

Plenary 6 & 7: Project Risks

Tuesday, 10:45 to 13:00



Session agenda

1. Risk transfer recap
2. The PPP “project cycle”
3. Specific PPP risks and their mitigation
4. Sector overview
5. Implications for project finance
6. Summary and further reading

PPP risk classification

PPP risks can be categories under three broad headings:

- **Supply risks:**
capital cost over-run and completion delay, operating performance, operating costs, lifecycle costs etc.
- **Demand risks**
volume risk, price risk, payment and credit risk etc.
- **Performance risks**
incentive risks etc.

PPP risks – supply risk transfer

PPP risk transfer characteristics varies by PPP type

	Structure				
	Public Sector	Service/ DBO	PFI/DBFO	PPP JV	Privatisation
What risk?					
<u>Supply-Side:</u> Capital cost over-run and completion delay, Operating performance, Operating costs, Lifecycle costs	Public	Private (if performance-linked payments)		Public / Private (Sharing in supply-side risk)	Private
<u>Demand-Side:</u> Volume risk, Price risk, Payment and Credit risk	Public	Public	Public (rarely private)	Public (if output-based contract)	Private (if sales to customers e.g. water)

Risk transfer – PFI Incentivising performance (I)

Achieving risk transfer in PFI involves four key components:

- **Fixed price** – Incentives to outperform (cost and innovation)
- **Paying for availability**
- **Performance regime**
- **Adverse consequences for failure to deliver** – liquidated damages / termination

By fixing the price to be paid for agreed outputs/outcomes – with financial consequences for failure to deliver – the provider is subject to strong incentives to perform.

Risk transfer – PFI Incentivising performance (II)

Prisons



Service Payment

Availability of cell only (therefore no volume risk)

Performance

- Prisoner escapes
- Quality level of cell
- Educational attainment

Roads



Service Payment

Shadow Toll and availability (some volume risk accepted)

Performance

- Safety – 25% of economic cost of personal injury
- Lane Closure deductions

Example – Risk transfer for an example PFI

Risk	Notes	Public Sector	Special Purpose Company (SPC)	Service Contractor	Construction Contractor
Volume Risk	1	✓	✓	✓	X
Inflation Risk	2	✓	✓	✓	✓
Insurance Renewal	3	✓	✓	✓	✓
Asset Renewal	4	X	✓	✓	X
Design Risk	5	X	X	X	✓
Delay in Opening	6	X	X	X	✓
Construction Cost Overrun	7	X	X	X	✓
Service Failure	8	X	X	✓	X
Service cost overrun	9	X	X	✓	X
General Legislative Change	10	X	✓	✓	✓
Specific Legislative Change	11	✓	X	X	X

Notes

1. Normally, a large element of this risk retained by public sector
2. Costed into bid model - normally indexed, based on RPI linked formulae, taking account of underlying cost base.
3. Historically a private sector risk but more recently balanced risk sharing is being adopted.
4. Costed into bid model - obligations placed on constructor regarding latent defects and on SPC regarding renewal.
5. Risk that design cannot deliver the services at the required performance or quality standards specified in design stage.
6. Constructor pays damages in the event of delayed opening.
7. Constructor generally accepts fixed price contracts, linked to RPI based formulae, which are costed into the bid model.
8. Service failings breaching agreed performance thresholds normally incur financial penalties borne by the service contractor, usually to a capped liability level equivalent to the forecast operating margin.
9. Service Contractor generally accepts fixed rate contracts linked to RPI based formulae which are costed into bid model.
10. A general change in the law e.g. change in employment legislation. Borne by SPC and flowed down through sub-contracts with service contractor and constructor where appropriate.
11. A specific law change only affecting the sector in which the PFI operates. Risk borne by public sector e.g. change in prison/hospital legislation.

Serco Group (Approach to PFI, 2002)

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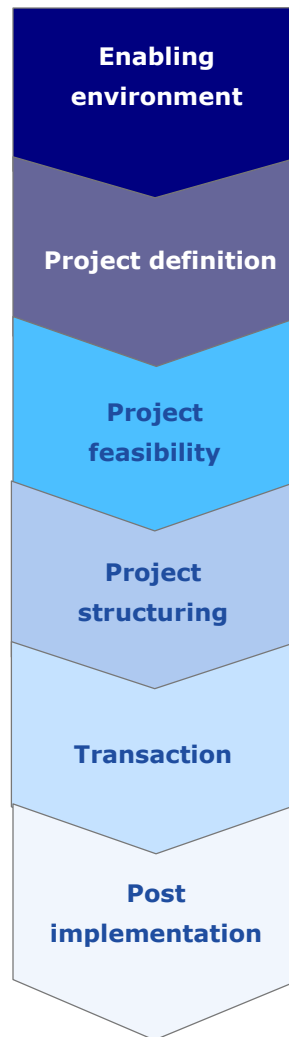
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The Project Cycle

The infrastructure project development process refers to the development and structuring of a PPP project, right from the initial stages of establishing the feasibility of the project, through to detailed structuring and securing private sector finance, as well as the subsequent management and monitoring of the project.

The key activities in the project development process can be classified into six broad phases.

Risk and risk transfer must be closely monitored and considered at each stage.



- Supporting legislation, regulation and institutional reforms
- Capacity building
- Consensus building

- Definition of service need/ identification of desired outputs and project partners
- Prioritisation vs. other projects
- Examination of various alternatives (reconfiguration, new assets)
- Pre-feasibility studies

- Organisational / administrative
- Financial / financial modelling
- Economic / social / environmental / technical / engineering
- Cost benefit analysis

- Public / private options assessment
- Project finance options
- Legal structuring / technical / engineering

- Project financing (ongoing)
- Legal structuring (ongoing) / technical / engineering (ongoing)
- Procurement

- Monitoring
- Evaluation
- Renegotiation / refinancing

Five step risk management and review process



Partnerships Victoria Risk Matrix

This table presents an adapted excerpt from a risk matrix prepared by Partnerships Victoria , describing the nature of the risk, relevant mitigation strategy, and consequently the preferred allocation between the private and public sectors

Risk category	Description	Consequence	Mitigation	Preferred Allocation
Native title	costs and delays in negotiating indigenous land use agreements where project site may be subject to native title	delay and cost	search of registers and enquiry if appropriate and take expert advice	public sector (as it generally has a better understanding of procedures, has special powers of acquisition and use of native title land)
Changes in law/ policy	change in law/ policy which could not be anticipated at contract signing	requirement of the private party to fund and carry out capital works, etc	government mitigates by excluding changes such as tax changes; also, mechanisms could be used to minimise and manage financial impact on government and (where appropriate) a regulatory regime to allow pass-through to end users	Public sector (although the parties may share the financial consequences)
Construction	events occur during construction which prevent the facility being delivered on time and on cost	delay and cost	private party will generally enter into a fixed term, fixed price building contract to pass the risk to a builder	private party will generally be liable
Financing unavailable	when debt and/or equity is required for the project, it is not available then, and in the amounts and on the conditions anticipated	no funding to progress or complete construction	government requires all bids to have fully documented financial commitments with minimal and easily achievable conditionality	private party
Competition	in a user pays model the risk of alternate suppliers of the contracted service competing for customers	revenue shortfall	private party to review likely competition for service and barriers to entry	private party (except to the extent that government has committed to an availability payment element or agreed to provide redress for impact of government subsidised competition)

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Risks

At the highest level, risks for a PPP project can be classified into the following categories:

- **Market risk**
- **Development / planning risk**
- **Project risk**
- **Political risk**
- **Regulatory risk**
- **Financial risk**

Demand side – Market risk

RISK

Market risks refer to risks that arise due to uncertainties on the market demand for the infrastructure service. These include for example:

- **volume risks** – which relate to uncertainties arising from the number of users and their frequency and intensity of use of the infrastructure service
- **price risks** – which arise due to uncertainties in the tariff that can be charged for the use of the infrastructure service.

Thus market risks are closely linked to the users' willingness and ability to pay.

MITIGATION

- Market risk assessment should inform PPP design.
- Good demand forecasts are essential.
- Lengthening concession periods may be appropriate in some circumstances.

Supply side – Development / planning risk

RISK

Development or planning risks refer to the risks arising from planning or preparing projects for private sector participation. Governments or the private sector may invest substantial amounts of money to develop a project (through payment for several scoping, feasibility and structuring studies) but bear the risk of the project being infeasible.

It is important to determine who has responsibility for developing the proposal and ensuring that it is deliverable? For example they must consider:

- Legal responsibility re wayleaves?
- Ability to acquire land
- Planning permission

MITIGATION

- Many of these are functions best delivered by the public sector.
- This can sometimes be achieved through joint ventures (Indian “BOT” transmission lines).

Supply side – Project risk

These can be split into start-up risks such as capital cost over-run, completion delays as well as ongoing risks such as operating performance, operating costs, lifecycle costs, etc. Here are some examples:

INPUT RISK

RISK: Most important for natural resources projects or where there is a key input e.g. electricity generation.

MITIGATION: Example: What happens if the FSA is short? Pakistan – gas offered to new IPPs is for only 5-10 years and for only 10 months per year. The solution in Pakistan has been to build dual-fired plants – but this becomes expensive .

OPERATIONAL RISK

RISK: What happens if the SPV fails to operate properly? Impact depends on the form of commercial contract but it is a real concern for the procurer.

MITIGATION: Ensure an established operator is involved in the SPV consortium and has operational management; or a management contract is provided to an established operator by the SPV.

CONSTRUCTION RISK

RISK: How to ensure that a viable project is ready to start operation at the agreed date?

MITIGATION: Responsibility for construction is often passed on to contractors through:

- Fixed price contracts
- Incentives and penalties

This may insulate the project company but can lead to higher costs. This “insurance premium” may be best for easily replicated jobs.

TECHNOLOGY RISK

RISK: Chosen technology is unable to deliver the project OR technology becomes outdated. The first is a risk for the company but depends on the way in which the PPP was procured (if asked for a CCGT or a diesel plant then the procurer is taking the risk, if asked for 450MW then in principle the SPV is taking the risk). The second is less of an issue for traditional infrastructure companies.

MITIGATION: Contract prices must be clearly defined.

Supply side – Political risk

RISK

Political risks are risks that arise from, changes of government, wars, civil disturbances, terrorism, etc. Their impacts include:

- currency transfer restrictions
- new taxes
- expropriation
- breach of contract.

MITIGATION

- Use of political risk guarantees/insurance
- Local borrowing/local equity involvement to ensure that any action is perceived as affecting local as well as foreign investors
- Use of multi-lateral borrowing (World Bank, AfDB etc)
- Ensure appropriate clauses in the contract re taxation

Supply side – Regulatory risk

RISK

Risks that arise from the lack of a suitably developed regulatory system which for example ensures regulatory independence from:

- the government
- regulations for the participation of the private sector in infrastructure
- appropriate periodic review of tariffs, etc

These can cause considerable uncertainties for lenders and investors in any infrastructure sector.

MITIGATION

Building a track record of regulation is key, but in the interim:

- regulation by contract
- partial risk guarantee (Romania and Uganda)

Supply side – Financial risk

RISK

Infrastructure projects are impacted by financial risks such as:

- exchange rate appreciation / depreciation
- changes in the interest rates, etc

These can have a substantial impact on costs and revenues.

MITIGATION

The ability to hedge financial risks depends on the level of development of capital markets and/or access to specialist hedging facilities.

Cost pass-through if the element cannot be hedged ie. fuel costs for an IPP

Risk Mitigation

Different approaches to risk mitigation exist. For example:

Insurance

- Commercial
- Political
- Regulatory

Subsidiary agreements

- Sales agreements (for inputs)
- Regulatory arrangements (treatment of cost changes)
- Off-take agreements (sales)

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Infrastructure Industries

- Electricity
- Water
- Gas
- Transport (Ports, Roads, Rail and Airports)

Consider

- Elements
- Approaches to PPP
- Examples

Overview



Prisons



Tramlinks

Bridges



Offices

Hospitals



Roads



Schools

Electricity: Generation and Transmission

Generation

- Key forms:
 - IPPs for greenfield sites (world-wide)
 - JVs and privatisation for existing plant (world-wide)
- Key considerations
 - Structure of payments: availability, take-or-pay and plans for future market structure
 - Degree of cost pass-through
 - Ability to pay

Transmission

- Key forms:
 - BOTs and JVs for greenfield sites (primarily Latin America)
 - Management contracts, JVs and privatisation for existing lines (limited examples)
- Key considerations
 - Structure of payments: availability, volume related
 - Management of the system, link to generation dispatch
 - Ability to pay

Electricity: Distribution

- Key forms:
 - Management contracts, JVs and privatisation for existing lines
- Key considerations
 - Degree of responsibility
 - Ability to downsize, reallocate workers etc
 - Responsibility for losses
 - Investment requirements
 - Regulatory arrangements
- Examples
 - UK – privatisation
 - Latin America – long term concessions
 - South Asia – management contracts (Orissa, India, and Dhaka, Bangladesh), privatisation (Orissa and Delhi, India, Karachi, Pakistan)
 - Africa – concession (Uganda)

Individual projects

- Water treatment plants and Sewage treatment plants
- Handled through BOTs/JVs
 - China, Scotland, Malaysia

Vertically integrated systems handled through

- Privatisation – England & Wales
- Concessions – Chile, South Africa, French West Africa, Philippines, Romania, Tanzania
- Leases – French West Africa, Mozambique
- Management Contracts – India, Johannesburg (South Africa), Mozambique

Key considerations

- Off-take arrangements – take-or-pay or volume related?
- Ability to pay if only partial reform
- Efficiency/NRW question
- Regulation

Transmission and Distribution

Key forms:

- Divestitures/privatisations – UK, Czech Republic, Hungary, Thailand (minority), South Africa (Johannesburg)
- Concessions – Latin America (Argentina, Brazil)
- BOO – Mexico

Key considerations

- Volume risk – link to consumer base often dominated by electricity generation and industrial uses
- Upstream risk – supply considerations/long-term supply contracts
- Several cross-border transmission lines raise specific problems: Chad-Cameroon, Mozambique-South Africa, Argentina-Chile – risk of merchant alternatives
- Regulation

Transport: (1) Ports

Three basic models

<i>Model</i>	<i>Infrastructure</i>	<i>Superstructure & Equip</i>	<i>Services</i>
Landlord	Port Authority	Private	Private
Tool	Port Authority	Port Authority	Private
Service	Port Authority	Port Authority	Port Authority

Landlord is effectively concession/privatisation

Examples:

- Privatisations – UK, Australia (Victoria)
- Concessions – Argentina, Pakistan, Mozambique, India, Philippines
- Management contracts (Service) – Australia (Victoria)

Key considerations:

- Degree of competition (East African ports, Indian ports) and link to regulation (India and Australia)
- On-transport links – rail, road etc
- Flexibility re pricing
- Links to major shipping lines

Transport: (2) Roads and Bridges

Key approaches being used:

- Concessions – UK, France, Italy, Spain, India, Mexico, Thailand, Chile, Hungary
- Rehabilitation/Maintenance contracts – Argentina, Chad

Key considerations:

- Need for a parallel free route (as in Mexico) - economically hard to justify but politically/socially important in some circumstances
- Pooled toll funds - allow standard tolls and then cross-subsidies to more expensive elements
- Single route or package?
- Shadow tolls and/or actual ones?
- Tariff differentiation and regulation
- Award system
- Volume risk

Transport: (2) Roads and Bridges continued ...

Volume risk

- Has been a major problem for the majority of tolled roads
- Number of cars has been over-estimated and this has caused financial problems
 - Bail-outs in Mexico, Chile etc

Alternative approaches:

- NPV (UK and Chile)
- Rather than have a pre-set concession length and allow the operator to take the risk, an NPV of revenues is defined and can be recovered over an allowed period
- An upper date for the end of the concession can lead to some volume risk, but it is more limited
- Has been used for both bridges (UK) and roads (Chile)
- In the UK bridges have been handed over earlier than planned owing to NPV

Transport: (3) Rail

Key forms:

- Concessions – by far dominant, driven by Latin America – especially Brazil (multiple concessions focused on transport corridors)
- Divestiture – UK (mixed system, divestiture of track infrastructure, franchising of train routes, separation of rolling stock into leasing companies)
- BOTs etc – greenfield projects, often city based light rail

Key considerations:

- Split of freight/passenger
- Competition – inter-modal and intra-modal
- Regulation

Transport: (4) Airports

More limited experience of private participation

- Privatisation – UK, Denmark, Thailand
- Concessions – Philippines, India, South Africa, Mexico
- Management contracts – USA

Key considerations

- Competition – between airports, within airports and between modes of transport
- Regulation – scope and form (dual-till versus single-till)
- Volume risk – linked to competition, regulation and fundamental issues

Risk differentials between sectors are important

Partly depend on the underlying businesses and partly the project structures

Will be reflected in the cost of funding

Consider the examples of Indian debt margins on the following slide

Exhibit 8: Interest Rate Spread Over 10-Yr G-Sec Yield by sector (Year 2005 & 2006)

Sector	Average Interest Rate	Spread over 10 Year G-Sec
Roads & Bridges	9.35	1.85
Ports	9.31	1.81
Airports	7.61	0.11
Railways	8.50	1.00
Water Supply	10.45	2.95

Exhibit 7: Average Interest Rate Spread over 10-Yr G-Sec Yield (2003-2006)

Year	Average yield of 10 Year G-Sec	Average Interest rate	Spread over 10 Year G-Sec
2003	7.19	9.30	3.66
2004	5.64	10.43	4.50
2005	5.93	9.34	2.37
2006	6.97	9.23	1.64

Summary

Some sectors have utilised many of the forms of participation, others are more focused

Certain factors have driven this:

- Perception of risk – especially linked to financing
 - Volume related
 - Responsibility for losses
- Willingness of government to let go – some infrastructure too vulnerable – political/social reasons (water) or defence (airports)
- Willingness to establish independent regulatory agencies

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Implications for project finance

Partly depends on the potential impact of the risk

- Will discuss in a separate session how to measure these impacts

Will also depend on:

- The proposed contractual arrangements
- Availability and cost of insurance

But overall could:

- Lead to more expensive debt
- A different debt:equity structure so that there is more equity as a buffer

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Summary

- Consider some examples of successful and unsuccessful projects
- Lessons can be drawn with respect to risk allocation and whether successful mitigation took place

Kenya-Uganda Railways, Kenya and Uganda – overview

- Both governments jointly arranged the concession of the Kenya-Uganda railway from government ownership, to a private buyer who would be expected to rehabilitate, operate and maintain the railway as well as to provide freight services in both countries and run passenger services in Kenya for at least five years.
- The concession was awarded as a result of an international, competitive bidding process and while the two concessions for the Kenyan and Ugandan parts of the rail network are legally separate, the tendering process was undertaken jointly by the two Governments and the contracts are substantially identical.
- When Rift Valley Railways (RVR) was first awarded the concession, it was led by South Africa's Sheltam Rail Company (61%), with the remaining participants being Prime Fuels (Kenya, 15%), Comazar (South Africa, 10%), Mirambo Holding (Tanzania, 10%), and CDIO Institute for Africa Development Trust (South Africa, 4%).
- The concession was granted for 25 years and the concessionaires took over in December 2006.
- The project was expected to cost US\$404m of which US\$4m made up payments to the Governments and the remaining was for investment commitments in physical assets.

Kenya-Uganda Railways, Kenya and Uganda – overview

- Of the US\$404m, US\$111m was estimated to be the cost for the first five years of the project, of which US\$47m would be contributed by the consortium in the form of direct equity and internal cash generation. The balance would be funded by loans from international organisations.
- Overall, the debt-to-equity ratio of the project was envisaged to be about 70:30
- The Kenya-Uganda railway concession was considered a flagship transport sector PPP in East Africa and won Euromoney's Project Finance "Africa Transport Deal of the Year" award in 2006 however, the project has run into considerable operational and legal difficulties since then, which have seriously hampered its likelihood of long term success.

Kenya-Uganda Railways, Kenya and Uganda – problems

- There were concerns that Sheltam lacked the experience of running a complex railway network and therefore was not in a position to increase cash flows sufficiently meet investment resource targets.
- The operational effectiveness of the project has also been debatable. For example in Kenya, the freight traffic increases stipulated in the concession agreement were not met in the first 12 months of the concession, and in fact instead of going up from 1.5 billion to 1.88 billion net tonne kilometres; the area of freight traffic had declined to 1.4 billion kilometres.
- There are also allegations that the operator has recently failed to make the quarterly fee payments to the Governments. The Kenyan government required US\$40m as proof of investment capability, with a threat of termination of the contract should this not be met. This was indeed the case, however RVR won a court order blocking the termination of its contract, and an out of court settlement was reached.
- While the concessions for the Kenyan and Ugandan parts of the rail network were legally separate, they were practically dependent on each other. As problems arose with the investors, both governments took very different approaches to the matter, and a political rift developed, highlighting this as a potential flaw in cross-border PPP contracts.

Cross-Harbour Tunnel, Hong Kong – overview

- Work commenced in 1969 to connect Kowloon to Hong Kong Island under a 1.9km stretch of harbour.
- The project was completely financed by the private sector under a build own transfer (BOT) scheme, with a contract awarded for 30 years, and cost approximately \$2bn.
- The contract was awarded to the sponsor who would require the least government subsidy, and on this basis the Cross-Harbour Tunnel Company Ltd was awarded the contract. The financing package had a debt-equity ratio of 64:36. Royalty payments were 12.5% of operating receipts.
- The tunnel was completed ahead of schedule in 1972 and it reached the end of its 30-year concession period and its control was transferred to the government in 1999 becoming the first BOT project that did not need to be re-negotiated and is widely considered to be a success story.
- Despite facing competition from an effective and cheap ferry service, the tunnel proved to be very popular. It began to make a profit four years after opening, and had repaid all debt by 1977.

Cross-Harbour Tunnel, Hong Kong – success factors

The factors of success attributed to the project:

- The concession period coincided with Hong Kong's rapid economic development.
- The government was able to transfer much of the operating risk to the private company by choosing a central location for the tunnel and hence ensuring a steady flow of traffic, and using alternative incentives to make the deal attractive to the private participant without increasing the risk that the government needed to take on.
- The private company had the necessary skills for undertaking the project, as evidenced by the use of an innovative method for building it (it was at the time the longest immersed tube tunnel ever constructed, despite being located in water considered too deep for such a construction).
- The project had strong political support, where the government went to great lengths to ensure successful planning and implementation, and actually started undertaking feasibility studies in the mid 1950s, more than ten years before awarding the contract for CHT.

Further sources

Online

1. Partnerships Victoria “Risk Allocation and Contractual Issues – A Guide” (2001)
[http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/RiskAllocationandContractualIssues1-Entire/\\$File/Risk%20Allocation%20and%20Contractual%20Issues1%20-%20Entire.pdf](http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/RiskAllocationandContractualIssues1-Entire/$File/Risk%20Allocation%20and%20Contractual%20Issues1%20-%20Entire.pdf)

Books

1. Matsukawa et al “Review of Risk Mitigation Instruments for Infrastructure Financing and Recent Trends in Development” (2007)
2. Yescombe “Public Private Partnerships – Principles of Policy and Finance” (2007)