Photo Credit

Steel beams and ladders

Inadequate Maintenance

Download Chatbot

Infrastructure assets are often under-maintained, either because maintenance is poorly planned or because planned maintenance is deferred. Political consideration or pursuit of personal gain often biases infrastructure expenditure towards new assets over maintenance, as described in an **IMF analysis of corruption in infrastructure** (Tanzi and Davoodi 1998).

Inadequate maintenance increases lifetime costs while also decreasing benefits. Regular maintenance is usually the lower-cost way to keep infrastructure assets at serviceable standards, compared to the alternative of allowing quality to degrade until major rehabilitation work is needed. The **World Bank's Africa infrastructure diagnostic study** (Foster and Briceño-Garmendia 2010a, 15) estimates that preventative maintenance for the roads sector in Africa could save $2.6 billion a year in capital expenditures rehabilitation. In South Africa, a **review of road maintenance by the South African National Roads Agency** (ZA 2004b, 36) indicates that delaying road maintenance for three years leads to increased costs of six times the original costs of preventative maintenance. If road maintenance is delayed for five years, costs rise to 18 times the preventive cost.

The poor performance of under-maintained infrastructure can be costly for users. For example, a **U.S. Engineers' Association report** (ASCE 2009, 1–4) estimates that poor road conditions cost motorists $67 billion a year in repairs and increased operating costs, while leaking pipes lose an estimated seven billion gallons of clean drinking water a day. The **Infrastructure Report Card** website (ASCE-IRC) discusses several key criteria regarding infrastructure quality: level of maintenance, capacity, physical condition, funding, public safety, resilience, and innovation. It recommends that all projects greater than $5 million use life cycle cost analysis and develop a plan for funding the project, including its maintenance and operation, until the end of its service life.

The **Pacific Region Infrastructure Facility**, after reviewing maintenance in their region, considered that a Build-Neglect-Rebuild approach was being used for infrastructure (PRIF 2013).

How PPPs can help—improved maintenance

PPPs can improve maintenance of infrastructure assets by improving incentives for both private contractors and governments to make quality maintenance a priority.

PPPs bundle construction or rehabilitation and ongoing maintenance into a single contract. This incentivizes the private company to build the asset to a high quality upfront, reducing the need for maintenance (resulting in a lower *whole of life* cost of the asset), as described in a **2010 United Kingdom National Audit Office report on PPP performance** (NAO 2010a, 8).

The private party then faces a strong incentive to carry out adequate maintenance. In the case where its revenue depends on user fees, the operator has an incentive to make sure the asset meets performance requirements and attracts users. Under government-pays PPPs, the operator's revenue typically depends both on the availability of the asset over time, and the operator’s ability to meet specific levels of service quality. In this case, PPP contracting also forces governments to commit upfront to making adequate funding available to maintain an asset over time. This can help overcome the tendency to cut maintenance budgets down the line and thereby delay necessary maintenance and rehabilitation.

PPP operators not only have the incentive to maintain assets, but also the means to do so. A life-cycle approach, combined with private finance, forces bidders to prepare financial models that include allocations for maintenance—whereas government agencies are dependent upon appropriation of budgetary funds.

Some types of PPP or related contracts reward improved maintenance directly. For example, **Frauendorfer and Liemberger** (Frauendorfer and Liemberger 2010, 34–37) describe performance-based contracts for non-revenue water reduction. Infrastructure provides examples of performance-based maintenance contracts, which share many characteristics of PPP, and which have proved effective at improving maintenance in the road sector.

Performance Based Road Contracts—Improving Maintenance of Infrastructure

Performance-based road contracts have proved successful in improving the quality of road maintenance—a pervasive problem in many countries. For example:

- Chad suffers from poor maintenance of its road network because of poor design of maintenance contracts with private contractors, as well as lack of domestic funding. In 2001, Chad awarded a performance-based maintenance contract for 441 kilometers of unpaved roads (seven percent of the country's road network), which pays a lump-sum fee per kilometer of road maintained to pre-defined standards. The roads have since met and even exceeded performance standards.
- Argentina also has experience with private-sector performance contracts on their road networks. The performance-based contracts have improved maintenance and reliability of the roads up to a specified standard agreed with the government, and have saved the government of Argentina almost 30 percent in additional capital expenditures for rehabilitation.

Sources: (Hartwig et al. 2005); (Liautaud 2001)

PPP limitations—need for effective contract design and regulation

In some circumstances, the ability of PPPs to create incentives to improve maintenance will be limited. This may be the case:

- In user-pays PPPs, where the PPP company is a monopoly provider, or for government-pays PPPs, if quality and safety standards are not carefully specified, monitored, and enforced. **Engel, Fischer, and Galetovic** (Engel et al. 2009) note the importance of effective monitoring in achieving the potential benefit of improved maintenance.
- If the contractor does not have much equity or other financial stake in the project, meaning it would rather walk away from a contract than spend on costly maintenance. This risk is described further in Considerations for Government, on the danger of over-leveraged projects.
- Towards the end of the contract, when the contractor knows it will not reap the benefit of further maintenance investments. Well-designed contracts require specific clauses dealing with the handback during the final phase of the concession.

A 2008 OECD paper discusses maintenance in PPP projects and argues that effective transfer of risk and responsibility to the PPP operator will likely not happen in the absence of competitive procurement (OECD 2008a). These limitations can be mitigated through good contract design, as described further in Designing PPP Contracts.

Related Content

- **INTRODUCTION**
- **PPP BASICS: WHAT AND WHY**
- **What is a PPP: Defining "Public-Private Partnership"**
- **Infrastructure Challenges and How PPPs Can Help**
- **How PPPs Are Financed**
- **ESTABLISHING THE PPP FRAMEWORK**
- **PPP CYCLE**

Additional Resources

- Innovative Revenues for Infrastructure (IRI)
- Executive Summary: Asset Recycling
- The Municipal Public-Private Partnership Framework - Project Summaries

Find in pdf at PPP Reference Guide - PPP Basics or visit the PPP Online Reference Guide section to find out more.

Disclaimer: *The resources on this site is usually managed by third party websites. The World Bank does not take responsibility for the accuracy, completeness, or quality of the information provided, or for any broken links or moved resources. Any changes in the underlying website or link may result in changes to the analysis and recommendations set forth on the* Public-Private Partnership Resource Center. *The inclusion of documents on this website should not be construed as either a commitment to provide financing or an endorsement by the World Bank of the quality of the document or project. If you have any comments on any of the links provided on the* Public-Private Partnership Resource Center, *please get in touch here*