health & safety standards issued by competent authorities for construction and operation works Liability for Death, Personal Injury, and third-Party Liability: - Obtain appropriate insurance cover for potential third-party liabilities and indemnify the PSA

6.2.9 Demand Risk

Refers to the risk that demand for service will vary from initially projected, such that the total revenue derived from the project over the project term will vary from initial expectations. Change in demand may also arise due to set up of any competing facility in the project vicinity.

The allocation of demand risk can vary depending on the type and specific mode of PPP. In case of DBFOT projects where a new infrastructure facility is to be developed the demand risk is often borne by the private partner. The private partner takes on the responsibility of designing, constructing and operating the facility while also assuming the risk associated with the demand for the services. The same is valid for DBFOO mode as well.

In PPP projects developed on BOT- HAM or BOT-Annuity mode, demand risk is borne by the Public Partner. They also take care of toll collection or user charges received from operation of the project. The same is valid for Service and O&M contract as well.

In some cases, demand risk is shared between the public and private partners. This can be done through revenue-sharing mechanisms or contractual arrangements that provide incentives for both parties to manage and mitigate demand risk. The sharing of risk encourages collaboration and aligns the interests of both partners. The table below show demand risk allocation in some of the prevalent PPP model.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Private Partner
	O&M Contracts	Private Partner
	Lease	Private Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Private Partner
	BOT- HAM	Private Partner
Partnership Project Development and Investment Opportunities	OMDA	Private Partner
	DBFOT	Private Partner
	DBFOO	Private Partner

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Competing Facilities	The PSA Should not operationalise any additional facility within site Limits either on its own or through any other Person until the earlier of 5 (five) years from the Scheduled Project Completion Date or based services level reaches a certain benchmark
Minimum Guaranteed Cargo	In case of Ports Project, the Concessionaire provides a minimum cargo guarantee to the Concessioneing Authority irrespective of the actual cargo handled

Note:- The above clause is indictive only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

Risk Mitigation measures for Project through Partner's perspective

Project Sponsoring Authority (Public Partner)	Private Partner
PSA should undertake the detailed feasibility studies and the project viability should be assessed with realistic assumptions	Private Partner must undertake its own assessment (other than PSA's) of the demand forecast to ascertain project viability

6.2.10 Revenue Risk

In Public-Private Partnership (PPP) projects, revenue risk refers to the uncertainty associated with revenue generation, particularly due to either demand fluctuations or due to collection inefficiency. Revenue Risk when not mitigated causes realization of overall revenues from the project much less than planned. This in turn causes severe financial stress on the project, leading to ancillary and interdependent issues like delay in loan repayment, working capital imbalance, unavailability of funds to carry out concessionaire obligations such as O&M.

In user-pay projects like toll roads or water supply PPPs, revenue risk includes fluctuations in user charges that may impact anticipated income levels. The tariff levels can be set by the authority or the private partner under certain rules and caps.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Public Partner
	O&M Contracts	Private Partner
	Lease	Private Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Private Partner
	BOT- HAM	Public Partner
Partnership Project Development and Investment Opportunities	OMDA	Private Partner
	DBFOT	Private Partner
	DBFOO	Private Partner

Risk Mitigation measures for Project through Partner's perspective

Project Sponsoring Authority (Public Partner)	Private Partner
- PSA can incorporate mechanisms such as Minimum Revenue Guarantee in the project. - Percentage of revenues guaranteed by PSA. - If actual revenues fall below the guaranteed percentage, then PSA reimburses to that extent - Amount is disbursed as a grant and not recovered. - PSA can provide Revenue Shortfall Loan in the project. - Percentage of revenues guaranteed by PSA. - If actual revenues fall below the guaranteed percentage, then PSA steps in to that extent - Amount is disbursed as a loan with or without interest, to be repaid over a period of time. Also, Authority can structure PPP in a way which incorporates Flexible Term Contract - Variation in the tenure of the concession period due to variance of actual traffic vis-à-vis projected traffic. - If the actual traffic > projected traffic, then concession period is proportionately reduced and vice versa. - Provision to cap concession period variation in concession period If collection is done by Authority, then the CA should carry clear principles of transfer of revenue to Private Party timely.	Private Partner can mitigate revenue risk through strong sensitivity analysis in revenue projections. Upside and downside traffic scenarios can be developed to assess revenue uncertainties and allocate risks between the government and concessionaire accordingly

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Tipping Fee/ User fee Reserve Account (Payment Mechanism)	The State/ Confirming Party shall maintain a separate Special Account (Tipping fees reserve account) for the disbursement of the monthly tipping fees payable to the concessionaire. The State/ Confirming Party shall maintain a minimum amount of 3 months' estimated payment advance of the prevailing tipping fees considering the inflation adjustments at all times, during the entire concession period to safeguard the concessionaire against any risk of non-payment of tipping fee from Authority ¹⁴
Revenue Short Fall Loan	If the Realisable Fee in any Accounting Year shall fall short of the Subsistence Revenue as a result of an Indirect political Event, a Political Event or an Authority Default, as the case may be, the Authority shall, upon request of the Concessionaire, provide a loan for meeting such shortfall (the "Revenue Shortfall Loan") at an interest rate equal to 2% above the Bank Rate ¹⁵
Fixed Storage Charge (Silo Projects)	"Fixed Storage Charge" means the Capacity-linked charge payable by the Authority to the Concessionaire under the Agreement. ¹⁶ The Fixed Storage Charges is payable on the Capacity of the Silo Complex, irrespective of the actual usage of that Silo Complex by the Authority but subject to the Availability of that Silo Complex

6.2.11 Financial Market Risk

In a PPP arrangement, Private Partner is usually given complete responsibility for the construction, operation & management of the Project as per the terms of the Agreement, therefore the financial market risks e.g. inflation risk, exchange rate fluctuation, interest rate fluctuation, re-financing, unavailability of insurance covers for certain risks, etc. are to be borne by the Private Partner irrespective of the PPP modes.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Private Partner
	O&M Contracts	Private Partner
	Lease	Private Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Private Partner
	BOT- HAM	Private Partner
Partnership Project Development and Investment Opportunities	OMDA	Private Partner
	DBFOT	Private Partner
	DBFOO	Private Partner

¹⁵As per Model concession agreement for Roads-BOT-Toll, MORTH - clause 28.1.2

¹⁶As per Model concession agreement for Food grain silos-DBFOO- Article1

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Obligations relating to refinancing	Upon request made by the Concessionaire to this effect, the Authority shall, in conformity with any regulations or guidelines that may be notified by the Government or the Reserve Bank of India, at the case may be, permit and enable the Concessionaire to secure refinancing, in whole or in part, of the Debt Due on such terms as may be agreed upon between the Concessionaire and the entity providing such refinancing; provided, however, that the refinancing hereunder shall be utilized for the project purpose only and shall always be subject to the prior approval of the Authority, which shall not be unreasonably withheld. For the avoidance of doubt, the tenure of debt refinanced hereunder may be determined mutually between the Senior Lenders and the Authority, but the repayment thereof shall be completed no later than 1(one) year prior to the expiry of Concession Period. ¹⁷
Insurance	The Concessionaire shall effect and maintain at its own cost, during the Concession Period, such insurances for such maximum sums as may be required under the Financing Agreements and Applicable Laws, and such insurances as may be necessary or prudent in accordance with Good Industry Practice ¹⁸

Note:- The above clause is indicative only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
• Build-in the inflation factor (e.g WPI/CPI) while estimating the CAPEX and OPEX of the Project • In case of refinancing, PSA’s consent should be obtained.	• Build-in the inflation factor (e.g WPI/CPI) while estimating the CAPEX and OPEX of the Project • Hedged exchange traded funds (ETF)/ currency forwards, currency futures, etc. may be exercised to reduce the exchange rate risk

6.2.12 Handover Risk

The final task in a PPP Project is the transfer of assets and operations at the end of the concession period (or earlier in case of termination). The date on which the Agreement expires or is terminated by a Termination Notice is called Transfer Date. The approach to this transfer should be clearly defined in the contract.

The Private Partner is responsible for risk of the project assets including land being handed back to the PSA in a timely manner and in good working condition “as-is-where-is” basis on

¹⁷As per Model Concession Agreement for PPP in BOT – Toll Model by MORTH – Obligations relating to refinancing – clause 6.4

¹⁸As per Model Concession Agreement for PPP in BOT – Toll Model by MORTH – Insurance during Concession Period – clause 32.1

the Transfer Date. In PPP mode such as DBFOO where the ownership of asset is with the Private Partner, there is no handover risk.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Private Partner
	O&M Contracts	Private Partner
	Lease	Private Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Private Partner
	BOT- HAM	Private Partner
Partnership Project Development and Investment Opportunities	OMDA	Private Partner
	DBFOT	Private Partner
	DBFOO	N/A

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Transfer on Expiry of the Concession Period / Termination	<i>The Concessionaire agrees that at least 6 Months prior to the expiry by efflux of time of the Concession Period, it shall, cause to be conducted at its cost by an Independent Engineer, a condition survey and an inventory of the entire Project Facilities and Services. If, as a result of such survey, the Expert notice that the Assets and Services or any part thereof have/has not been operated and maintained in accordance with the requirements therefor under this Agreement the Concessionaire shall, at its cost and expenses, take all necessary steps to put the same in good working condition well before the Transfer Date.¹⁹</i> <i>If for any reasons other than those attributable to the PSA the Concessionaire fails to transfer assets, rights and contracts on the Transfer Date, there shall be no suspension of the operation and maintenance of the Project Facilities and Services and the Concessionaire shall, as a trustee of the Concessioneing Authority, continue to operate and maintain the Project Facilities and Services or such of them, as directed by Concessioneing Authority until completion of the relative transfer formalities</i> <i>In the event of failure to do so, the Concessionaire shall be liable to pay to the PSA, for every Day of delay, liquidated damages computed at the rate of the average daily profits earned during the 3 (three) years immediately preceding the Transfer Date, or from COD till Transfer date in case the Project is terminated less than three years from COD.²⁰</i>

¹⁹As per Model concession agreement - 2021 of Port sector – 12.1.f – condition survey

²⁰As per Model concession agreement - 2021 of Port sector – 17.6 – Delayed Transfer of Assets

Section of Agreement	Contractual Provision
Defect Liability upon Termination	The Concessionaire shall be responsible for all defects and deficiencies in the Project for a period of 120 days after Termination/Transfer Date, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project. ²¹

Note:- The above clause is indicative only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

Risk Mitigation measures for Project through Partner’s perspective

Project Sponsoring Authority (Public Partner)	Private Partner
PSA should make sure that the concession agreement includes mechanism for surveying/ assessing the condition of project assets in advance of Handover to ensure appropriate measures are undertaken by the Concessionaire to ensure quality of the asset is maintained as mentioned in the concession agreement.	- Private Partner can mitigate handover risk through maintaining proper insurance of project assets. - For example, if the project infrastructure is damaged prior to handover as a result of unforeseen circumstances, the Private Partner will typically be obliged to repair it at its own cost. Maintaining insurance would cover the risk partially or fully.

6.2.13 Force Majeure Risk

Force majeure is an event (or combination of events) outside the reasonable control of contracting parties which prevents one or both parties from performing all or a material part of their contractual obligations therefore risk is to be shared by both parties for the events specified as force majeure event in the Agreement. The basic principle of force majeure is that the risk is shared, and each party bears its own loss irrespective of the PPP mode.

Section of Agreement	Contractual Provision
Force Majeure	Standard bidding documents of NHAI, Ports, MMLP etc. shall be referred for drafting the clauses related to force majeure events, cost and risk to be borne by respective parties due to force majeure events, responsibility of notice of force majeure, extent of force majeure, etc.

Note:- The above clause is indicative only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

6.2.14 Concessionaire Event of Default

It refers to the risk arising in the event of default of the Concessionaire i.e. Private Partner fails to fulfill its contractual obligations. The PSA on the other hand, will consult lenders for remedial measures. If remedial measures didn’t work out, then as per provisions of Concession

²¹As per Model Concession Agreement for PPP in BOT – Toll Model by MORTH – Liability for defects after Termination – clause 39.1

Agreement, the PSA steps in and tries to get fulfilled those unfulfilled obligations of the Concessionaire. The related cost is recovered from the Concessionaire as per the provisions of Concession Agreement. In case of early termination, the Private Partner is at risk of being deprived of its expected revenue stream to repay the debt that it incurred in developing the project.

Risk	Allocation
Concessionaire Event of Default	Shared

It may be noted that irrespective of the PPP mode, the risk is shared by Public Partner as well as Private Partner.

Section of Agreement	Contractual Provision
General	Liquidated damages, Key Performance Indicators should be clearly defined in the agreement The damages are linked with Performance Security for each and every day of delay

Note:- The above clause is indicative only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

6.2.15 Authority Event of Default

It refers to the risk that the PSA will fail to fulfill its contractual obligations during concession period. During pre-COD period, if the PSA fails to fulfill any or all of its obligations, then the extension of time is granted to the PSA as per provisions of Concession Agreement. Post completion of cure period, the PSA is liable for the damages to be paid to the Concessionaire.

Risk	Allocation
Authority Event of Default	PSA

Similarly, for post-COD period, for all breach of Agreement, the PSA shall pay the damages to the Concessionaire as per provisions of Concession Agreement.

Hence, it may be noted that irrespective of the PPP mode, the risk is borne by Public Partner only

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
General	Liquidated damages, Key Performance Indicators should be clearly defined in the agreement The damages are linked with Performance Security for each and every day of delay

6.2.16 Social Risk

Policy relating to social impacts (relocation, resettlement, rehabilitation, impact on habitat) of an infrastructure is vested with the PSA therefore the Authority is required to bear this risk, however, the private partner will be responsible for implementing social management measures.

PSA at the time of the project preparation stage should study the impact of the proposed project on adjacent residents/ habitants, social infrastructure, communities, and adjacent properties (including natural resources e.g. river, forest, mountain, wildlife, etc.) and conduct the Social Impact Assessment (SIA) studies to minimize the negative impact of the project on adjacent habitants/ properties. Private Partners should adopt nationally/ internationally recognized social standards and practices to manage the social risks.

Risk	Allocation
Social Risk	PSA

Social risks such as nationwide/ sector-wise labour strikes should be borne by the Authority, however the social risks such as the labour strike only at the project facility shall be borne by the Private Partner only.

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Obligation of the Authority	The authority shall be liable for the rehabilitation and resettlement of persons affected by the construction of the Project. Reference Clause ²²

Note:- The above clause is indicative only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

6.2.17 Environmental Risk

PSA is the most competent and empowered one to process and obtain the environmental in-principle permits before starting the procurement process. However, the compliance to the environmental laws during construction and operation of the Project shall be ensured by the Private Partner. For the success of a PPP project, it is very critical that well-prepared projects in terms of availability of right of way, crucial approvals (such as forest, environmental, competent authority’s permissions, etc.) are obtained in advance before getting into the bidding process of a project.

Risk	Allocation
Environmental Risk	PSA

PSA, at the project preparatory stage, should identify the applicability of the environmental/ forest clearances to the project and undertake Environmental Impact Assessment (EIA) studies and obtain approval of the competent authorities.

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Condition Precedent of Authority	Authority shall have procured all Applicable Permits relating to environmental protection & conservation, forest clearances, etc. in respect of the land forming part of the project site/ROW/project corridor.

Reference Clause for illustration purpose

Note:- The above clause is indicative only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

²²As per Model Concession Agreement for PPP in Hybrid Annuity Model by MORTH – Obligation of the Authority- clause 6.1.2 (j)

6.2.18 Variations Risk

Variations risk involves the changes requested by either party of the Agreement with construction/ operation/ or expansion of the project. PSA generally bears risk and cost of change if such a change is implemented at its request. On the other end, Private Partner will bear the risk and cost of change if such change is requested by the Private Partner itself. A sharing mechanism may also be specified in the Contract Agreement wherein changes is inevitable due to unavoidable circumstances. In a typical PPP agreement, a clause “Change of Scope” is generally placed which has provisions of additional works/ services/ construction in the project which were not envisaged at the stage of project bidding and payment thereof by Authority to the Private Partner on account of additional works due to Change of Scope. In some of the PPP projects, a limit of change (additional financial burden upto 5% to 15% total project cost) is also kept in the Agreement.

Variations risks such as e.g. cost arising on account of variation in change of scope, change in law, force majeure or breach of Agreement, price index (if agreed in the Agreement), etc.) are usually borne by the PSA.

Type	Sub Type	Allocation
Limited Private Participation	Service Contract	Public Partner
	O&M Contracts	Public Partner
	Lease	Public Partner
Integrated Project Development and Operation Opportunities	BOT-Annuity	Public Partner
	BOT- HAM	Public Partner
Partnership Project Development and Investment Opportunities	OMDA	Public Partner
	DBFOT	Public Partner
	DBFOO	Public Partner

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Change of Scope ²³	• In the event of the Authority determining that a Change of Scope is necessary, it shall issue to the Concessionaire a notice specifying in reasonable detail the works and services contemplated thereunder (the “change of scope Notice”). • Within 30 (thirty) days of issuing a Change of Scope Order, the Authority shall make an advance payment to the Concessionaire in a sum equal to 20% of the cost of Change of Scope as agreed hereunder, and in the event of a Dispute, 20% of the cost assessed by the Independent Engineer.

²³As per Model Concession Agreement for PPP in BOT – Toll Model by MORTH – Change of Scope – Article 16

Section of Agreement	Contractual Provision
	All costs arising out of any Change of Scope Order issued during the Construction Period shall be borne by the Concessionaire, subject to an aggregate ceiling of 0.25% of the Total Project Cost.

Note:- The above clause is indicative only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

6.2.19 Change in Law (Legal Risk)

As per the concession agreement, the risk of any change in law arising after the signing of concession agreement will fall on the PSA. Thus, it is important that the concession agreement clearly defines 'Change in Law' as any change in law directly impacting the project. Loosely defining the 'Change in Law' Article in the concession agreement could result in contingent liability on the PSA.

Risk	Allocation
Change in Law (Legal Risk)	PSA

In order for PSA to bear the cost associated with the change in law, the concessionaire has to prove to PSA that there is an element of discrimination in the effect of the change in law. This discrimination may be against the private partner specifically or against sector concerning the PPP project.

It may be noted that irrespective of the PPP mode, the Legal Risk is borne by public partner only.

Risk Mitigation Measures from Project / Contract Perspective:

Section of Agreement	Contractual Provision
Change in Law	Definition of Change in Law – “Change in Law” means the occurrence of any of the following after the Bid Date and having Adverse Impact: a) the enactment of any new Indian law; b) the repeal, modification or re-enactment of any existing Indian law or any international treaty to which Government of India is a signatory; c) the commencement of any Indian law which has not entered into effect until the Bid Date; d) a change in the interpretation or application of any Indian law by a judgement of a court of record which has become final, conclusive and binding, as compared to such interpretation or application by a court of record prior to the Bid Date; or e) any change in the rates of any of the Taxes that have a direct effect on the project;²⁴

²⁴ As per Model concession agreement - 2021 of Port sector –Change in Law- clause 13.1

Section of Agreement	Contractual Provision
	If as a result of Change in Law, the Concessionaire suffers an increase in costs or reduction in net after-tax return or other financial burden, the aggregate financial effect of which exceeds the higher of Rs. 1 crore and 0.5% of the Realisable Fee in any Accounting Year, the Concessionaire may so notify the PSA and propose amendments to this Agreement so as to place the Concessionaire in the same financial position as it would have enjoyed had there been no such Change in Law. ²⁵

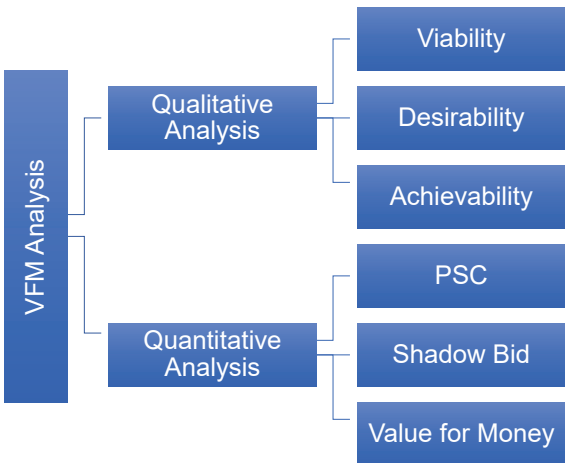
Note:- The above clause is indicative only. The Clause shall be incorporated suitably in the Agreement with appropriate legal language as mentioned in model concession agreements.

²⁵ As per Model Concession Agreement for PPP in BOT – Toll Model by MORTH - Reduction in costs- Clause 41.2

CHAPTER 7: Mitigating Project Risk through VFM analysis

Value for Money (VFM) analysis is conducted to ascertain whether the project being developed through a PPP framework offers good value to the public entity and ultimately to the general public. The analysis is useful to decide whether to pursue the project under a PPP framework. On receipt of bids from the private partners, the results of value for money analysis are useful for examining whether the winning bid delivers value to the public entity.

Figure 8: *Types of VFM Analysis*



The key questions that this analysis answers include:

- Whether developing the project under a PPP framework results in any value addition to public sector?
- Whether the bid submitted by the preferred bidder is acceptable to the public entity thereby providing value to the public sector

The VFM analysis is a combination of qualitative and quantitative analysis as demonstrated below:

7.1 Qualitative Analysis

The purpose of the qualitative assessment is to subjectively test whether the objectives, service requirement and proposed structure of the project are likely to provide the private sector with sufficient scope to provide the public entity and the end users considerable value. Some of the factors that need to be considered while undertaking the qualitative analysis are detailed below:

- **Viability:** An assessment of whether there are any efficiency, accountability or equity issues which demand that services are provided by the Project Sponsoring Authority directly rather than through a PPP project. It also considers the extent to which the service requirements can be adequately captured in a contract - based approach, with a clear specification in output terms for the PPP project to transfer risk effectively to the appropriate parties.
- **Desirability:** Determination of the relative benefits provided through different procurement routes, such as incentives and risk transfer in PPPs vis-à-vis the Government's lower

cost of borrowing in conventional procurement. This requires an upfront consideration of the relative advantages and disadvantages associated with a long-term contractual relationship between the public and private sector, and the strength of the mechanisms that could be used to ensure that multiple benefits are realized.

- **Achievability:** Estimating the level of likely market interest, the skills and capacity of the private sector, their appetite for risk, any lender constraints and whether the PSA has sufficient capability to manage the complex processes involved.

7.2 Quantitative Analysis

Quantitative Assessment involves estimation of the risk adjusted cost of delivering a project through the PPP mode as compared to the risk adjusted cost of delivering the same project through the traditional public procurement mode. The value analysis compares the estimated cost of procuring the project through traditional public procurement with the estimated cost of procuring it on a PPP basis. The quantitative assessment aims to:

- Support the qualitative assessment in determining value for money to PSA
- Enable projects to make appropriate use of private capital, to justify explicit additional costs against the benefits achieved as a result of transferring risk to the private sector;
- Enhance the data availability to PSA to support future procurements, and to be able to justify decisions taken in the context of Government policy.

The steps involved in VFM analysis at the feasibility stage is shown as below

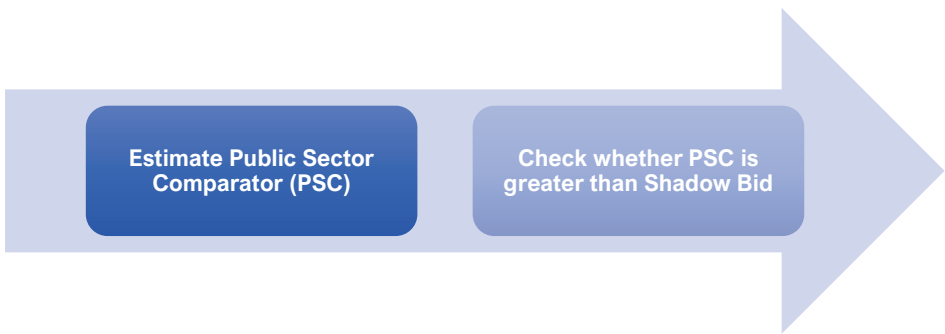


Figure 9: Steps involved in VFM Analysis

If the PSC is greater than Shadow Bid, there is value for money in implementing the project through PPP

7.2.1 Public Sector Comparator

To understand the costs of a traditional public-sector approach, Public Sector Comparator (PSC) is used to compare and understand the value proposition of projects. The Government of Western Australia, Department of Treasury, defines PSC as: “The PSC is an estimate of the net present cost to Government if it was to deliver the project under a more traditional procurement method, for example design and construct”. The World Bank assisted presentation on “Public Sector Comparator for Highway PPP Projects” defines PSC as: “The PSC is the hypothetical risk-adjusted cost if a project were to be financed, owned and implemented by a Government Agency”. The PSC is developed in accordance with the required output specification, the proposed risk allocation and is based on the most efficient form and means of Government delivery of its obligations.

- **Raw PSC**
- **Competitive neutrality**
- **Retained Risk**
- **Transferable Risk**

Raw PSC

The raw PSC is referred to as Whole of Life Cycle Cost which is estimated as net present value of projected cash flow from the project over its useful life. The raw PSC provides a base costing under the public procurement method where the underlying asset or service is owned by the public sector. This includes all capital and operating costs, both direct and indirect, associated with construction, finance, maintenance, and delivery of the service (or underlying asset) over the same period as the term under the proposed PPP mode of project and to a defined performance standard as required under the output specification. Expected cash flows for the raw PSC need to be forecast over the life of the project. The raw PSC should not include any valuation of risks to which Government remains exposed. In many cases, the public procurement method may involve an element of design and construction outsourcing or other forms of private contractor management. The raw PSC should not include any such third-party revenues.

Competitive neutrality

Competitive Neutrality removes the net competitive advantages that would accrue to a government business by virtue of its public sector ownership. The purpose of including this component is to allow a like-with-like value assessment between a PSC and private bids.

Government-owned entities are engaged in many significant business activities and as a result there are distortions in resource allocation. Competitive advantages from public

sector ownership typically include taxes that are not levied on public entities. Similarly, the competitive disadvantage for public sector ownership is in terms of increased scrutiny and reporting requirements.

Competitive neutrality inclusions in the PSC are made on a cash flow basis and the cost of capital is not included in the Competitive neutrality component of the PSC numerator but is reflected in the discount rate used to calculate the Net Present Value (NPV). Non-cash adjustments such as depreciation would not form part of Competitive neutrality.

The steps of estimating Competitive neutrality inclusions are shown as below:

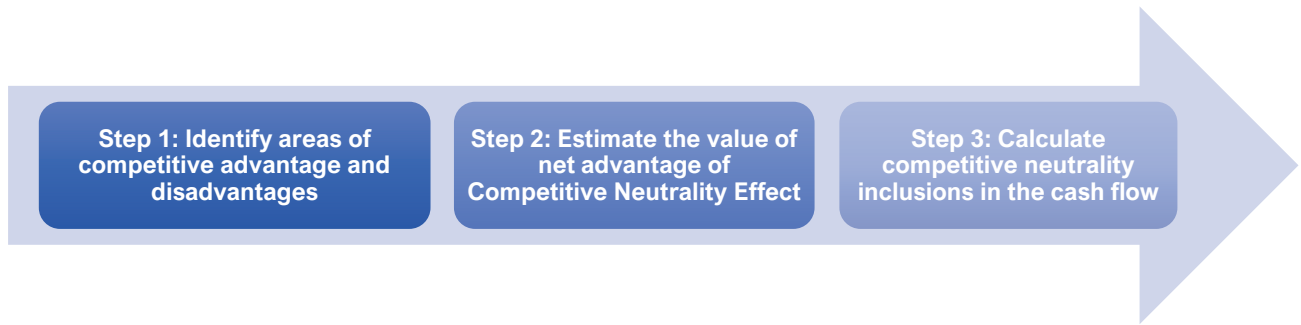


Figure 10: *Steps of estimating Competitive neutrality*

Project Risks – Retained and Transferable Risks

To calculate the PSC, the risks that are present over the life of the project need to be quantified. These include those risks that are retained and those which could be transferred to the private partner. (The value of project specific risks is to be added to the cash flows while calculating the PSC. The risk may be quantified in terms of a regular cash-flow, or it may be reflected as a discount factor while arriving at the NPV value).

The steps involved in quantifying the risks are shown as below:

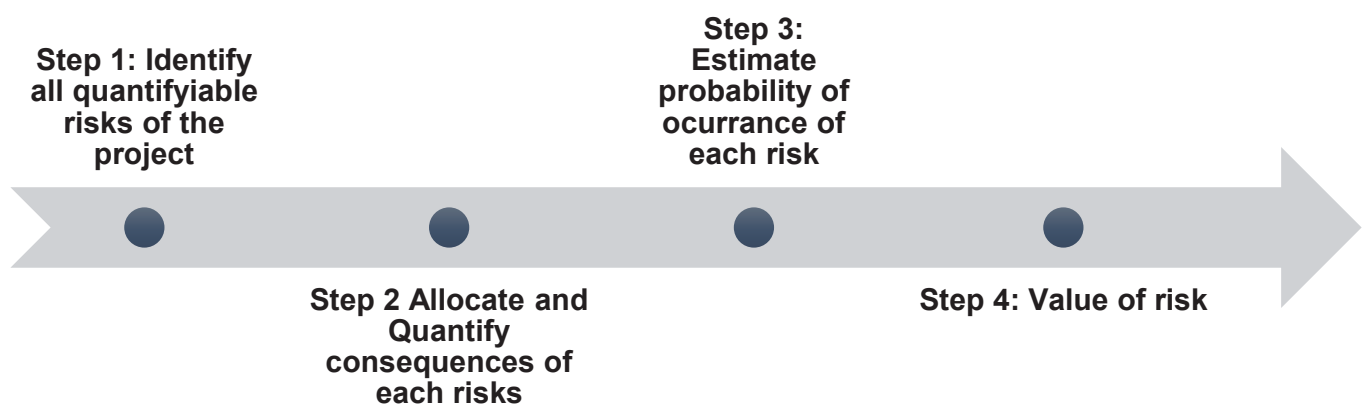


Figure 11: *Steps involved in quantifying the risks*

Step 1: Identify all quantifiable risks of the project

The first step in quantifying risk is to identify all risk that are quantifiable in the project. Section 4.2 can be referred to identify the risk.

Step 2: Allocate risks appropriately

Once all the material risk are identified, next step is to allocate the risk. Chapter 5 could be referred to regarding the allocation of probable risks.

Step 3: Estimate the probability of occurrence of each risk

The next step will determine the probability of the occurrence of a risk will with its associated additional costs (over and above base costs) under each procurement method. For example, if one out of every two projects, incurs costs due to a particular risk, the probability of occurrence would be 50%.

Step 4: Value of risk

Once the probability distribution parameters have been established for each risk, the cost of each potential impact can be calculated. The value of risk can be calculated through Monte Carlo Simulation.

Estimating PSC

Based on the four factors explained above, PSC is estimated as below:

Equation 1 Estimated Net Cost of PSC

Estimated net cost of PSC = Raw PSC + Competitive neutrality inclusion + Value of transferable risks + Value of retained risks

7.2.2 Shadow Bid / PPP reference bid

The Shadow Bid is a hypothetical private party bid. It can also be referred as PPP reference bid. In case of Shadow Bid, the costing of the output specifications should be carried out from a private party’s perspective. Comparing the net present cost to the PSA/public finances of a risk-adjusted PSC model with the net present cost of a risk adjusted PPP reference model enables an assessment of whether service delivery by the Government or by a private party yields the best value to the public entity. The key steps for estimating the costs to public entity in case of PPP reference bid /Shadow bid includes:

If the estimated net cost for the PSC is higher than the net cost for the Shadow Bid, then the value test is positive, and the PPP is expected to provide value to the public entity. One of the important considerations, is that the scope of Shadow Bid in terms of output specifications & performance levels should be same as that of PSC.

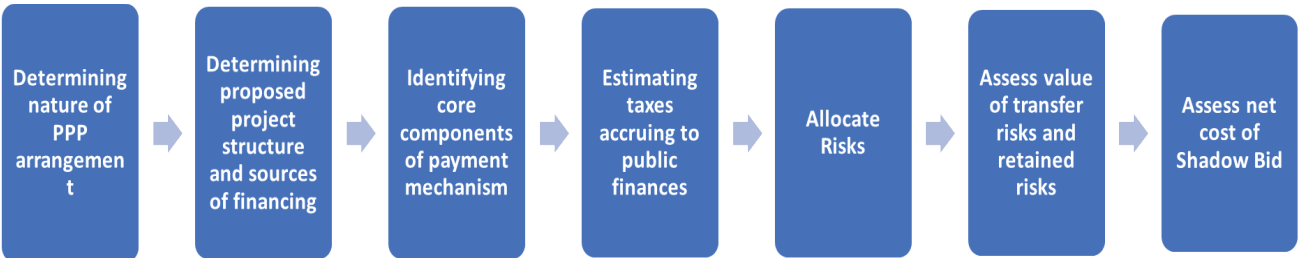


Figure 12: Key steps for estimating the costs to public entity in case of PPP

7.3 Estimating Value for Money

VFM estimation is based on calculation of estimated cost based on two approaches:

- a) Total estimated cost to the public sector delivering an infrastructure project using traditional procurement processes through Public Sector Comparator
- b) Total estimated cost to the public sector of delivering the same project to the identical specifications using Shadow Bid / PPP reference bid approach

The difference between the total estimated costs under each model is the VFM. The illustration below shows PSC as the stacked bars on left and PPP is shown as the right-hand bar.

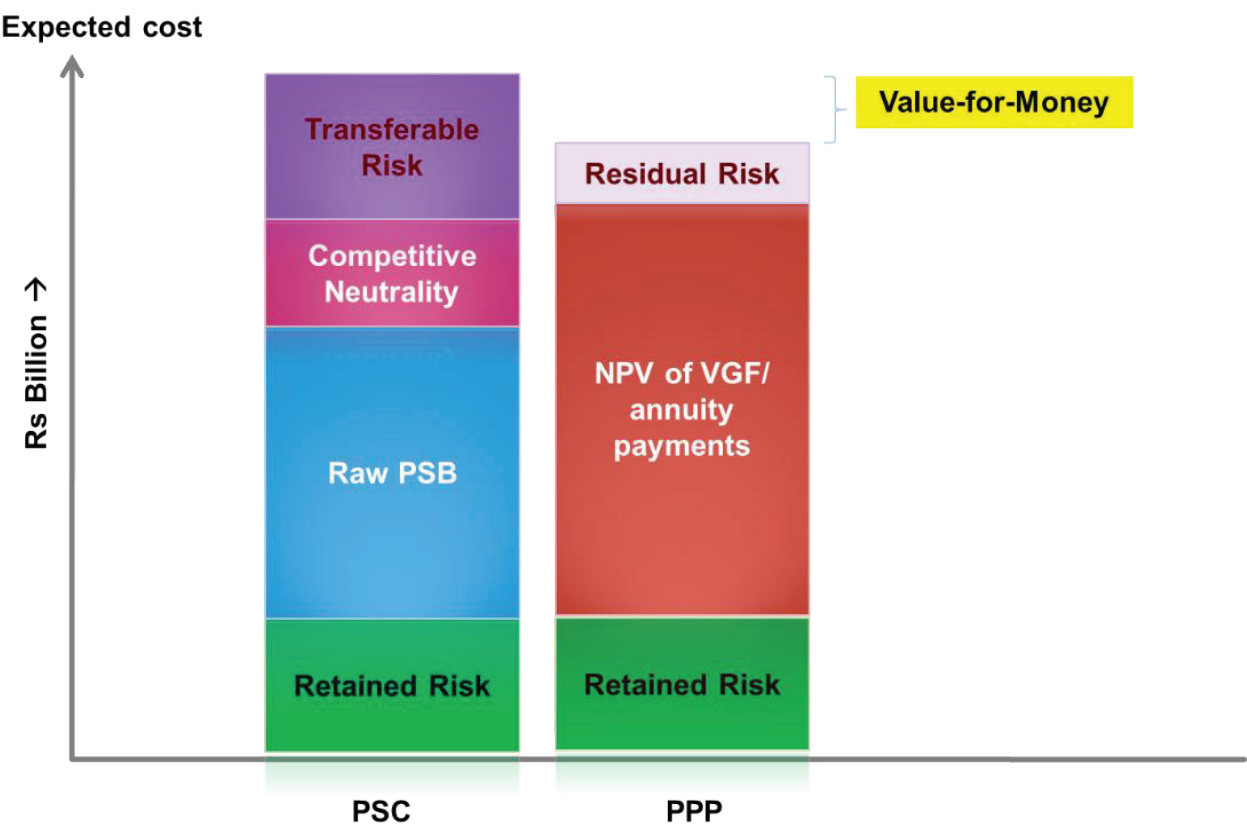


Figure 13: Visualizing VFM

On comparison between PSC and PPP, the cost components will vary slightly in magnitude between the two procurement methods (as shown by the colored segments in the figure above). Difference between the estimated total project costs is the VFM.

7.4 VFM Toolkit

Testing for Value for Money (VFM) should be an important part of any PPP project development. If a project is not expected to provide VFM for the PSA, then the project should not be implemented on PPP.

VFM analysis can be undertaken as a quantitative (numerical) and / or qualitative (subjective, or judgement-based) assessment as explained in section above. The toolkit published on pppinindia.gov.in website has a Suitability Filter (Fig 15) which is one way of making a

qualitative test of a project's VFM potential. The VFM Indicator tool can also be used to make a quantitative assessment of VFM which is explained in section 7.5 in this document.

- Answers to questions are scored
- Result shown on **Suitability Indicator**
- **'Very Attractive'** or **'Very Difficult'**
 - Give clear result for or against
- **'Difficult'**
 - Probably not suitable as a PPP
- **'Possible'**
 - Could be suitable, need to address problems first
- **'Attractive'**
 - Probably suitable

Figure 14: Suitability Filter

The aim of the VFM toolkit is to:

- Present a method that can assist the Project Sponsoring Authority in arriving at an indication of expected VFM based on quantitative inputs
- Allow for the improved data to be used as it becomes available in India

7.5 VFM Test

A VFM test compares the estimated cost of procuring the project in the public sector (the traditional route) with the estimated cost of procuring it as a PPP.

The PSC and the PPP are compared from the point of view of the government's finances. A PPP provides value for money if it reduces the net cost to the Ministry of Finance or Finance Department (including the Sponsoring Authority's own financial position). This happens when the overall cost of the PPP is expected to be lower than the cost of the PSC

The typical components of the VFM test are shown for an example annuity-based project below:

Present value inputs are calculated using cashflows provided by the Financial Viability Indicator tool, discounted at the user-input discount rate.

All calculations should be made in nominal terms.

Cash costs and receipts - from Financial Viability Indicator tool		<i>PSC</i>		<i>PPP</i>
PV of payments for a public sector project	<i>R cr.</i>	768.7		
PV of payments under PPP	<i>R cr.</i>			300.3
Total costs for public finances	<i>R cr.</i>	768.7		300.3
Gross VAT received	<i>R cr.</i>	0.0		0.0
Corporate tax (including MAT) received	<i>R cr.</i>			70.6
Third party income (eg, tolls, charges, advertising) received	<i>R cr.</i>	600.6		
Total receipts for public finances	<i>R cr.</i>	600.6		70.6
Net cash cost to Public Finances (= costs - receipts)	<i>R cr.</i>	168.1		229.7
Risk adjustment		<i>PSB</i>		<i>PPP</i>
Expected value of risk that would be transferred under PPP	<i>R cr.</i>	181.1		
Expected cost of added risks from a PPP for the public sector	<i>R cr.</i>			14.8
Adjusted net cost to Public Finances	<i>R cr.</i>	349.2		214.9
Expected VFM	<i>R cr.</i>			134.3

Figure 15: VFM Test

The individual lines in the VFM test stated above are:

- **Public Finance Outflows:** – Cash spent by the public finance ministry or department (or spending department)
 - ♦ **PV of payments for a public sector project:** present value of all money that would be spent on the project by the public sector if it is procured in the public sector (i.e. if it is the PSC)
 - ♦ **PV of payments under PPP:** present value of all money that would be paid by the public sector to the private party in a PPP project.
- **Public Finance Inflows:** All cash received by the public finance ministry or department
 - ♦ **Gross Goods and Services Taxes:** Total GST or other indirect taxes collected from the project
 - ♦ **Corporate tax:** all money that would be collected by the public sector through taxes on the private operator if the project was a PPP
 - ♦ **Third party income (e.g tolls):** All money the public Sponsor would have collected from the project if the project were carried out by the public sector. (e.g. income from toll collection)
- **Net cash cost to public finance ministry or department:** The total money cost of project to the public sector under the public and private procurement options (= outflows – inflows)
 - ♦ **Non-cash adjustment for risk transferred under the PPP:** The expected money value of the risk in the project that would be shifted onto the private sector under PPP (this is explained more below). This is an additional cost that would be faced by the public sector if the project was implemented by the authority.

- **Adjusted net cost to public finances:** The expected cost to the public sector including an adjustment for the transferred risk.

If the adjusted net cost for the PSC is higher than the net cost for PPP, then the VFM test is positive, consequently indicating that implementing the project on PPP is expected to provide value for money.

For more details on the calculation of VFM, please refer online toolkits on the website pppinindia.gov.in.

Bibliography:

1. **PPP Risk Allocation Tool 2019 Edition developed by Global Infrastructure Hub (GI Hub) and Allen & Overy.**
2. **Report of the Committee on Revisiting and Revitalizing Public-Private Partnership (PPP) Model of Infrastructure (November 2015), Department of Economic Affairs, Ministry of Finance, Government of India**
3. **Guidance on PPP Contractual Provisions 2019 (World Bank)**
4. **The Governance Brief (Restoring Confidence in Public – Private Partnerships) – Reforming Risk Allocation and Creating more collaborative PPPs (ADB) 2020**
5. **PPP Guide for Practitioners, 2016 (DEA)**
6. **Government Guarantees - Allocating and Valuing Risk in Privately Financed Infrastructure Projects, World Bank 2007**

Annexure - I

Checklist for Risk allocation and Mitigation.								
S. N.	Cardinal Risks	Risk Type		Project Stage	Risk Allocation			Risk Mitigation measures adopted
		Category	Sub-Category		PSA (Public Partner)	Private Partner	Shared	
1	Design / Construction Risk	Delay in Land Acquisition and in providing Access to Site Risk		Provision of required land	Pre-Construction			
				Timing of provision of required land	Pre-Construction			
				Suitability of land	Pre-Construction			
				Access to the site and associated infrastructure	Pre-Construction			
				Site security	Pre-Construction			
				Utilities and installations	Pre-Construction			
				Site condition	Pre-Construction			
				Existing asset condition	Pre-Construction			

Checklist for Risk allocation and Mitigation.								
S. N.	Cardinal Risks	Risk Type		Project Stage	Risk Allocation			Risk Mitigation measures adopted
		Category	Sub-Category		PSA (Public Partner)	Private Partner	Shared	
2		Planning Risk	Key planning consents	Pre-Construction				
3.	Design Risk		Suitability of design	Pre-Construction				
			Approval of designs	Pre-Construction				
			Changes to design	Pre-Construction				
			Cost increases	Construction Stage				
4.	Construction Risk		Works completion delays	Construction Stage				
			Project management and interface with other works/facilities	Construction Stage				
			Quality assurance and other construction regulatory standards	Construction Stage				

Checklist for Risk allocation and Mitigation.							
S. N.	Cardinal Risks	Risk Type		Project Stage	Risk Allocation		
		Category	Sub-Category		PSA (Public Partner)	Private Partner	Shared
			Liability for death, personal injury, property damage and third party liability	Construction Stage			
5.		Approval Risk	Subsequent planning approvals	Pre-Construction			
6.	Operation Risk	Operations and maintenance risk	Increased operating costs and affected performance	Operational Stage			
			Performance/price risk	Operational Stage			
			Operational resources or input risk	Operational Stage			
			Intellectual property	Operational Stage			
			Liability for death, personal injury, property damage and third party liability	Operational Stage			

Checklist for Risk allocation and Mitigation.								
S. N.	Cardinal Risks	Risk Type		Project Stage	Risk Allocation			Risk Mitigation measures adopted
		Category	Sub-Category		PSA (Public Partner)	Private Partner	Shared	
			Maintenance standards	Operational Stage				
			Variation in the projected demand	Operational Stage				
7.		Demand Risk	Adjacent Projects impact	Operational Stage				
			Government support measures	Operational Stage				
			Concessionaire's ability to secure Project finance	Pre-Construction				
8.	Finance Risk	Financial Closure Risk	Refinancing	Operational Stage				
		Financial Market risk	Inflation	Construction and Operational Stage				
			Exchange rate fluctuation	Pre-Construction stage				
			Interest rate fluctuation	Pre-Construction stage				
			Unavailability of insurance	Operational Stage				
9.								

Checklist for Risk allocation and Mitigation.								
S. N.	Cardinal Risks	Risk Type		Project Stage	Risk Allocation			Risk Mitigation measures adopted
		Category	Sub-Category		PSA (Public Partner)	Private Partner	Shared	
10.	Ownership Risk	Technology risk		Operational Stage				
11.		Handover risk		Operational Stage				
12.		Force Majeure risk		Pre-Construction, Construction and Operational Stage				
13.		Concessionaire event of default		Pre-Construction, Construction and Operational Stage				
14.		Authority event of default		Pre-Construction, Construction and Operational Stage				
15.		Social Risk		Pre-Construction, Construction and Operational Stage				

Checklist for Risk allocation and Mitigation.								
S. N.	Cardinal Risks	Risk Type		Project Stage	Risk Allocation			Risk Mitigation measures adopted
		Category	Sub-Category		PSA (Public Partner)	Private Partner	Shared	
16.		Environmental Risk		Construction and Operational Stage				
17.		Variations Risk		Construction and Operational Stage				
18.		Change in law		Construction and Operational Stage				



सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA