



# SELECTED SOCIAL SECTOR CASE STUDIES FROM INDIA

Sub-national PPP  
Interventions



## **Selected Social Sector Case Studies from India**

Sub-national PPP Interventions

### **Editors**

Dr. Arvind Mayaram

Dr. Vivek Tyagi

### **Published by**

CUTS Institute of Regulation and Competition

Second Floor, Flat No. 5, House No. 658, Khasra No. 258, Lane No. 4,  
Westend Marg, Saidulajab, New Delhi-110030

Ph: +91 11 46170236

Email: [circ@circ.in](mailto:circ@circ.in) | Website: [www.circ.in](http://www.circ.in)

Citation:

ISBN 978-9-35-768175-9



9 789357 681759 >

CIRC (2022). Selected Social Sector Case Studies from  
India, CIRC, New Delhi

© CIRC 2022

*Any reproduction in full or part must indicate the title of the Report, name of the publisher as the copyright owner, and a copy of such publication may please be sent to the publisher.*

**Disclaimer:**

While every effort has been made for the correctness of data/information used in this report, CIRC do not accept any legal liability for the accuracy or inferences for the material contained in this report and for any consequences arising from the use of this material. © 2020 CUTS Institute for Regulation and Competition

No part of this report may be disseminated or reproduced in any form (electronic or mechanical) without permission from CIRC. This report should be cited as: CIRC (2022). Selected Social Sector Case Studies from India: Sub National PPP Interventions, November 2022

# Contents

Abbreviations .....	7
Foreword .....	11
1. Introduction .....	15
2. Overview .....	16
A. Defining PPP .....	16
B. PPP Frameworks .....	17
i. BOT (Build-Operate-Transfer) also known as DBFOT (Design-Build-Finance-Operate-Transfer) .....	18
ii. DBO (Design-Build-Operate) .....	18
iii. BOOT (Build-Own-Operate-Transfer) also known as DBOOT (Design-Build-Own-Operate-Transfer) also known as DBFO (Design-Build-Finance-Operate) .....	19
iv. BOO (Build-Own-Operate) also known as DBOO (Design-Build-Own-Operate) .....	19
C. Financial sustainability PPP projects .....	24
D. PPPs in Social Sectors in India .....	25
3. Case Studies .....	29
Case 1: Establishment of "Gyanodaya" senior secondary schools through PPP mode: a case study from Rajasthan, India .....	29
i. Project and its objectives .....	29
ii. Type of project envisaged .....	33
iii. Key Performance Indicators .....	35

iv.	Risk Sharing Mechanism.....	36
v.	Default mechanism .....	38
vi.	Debt Repayment .....	39
vii.	Strength and weakness of the structure and operation mechanism chosen .....	39
viii.	Reasons for Bid failure .....	42
ix.	Learnings.....	43
Case 2: School choice as a feasible PPP in India: a case of Andhra Pradesh and Delhi, India.....		
		49
i.	Project and its objectives.....	49
ii.	Type of project envisaged.....	53
iii.	Risk Sharing Mechanism.....	53
iv.	Debt Repayment .....	54
v.	Strength and weakness of the structure and operation mechanism 54	
vi.	Success and failure.....	55
vii.	Recommendation.....	56
Case 3: Emergency response in the state of Tamil Nadu, India: A PPP service delivery panacea.....		
		57
i.	Project and its objective .....	57
ii.	Type of project envisaged.....	59
iii.	Key Performance Indicators (KPIs) .....	60
iv.	Risk sharing mechanism .....	62

v.	Default Mechanism and Debt Repayment .....	64
vi.	Monitoring Mechanism .....	64
vii.	Strengths and Weaknesses of the Project .....	69
viii.	Successes and Learnings .....	71

Case 4: A scientific solution to tackling municipal solid waste (MSW) under PPP framework: case of waste to energy (WTE) plant in Ghazipur, Delhi 75

i.	Project and its objectives.....	75
ii.	Type of project envisaged.....	77
iii.	Costing.....	79
iv.	Risk Sharing Mechanism.....	80
v.	Debt Repayment .....	81
vi.	Strengths and Weaknesses of the Structure and Operation Mechanism Chosen .....	81
vii.	Success and failure.....	84
viii.	Recommendation.....	85

Case 5: Harnessing PPP efficiency from energy performance contracting: case of street lighting in the city of Bhubaneswar, Odisha, India ..... 87

i.	Project and its objectives.....	87
ii.	Type of project envisaged.....	90
iii.	Key Performance Indicators .....	92
iv.	Risk Sharing Mechanism.....	92
v.	Debt Repayment .....	92

vi.	Strength and Weakness of the Structure and Operation Mechanism Chosen. ....	93
vii.	Success and Failure.....	95
viii.	Recommendation.....	97
	References .....	100

## Abbreviations

ADB	Asian Development Bank
APF	Azim Premji Foundation
APRESt	Andhra Pradesh Randomised Evaluation Studies
APSC	Andhra Pradesh School Choice
ASER	Annual Status of Education Report
BEC	Baseline Electricity Consumption
BEE	Bureau of Energy Efficiency
BMC	Bhubaneswar Municipal Corporation
BOOT	Build, Operate, Own and Transfer
BYPL	BSES Yamuna Power Limited
CBSE	Central Board of Secondary Education
CCS	Centre for Civil Society
CEMS	Continuous Emission Monitoring Systems
CERC	Central Electricity Regulatory Commission
CMS	Centre for Media Studies
CO	Communication Officers
DBFMOT	Design, Build, Finance, Manage, Operate and Transfer
DEA	Department of Economic Affairs
DERC	Delhi Electricity Regulatory Commission
DFID	Department for International Development
EDMC	East Delhi Municipal Corporation
EDWPCL	East Delhi Waste Processing Company Limited
ELA	Expected Level of Achievement
EMRI	Emergency Management and Research Institute
EMS	Emergency Management Services
EMTs	Emergency Medical Technicians



EPC	Energy Performance Contracting
EPEC	European PPP Expertise Centre
ERC	Emergency Response Centre
ERS	Emergency Response Service
ESCO	Energy Services Company
EWS	Economically Weaker Sections
GIS	Geographic Information System
GoI	Government of India
GoR	Government of Rajasthan
H&UDD	Housing and Urban Development Department
ICT	Information and Communication Technologies
IE	Independent Engineer
IEWMCL	Indraprastha Energy & Waste Management Company Ltd.
IFC	International Finance Corporation
IHDS	Indian Human Development Survey
KPI	Key Performance Indicators
LED	Light-Emitting Diode
MCD	Municipal Corporation of Delhi
MoU	Memorandum of Understanding
MSW	Municipal Solid Waste
NBER	National Bureau of Economic Research
NDMC	North Delhi Municipal Corporation
NGO	Non-Governmental Organisation
NMC	North Delhi Municipal Area
NRHM	National Rural Health Mission
NYCGP	New York City Global Partners
PPP	Public Private Partnership

RDF	Refused Derived Fuel
RFP	Request for Proposal
RFQ	Request for Qualification
RTE	Right to Education
SBM	Swachh Bharat Mission's
SDMC	South Delhi Municipal Corporation
SLF	Sanitary landfill
SPV	Special Purpose Vehicle
TNHSP	Tamil Nadu Health Systems Project
TPC	Total Project Cost
ULB	Urban Local Bodies
USAID	U.S. Agency for International Development
VGf	Viability Gap Funding
VOIP	Voice Over Internet Protocol
WTE	Waste to Energy



# Foreword

Among the key themes in UN backed 17 sustainable development goals (SDGs) and associated targets, are poverty eradication, energy, water and sanitation, health, and human settlement. A large number of SDG targets, such as drinking water and sanitation, education, medical care etc. pertain to development of infrastructure and services, which are defined as social sectors. Provisioning of public infrastructure and services have traditionally been the responsibility of the public sector (government and its agencies). This has been the accepted norm in most countries, but its relevance becomes greater in the emerging market and economies (EMDEs). However, limitations of public sector led delivery is increasing constraining the expansion of social sector infrastructure assets and services on account of two major reasons. First, public finances are coming under stress on account of the increased demand of social services like education, health, drinking water and sanitation and secondly, the impatience of the consumer (public) with poor quality infrastructure and associate services. These are making it imperative for the public sector to develop alternative delivery mechanisms which include having the private sector as a partner.

There are a number of ways in which the private sector delivers public infrastructure and services. These arrangements can range from privatization where the ownership of the asset and risks are transferred to the private sector, to the conventional procurement models where government contracts with the private sector for specific packages of works or services. Under conventional procurement, the public sector largely retains the risks associated with ownership, operational performance and services integration. However, these models have several constrains. As public infrastructure must be accessible and affordable to all and the private sector is driven by commercial viability, most of these are not amenable to privatization because of the pricing issues.

Public Private Partnership (PPP) frameworks are an outcome of this quest to find a model that would retain the “public” character of infrastructure assets, and also the liabilities, while making the project attractive for the private sector to invest in and manage for a defined period of time. In other words, it is the mode of providing public infrastructure through private finance and management. There are a number of PPP models, characterized by joint management and risk sharing between the public and private sectors. These include relatively simple outsourcing-type partnerships – where services are provided on short to medium-term contracts or long-term concessions in which financing, construction and maintenance is with the private sector for a fixed period. Well-formed partnerships with the private sector have delivered clear benefits in introducing higher efficiency during construction including timely completion of projects, and in creating the right type of incentives for the private sector to manage risks effectively.

In India, PPP projects have been executed, with a mixed experience of success and failure, in economic sectors like highways, ports, airports etc. However, there are only a few examples of its implementation in social sector projects such as health, education, water and sanitation. It is, therefore, a big challenge to establish the credibility of such partnerships, which would encourage the government to design, adopt and experiment with PPP models in social sectors projects on a bigger scale. The resistance is great owing to such projects having a direct interface with the public at large.

CUTS Institute for Regulation and Competition (CIRC) has developed a compendium of case studies of social sector projects implemented in several states in India. These case studies have been developed through primary and secondary research, including interviews and discussions with concerned officials and private sector partnerships. The team has collected and collated information regarding various factors including risks, revenue models, success and failures of such social sector projects.

This compendium presents several case studies related to select social sector PPP projects in India. The case studies have been prepared to highlight the experience and lessons learnt so far and provide pointers to improve the design of future PPP for better outcomes. The learnings would be helpful in scaling up social sector projects with better outcomes and greater satisfaction for the consumer (beneficiaries). In this compendium, representative case studies have been selected to present cases of both success and failure.

It is expected that these case studies will enable a reader to understand and identify the underlying principles and issues that determine the extent to which the outcomes of these projects are in consonance with the project objectives. A good case study can give the reader insights to understand what works and what doesn't.

The choice of case studies provides a representation across different sectors. The case studies cover the features such as a quick snapshot of the project, its key objectives, design structure, Key Performance Indicators (KPIs), risk sharing mechanism, default mechanism, debt profile, strength and weakness of the contractual structure and operation mechanism, and finally the reasons for its success or failure. Key learnings and observations are discussed at length for each project. It is expected that the case studies will assist public authorities in understanding the needs, challenges and risks associated with PPP arrangements in social sector projects. Improving quality of project identification, preparation, and project award and monitoring of PPPs. It also covers associated issues such as, governance and fiscal implications, and managing the transition to a large-scale PPP program to improve infrastructure services.

**Dr. Arvind Mayaram**

Former Finance Secretary to Government of India & Chairperson, CIRC



# 1. Introduction

---

A public–private partnerships (PPPs) continue to draw considerable attention from governments for developing social infrastructure, in many countries across the world. In India, PPP projects started in the early 2000’s. Since then, Government of India is actively pursuing private sector contribution for developing infrastructure projects. However, for mainstreaming PPP projects, building strong legal and institutional frameworks, backed by political will alone appear insufficient<sup>1</sup>. In an article printed by “The Hindu”, 65 PPP projects, which valued over INR 770 billion were terminated in India<sup>2</sup>. With an uneven distribution of PPP projects across sectors and states – projects with high return on investment (RoI) like highways, ports and electricity generation have taken off quickly, while comparatively less rewarding sectors like health, education, railways, water and sanitation and other “social” sectors<sup>3</sup> have lagged. In India, the path to widespread PPP deployment has been challenging, and the progression of PPP projects in social sectors has been dwindling. Hence, the experience of public officials in managing these is very limited<sup>4</sup>.

This book intends to display selected PPP case studies in social sector projects in India and bring out factors contributing towards their success, and suggests modifications for reducing the incidence of failed projects.

---

<sup>1</sup> The Department of Economic Affairs' (DEA) PPP Cell published guidelines for the formulation and approval of PPP projects in 2011, after the Ministry of Finance centralizes the coordination of PPPs

<sup>2</sup> *The Hindu*, January 14, 2017

<sup>3</sup> No recent procurement under PPP framework as per data available on [www.pppinindia.gov.in](http://www.pppinindia.gov.in).

<sup>4</sup> When compared with infrastructure and other sectors



## 2. Overview

---

### A. Defining PPP

PPPs can broadly be defined as a co-operative undertaking between the public and the private sector for delivering services related to public needs. Although, there is no consensus on one widely accepted definition of public-private partnerships (PPP) but some internationally accepted definitions of PPPs are as follows:

The Asian Development Bank (ADB) defines PPPs whereby *“government, while engaging the private sector, acknowledge and structure their role in ensuring that social obligations are met and successful sector reforms and public investments achieved. PPPs allocate the tasks, obligations, and risks among the public and private partners in an optimal way - The structure of the partnership should be designed to allocate risks to the partners who are best able to manage those risks and thus minimize costs while improving performance.”*

The National Council for Public-Private Partnerships (NCPPP) defines PPPs as *“a contractual arrangement between a public agency (federal, state or local) and a private sector entity. Through this agreement, the skills, and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public. In addition to the sharing of resources, each party shares in the risks and rewards potential in the delivery of the service and/or facility.”*

The PPP Knowledge Lab<sup>5</sup> (World Bank) defines a PPP as *"a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance"*.

APMG<sup>6</sup> defines PPPs as *"a contractual means to deliver public assets and public services. PPP contracts include those intended to develop and manage new infrastructure, contracts to undertake significant upgrades to existing infrastructure (these are called infrastructure PPPs), and those under which a private partner manages existing infrastructure or only provides or operates public services (known as service PPPs)."*

## B. PPP Frameworks

There are several options possible to develop a project under a PPP framework. A PPP project is to be designed based on the expertise of partners and under a framework, which can properly allocate available resources and mitigate risks. Over the years, several different models have been developed and implemented based on the specific needs related to an individual project. The PPP project can be deployed under different contractual agreements, which can range from contracting out an asset for limited period to complete privatization by transferring the ownership to the private party.

In India, PPP projects have been implemented under several frameworks and some of the commonly implemented frameworks are:

---

<sup>5</sup> What are Public Private Partnerships? at <https://ppp.worldbank.org/public-private-partnership/overview/what-are-public-private-partnerships>. World Bank

<sup>6</sup> Defining PPPs for The Purpose of This PPP Guide at <https://ppp-certification.com/ppp-certification-guide/11-defining-ppps-purpose-ppp-certification-guide>. APMG

i. BOT (Build-Operate-Transfer) also known as DBFOT (Design-Build-Finance-Operate-Transfer)

BOT framework is typically used to develop a discrete asset rather than a whole network. BOT is generally used when a project greenfield<sup>7</sup> in nature is under consideration. In a BOT partnership projects the private party finances the project, constructs/implement the facility or system, operates it for a certain period (concession period), after which the facility is transferred back to the public party. The private party generally charges a fee to the utility to recover its investments. All the risk associated with the project are assumed by the private party until the assets are transferred to the public party, who is responsible for all kind of O&M activities and risks thereafter. BOT<sup>8</sup> is the conventional model used for PPP project across the globe and about 50 percent of PPP project in India has been implemented under the broad umbrella of BOT. In India, BOT, BOT Toll, BOT Annuity, DBFOT, DBFOT Toll, DBFOT Annuity are most used PPP structures.

ii. DBO (Design-Build-Operate)

In a DBO PPP Project the financial obligations are retained by the public party, and it owns and finances the complete development of assets. The responsibilities of private partner are restricted to designing, building, and operating the assets. The public entity abides by all the financial risks and private entity typically receives a fixed sum of money for designing and building the project. During the operation period an operating fee is paid by the public entity, which is based on certain performance parameters and the

---

<sup>7</sup> Although refurbishment may be involved

<sup>8</sup> Variant of BOT

maintenance activities are the sole responsibility of the private party. DBO is not commonly used in India.

- iii. BOOT (Build-Own-Operate-Transfer) also known as DBOOT (Design-Build-Own-Operate-Transfer) also known as DBFO (Design-Build-Finance-Operate)

This PPP model transfer all the associated risk to the private partner who assumes responsibility for all aspects of the project i.e. designing, building, maintaining and operating the facility for the concession period. The build-up facility is solely owned by the private service provider for a fixed period and the project belongs to an arrangement which falls within the domain of a private finance initiative. In the Indian context a significant number of projects are implemented within a broad structure of BOOT. The ability of the private sector to manage risks is considered as a positive factor under the scheme, but undermining the risk associated with long term projects has led to projects running into trouble in the past. In the current context the risk allocation is the primary factor under consideration/review to reduce the threat of underperformance of PPP projects. DBOOT and DBFO are two variants under the BOOT structure.

- iv. BOO (Build-Own-Operate) also known as DBOO (Design-Build-Own-Operate)

BOO also known as BOOM or DBOO, is typically used to develop a “Greenfield” project (like in the BOT or DBOT framework). The private party is involved in all the phases right from the conceptualization of the project and own the project after completion. The private party absorbs all the risks associated with the project and is solely responsible for operating and

maintaining assets. The recovery of investment is based on regular payments received from the public party as per the concession agreement for various operation and maintenance activities. The basic difference between BOO and BOT or DBOT is that ownership of the asset belongs to private party and is not transferred back to public party.

Figure 2.1: Distribution of risks, responsibilities, and governance structure amongst public and private partner under different PPP frameworks<sup>9</sup>

TYPES OF CONTRACTUAL STRUCTURES				
OPERATION & MAINTENANCE SERVICES (O&M)		CONCESSION		FULL PRIVATIZATION
		PUBLIC OWNERSHIP OF THE FACILITIES	PRIVATE OWNERSHIP OF THE FACILITIES	
Models	LDO (lease-develop-operate)	BOT (Build-Operate-Transfer) DBOT (Design-Build-Operate-Transfer) BTO (Build-Transfer-Operate) ROT (Rehabilitate-Operate-Transfer) DBFOT (Design-Build-Finance-Operate-Transfer)	BOOT (Build-Own-Operate-Transfer) DBFMOT (Design-Build-Finance-Manage-Operate-Transfer) DBFO (Design-Build-Finance-Operate)	DBOO (Design-Build-Own-Operate) BOO (Build-Own-Operate)
		Public ← Financing Responsibility → Private		
Agreement Type	Leasing agreement	PPP agreement	PPP agreement	PPP agreement or Sale agreement
	Public ← Project Governance → Private			
Risk Allocation	Construction: Public Investment: Public Commercial: Public Operation: Private	Construction: Private Investment: Private Commercial: Public/Private Operation: Private	Construction: Private Investment: Private Commercial: mainly Private Operation: Private	Construction: Private Investment: Private Commercial: Private Operation: Private
	Low Risk → Risk assumed by private party → High Risk			

Low High

Source: Referred and redeveloped: European Commission (2003) and OECD (2014)

<sup>9</sup> Guidelines for successful public – private partnerships, Brussels, 2003. European Commission. & Private Financing And Government Support To Promote Long-Term Investments In Infrastructure, 2014. OECD.

Table 2.1: The implications of different frameworks in different sectors with relevant examples

Sl. No.	Framework	Implementation sectors	Examples
1	<b>BOT / DBFOT</b>	<p><b>Infrastructure sector:</b> Roads, parking lots, public buildings, sport facilities, airports, water and sewerage, sanitation etc.</p> <p><b>Social sector:</b> Skill development, social infrastructure</p>	<p>1. Waste Based Power (Ranchi) Project - BOT PPP project: An INR 77 crore PPP project under the authority of Ranchi Municipal Corporation.</p> <p>2. School Building (Solapur) Project - BOT PPP project: An INR 6.27 crore project under the authority of Solapur Municipal Corporation.</p> <p>3. Setting up of 11.5 MW solid waste-based power unit in Patna–DBFOT PPP Project: An INR 15 crore project under authority of Bihar Urban Infrastructure Development Corporation Limited, Bihar.</p>

2	<b>BOOT / DBOOT/ DBFO</b>	<p><b>Infrastructure sector:</b> Roads, parking lots, public buildings, sport facilities, airports, water and sewerage, sanitation (waste management) etc.</p> <p><b>Social sector:</b> Social infrastructure, hospitals etc.</p>	<p>1. Implementation of 600 TPD solid waste management in Faridabad - DBFO PPP Project: An INR 37.33 crore project under authority of Municipal Corporation of Faridabad, Haryana.</p> <p>2. Technical &amp; Engineering College (Sanjeev Nagar) Project - BOOT PPP Project: An INR 9.30 crore project under authority of Directorate of Technical Education.</p> <p>3. Hospital (Wanjri) Project - DBOOT PPP Project: An INR 98.78 crore project under authority of Nagpur Municipal Corporation, Maharashtra.</p>
3	<b>BOO / DBOO</b>	<p><b>Infrastructure sector:</b> Roads, parking lots, public buildings, sport facilities, airports, etc.</p>	<p>1. Construction of IT and commercial complex at Rourkela – BOO PPP Project for building Social and Commercial Infrastructure: An 76.90 crore project under</p>

		<p><b>Social sector:</b> Social infrastructure, skill development, education, health</p>	<p>authority of Odisha Industrial Infrastructure Development Corporation.</p> <p>2. Grain Warehouses (Circuit II) - BOO PPP Project for building Social and Commercial Infrastructure: An 1500 crore project under authority of Food Corporation of.</p> <p>3. Development of Engineering College at Tezpur, Assam- A BOOM PPP Project for building Social and Commercial Infrastructure under authority of Department of Technical Education, Assam.</p>
--	--	--	---



### C. Financial sustainability PPP projects

PPP projects can be divided in three basic groups based on financial sustainability and each one requires a different framework. GoI can consider building a regulatory framework based on the financial sustainability of the project and propose alternative routes for making a social sector project financially viable for private sector investments. The categories are as below:

**a) Fully self-sustainable:** Projects which can generate sufficient fund flow post construction through various sources including revenues from sale of particular service. The streams of revenue allow the private partner to recover the investment in full during the operational life of the project.

**Example:** Typical highway projects are one of the examples, where the volume of daily traffic is sufficiently high and often increases with time. In these cases, any back up financial assistance for private party to sustain is not necessarily the prime concern.

**b) Not financially sustainable:** Private sector investment cannot be recovered from any direct source that can generate revenue from the asset build by them. In this case, the public sector becomes the purchaser of the services and payments are often linked to predefined performance parameters.

**Example:** Social infrastructure such as hospitals, schools, and social housing fall under this category. Social infrastructure sector needs more attention than the others. The most important challenge before state governments is the lack of appetite for private finance initiatives in social sector projects because of a comparatively less rewarding structure.

**c) Partially self-sustainable:** These are the project where the revenues are generated from tariffs and similar charges paid by end users, but being of social value, levels of tariff is regulated by the public sector and kept low, making the project non-viable.

**Example:** Essential services like metropolitan light rail, railways, and water and sewerage fall under this category, where the stream of revenues is not enough to repay the cost of the private investment<sup>10</sup>. To make these projects viable and attractive for private partner, the public party provides additional support such as, grants during the construction phase, tax benefits/relief during the operational phase and/or sharing the disruptive risks during the project lifecycle.

#### D. PPPs in Social Sectors in India

Although direct and positive relationship has been established between development of physical infrastructure and national productivity, for attaining sustainable development it is essential for a country to invest in human capital development. Social sector can play a crucial role in enhancing macroeconomic fundamentals such as higher growth, lower government debt and inflation, and create more jobs. India is one of the fastest growing economies in the world with the largest proportion of young population, and it has been working towards reducing the dependency ratios. However, having a younger populace does not essentially transfer into demographic dividend until it is complemented by enhancement in socioeconomic indices. Lack of skill and education result in loss of opportunities - that need to be addressed by government with proper social sector interventions. Similarly,

---

<sup>10</sup> Because of regulations on tariff levels

poor health indicators such as high maternal or infant mortality rate or poor health coverage result in loss of productivity.

Insufficiency in distribution, delivery, and maintenance of public services by government has generated the need for private sector participation in social sectors infrastructure development and delivery of social services through PPPs. Although structure of PPPs in social sector was defined only during the Tenth Five Year Plan of India (2002-07) that envisioned participation of the private sector in the delivery of health and education services<sup>11</sup>, the initial evidence of PPPs through 'community support' for government program for construction of irrigation canals was sought during the First Five Year Plan itself.<sup>12</sup>

In India, PPPs have now become quite common in developing utility and transport infrastructure. However, in social sectors, they have failed to gain traction, especially at the local level. The master list of PPP projects compiled by the Government of India till date reveals that out of a total of 1,825 PPP projects at various stages of development, only around 3 percent are PPPs in social sectors (Health & Education). To capitalize on the demographic dividend, deficit in social infrastructure has to be met through timely and cost-effective methods. PPPs through effective and transparent implementation procedures can be a possible long-term solution, a contention supported by the success of several social sector PPPs in India, especially in education, skill development and health. This suggests that robust models could be developed and replicated both in India and similar other developing economies.

---

<sup>11</sup> OECD. 2010. Global Forum on Development. *Delivering Social Infrastructure through PPP*. Paris.

<sup>12</sup> Government of India. Planning Commission of India. 2004. *Report of the PPP Sub-Group on Social Sector*. New Delhi

Table 2.2: Summarizes PPPs in social sectors (Health & Education) at various stages of development.

<b>PPPs in Social Sector in India till May 15, 2022</b>		
<b>Social Infrastructure</b>	Health Care	14
	Education	37
	<b>Total</b>	<b>51</b>

Source: InfrastructureIndia.gov.in

**Process of PPPs in social sectors:** Most PPP projects in social sectors are publicly funded with private service delivery and private management. Like core infrastructure sectors, a need has been felt to attract private financing for PPPs in social sectors. PPPs in social sectors are characterized by three distinguishing features:

- a) A partnership based on well-articulated 'contract'
- b) A long-term relationship between the public and the private sector
- c) Flexibility and responsiveness in decision-making

The private sector includes all non-government entities such as the corporate sector, self-help groups, partnerships, individual and community-based organizations, voluntary organizations etc.

In India, the remit of the Central Government is in areas where the Parliament has exclusive powers to legislate. An expanded function of the welfare state includes provision of public utilities and services to its citizens

such as roads, power and water supply or social sector facilities such as education, health care and old age care. Given the federal structure of the Constitution of India, while the responsibility of the social sectors is devolved to the state governments, the nature of the polity allows the Central Government to intervene through a complex system of incentives and disincentives. This acts as one of the key barriers in faster introduction of PPP projects in all sectors.

A more cautious approach to implementation of PPPs in social sector by India can be explained by the need to learn from its own experiences, both positive and negative. Subsequently, considerable time is required to incorporate changes into government proposals to form new partnerships, which is a very slow process as it involves multiple rounds of adjustment and approval. Nevertheless, after learning from several successful and unsuccessful PPP projects, a number of projects have been identified for implementation, which may result in substantial PPP deployment in the social sectors. Some of these have been showcased in the next section.

### 3. Case Studies

---

#### **Case 1: Establishment of "Gyanodaya" senior secondary schools through PPP mode: a case study from Rajasthan, India**

##### i. Project and its objectives

The Government of Rajasthan (GoR), through the Department of School and Sanskrit Education (Authority), has been engaged in the provision of school education in the Indian state of Rajasthan since 1958. In 1991, Rajasthan's average literacy rate stood at just 39 percent. Since then, the State has steadily been improving its rating. Although the State's literacy rate had risen from 60 percent to 67 percent<sup>13</sup> during 2001-2011, it still stands lower than the national literacy rate of 74 percent.

As part of GoR's endeavour to expand infrastructure for the secondary school education in rural areas and improve its quality, a decision was taken to establish, manage, and operate 50 "Gyanodaya"<sup>14</sup> senior secondary schools imparting education from standard VI to XII. The schools were to be constructed, managed, and run by the private partner as a PPP, which would bear the entire capital cost. GoR's role was to facilitate identification and allotment of land and providing capital assistance of INR 500 per sq. ft. for the constructed area of the school, subject to a maximum of INR 5 million. This was to be paid in three instalments based on construction milestones and the use of own funds by private developers. Fifty percent of the seats were to be reserved for voucher beneficiaries, termed "Government Seat" and

---

<sup>13</sup> Rajasthan's literacy rate of 67 percent (81 percent male and 53 percent female)

<sup>14</sup> "Gyanodaya" means "rise of knowledge"

the remaining seats could be provided to paying students. GoR was to issue Education Vouchers to eligible recipients, whose fee of up to INR 8,000 per annum was to be paid through the public exchequer over the entire concession period.

Schools were to recover, through the encashment of Education Vouchers, a part of their recurring cost. The remaining operational cost was to be borne by the private partner through an open market fee structure. Private partners could charge a market determined fee for the remaining 50 per cent seats and would have full independence in the matters of teachers' recruitment and running of schools, subject to affiliation bye-laws of affiliating Boards of Education and State Government regulations. The concessionaire was also allowed to take up alternative revenue-generating activities in the school without adversely impacting the running of the school in accordance with terms and conditions contained in the Concession Agreement. The additional activities could be undertaken with the prior written approval of the Authority. The supplementary activities that could be included were primary education, hostel facility, transportation facility, etc.

### **Key objectives of the project**

The key objectives GoR aimed to achieve were:

- To augment the access to secondary school education in the rural areas of Rajasthan, with specific emphasis on the girl students.
- To improve the quality of education delivery through the participation of the private sector.
- Induction of private sector efficiencies in operation and management of schools, including co-curricular and extra-curricular activities.

### **Affiliation of schools**

Schools were to be affiliated to either the Central Board of Secondary Education (CBSE) or State Education Board, the choice being left to the private partner. The medium of instruction could be English or Hindi, the official languages of the State. Assets of the school were to remain in the joint name of the State Government and private partner for 30 years.

### **Categorisation of students**

The GoR divided the students seeking admission to Gyanodaya schools into three different categories AI, AII and AIII, defined as below:

#### **Student Categories**

- Gyanodaya A-I Students: (Admitted as per Authority's prescription; tuition fee payable by the Authority)
- Gyanodaya A-II Students: (As may be required to be admitted, from class VI to class VIII, as per applicable law or norms prescribed by the Authority; no tuition fee to be charged/paid)
- Gyanodaya A-III Students: Admitted by concessionaire; tuition fee payable by students.

#### **Allocation of Students' Seats**

% of Gyanodaya AI Students in a class 12: 50%	- Class 6-8: 25%; Class 9-12: 50%
% of Gyanodaya AII Students in a class 12: 0%	- Class 6-8: 25%; Class 9-12: 0%
% of Gyanodaya AIII Students in a class 12: 50%	- Class 6-8: 50%; Class 9-12: 50%



- **Gyanodaya AI Students** – Voucher Students (Reserved seats)

The payment of tuition fees of Gyanodaya AI Students was linked to the attainment of agreed performance outcomes (the Key Performance Indicators) that also guarded against discrimination or neglect of Gyanodaya AI students.

The concessionaire was entitled to receive the Gyanodaya AI amount against all occupied and unoccupied Gyanodaya AI Seats for the first seven years from the Commercial Operation Date (COD). Subsequently, the concessionaire was solely responsible for identifying and ensuring admission of the Gyanodaya AI Students against the Gyanodaya AI seats.

- **Gyanodaya AII Students** – Free Seats

The concessionaire was to impart education to such students without charging any tuition fees.

- **Gyanodaya AIII Students** – Paid Seats

**Allocation of seats under the agreement:**

- 50% of the Student Capacity of each section<sup>15</sup>, from class VI to class XII, to Gyanodaya AIII Students;
- 50% of the Student Capacity in each section, from class IX to class XII, to Gyanodaya AI Students;
- 25% of the Student Capacity in each section, from class VI to class VIII, towards Gyanodaya AI Students; and
- 25% of the Student Capacity in each section, from class VI to class VIII, towards Gyanodaya AII Students.

---

<sup>15</sup> Each section shall consist of 40 students

### Box 3.1.1: Project Snapshot

Dates	<ul style="list-style-type: none"><li>o The bidding process was initially proposed to be completed by March 2009; however, it began in April 2010</li></ul>
Cost	<ul style="list-style-type: none"><li>o <i>Total Project Cost (TPC) for 10 projects:</i> INR 1,719 million, revised to INR 2,074 million</li><li>o <i>Viability Gap Funding (VGF) from Government of India (GoI) for 10 projects:</i> INR 343.8 million, revised to INR</li></ul>

#### ii. Type of project envisaged

These PPP schools were built on a Design, Build, Finance, Manage, Operate, and Transfer (DBFMOT) basis. With assistance from the Department of Economic Affairs (DEA), Government of India (GoI), ADB, and state PPP cell, GoR selected KPMG for managing the transactions – including activities from project concept feasibility assessment to finalising a successful bidder on a 'fast track' basis. The project was conceptualised in November 2008, and the financial year ending March 2009 was proposed as the date of final bid submissions. However, due to a number of implementation challenges, the project got delayed with the first bidding document being released only in 2010.

In April 2010, the Authority commenced a bidding process to select private participants for developing senior secondary schools through a Request for Qualification (RFQ). To attract credible private partners, it was considered necessary to bundle several schools into a single project for economies of scale. One project constituted developing five senior secondary schools in

one district. The RFQ document proposed pre-qualification for 10 project districts and 50 villages located within Ajmer and Udaipur divisions in Rajasthan. However, the project was terminated due to conflicting views on PPP structure amongst Central Government experts resulting in implementation delays, with many bidders losing interest. This is a case of a very well-designed project failing due to implementation issues.

**Design structure:**

- Design-Build-Finance-Manage-Operate-Transfer (DBFMOT) basis.
- Concession period: 30 years from Effective Date, including the construction period.
- The tuition fee of Gyanodaya AI Students is payable in four installments and linked to performance.
- Pre-determined provision for fee escalation during the entire concession period.
- Provision for supplementary activities.
- Provision for capacity expansion after five years.
- Payments linked to achievement levels of KPIs.
- Third party monitoring through an independent engineer during the period of construction
- Third party monitoring of the academic achievements and performance by the Authority during operations.

### iii. Key Performance Indicators

The following table shows the key indicators of the project, along with the objectives that they address.

Table 3.1.1: Key Performance Indicators

Indicators	Objective
To measure the education imparted to all students KPI <sub>1</sub>	Comparing the pass percentage of students of Gyanodaya schools with the National Average pass percentage in class XII CBSE board exams is expected to set a high performance level target
To measure the education imparted to voucher students KPI <sub>2</sub>	To reduce any discrimination between voucher and non-voucher students by the school
To measure the dropout rate of voucher students KPI <sub>3</sub>	To reduce dropout rates to less than 5 percent
To measure subject knowledge (KPI <sub>4</sub> - English, KPI <sub>5</sub> - Computer awareness, KPI <sub>6</sub> - Mathematics, and KPI <sub>7</sub> - Science) of voucher students	<ul style="list-style-type: none"> <li>■ To measure the performance and quality of education imparted to the voucher students in the Gyanodaya Schools</li> <li>■ To increase competition among Gyanodaya Schools for better performance</li> </ul>

Details of how to measure the above parameters are given in Annexure A.

The seven KPIs are then collated into a single weighted variable – Expected Level of Academic Achievement (ELA). ELA can be calculated using the following weighted formula:

$$ELA = 0.15 (KPI_1) + 0.15 (KPI_2) + 0.4 (KPI_3) + 0.075 (KPI_4) + 0.075 (KPI_5) + 0.075(KPI_6) + 0.075(KPI_7)$$

Payment of recurring component is linked to Expected Level of Achievement (ELA).

Table 3.1.2: Expected Level of Achievement and Corresponding Performance

<b>Performance– ELA</b>	<b>Payment</b>
ELA ≤ 0.75	75 percent of the funds to be reimbursed
0.75 < ELA < 1.0	100 percent reimbursement of funds
ELA = 1.0	110 percent reimbursement of funds

#### iv. Risk Sharing Mechanism

Responsibilities/risks shared by public partners and private partners under the implemented PPP framework.

Table 3.1.3: Risk Sharing Mechanism for Public and Private Partners

<b>Public Partner</b>	<b>Private partner</b>
Designing the project and project roll-out	Establishing, managing, and operating five Senior Secondary Schools for 30 years
Land (On lease; no premium; stamp duty exempted)	Affiliation with Central Board of Secondary Education (“CBSE”) or State Board subject to compliance of guidelines/rules framed by them. Also, comply with guidelines of the VGF Scheme to avail VGF funding.
Construction Grant (@ INR 500 per sq ft with a ceiling of INR 5 million per school). In addition, eligible for VGF grant up-to 20 percent of TPC subject to guidelines of the VGF Scheme.	Allocate 25 percent of seats to voucher students from class VI to VIII (together with RTE <sup>16</sup> students of further 25 percent takes it to 50 percent) and 50 percent of the seats to voucher students from class XI to class XII.
Tuition fee of Gyanodaya AI Students - INR 8,000 <sup>17</sup> per voucher student in 2010 escalated annually @5 percent for the entire concession period.	Payments linked to achieving Key Performance Indicators and incentives attached to better performance.
Allocating voucher students for the first seven years	To get voucher students from the 8 <sup>th</sup> year onwards.

<sup>16</sup> RTE – Right to Education Act, which makes it mandatory for all private schools to provide free education to students from economically weaker sections of society.

<sup>17</sup>INR 8,000 for first year and escalation factor to be considered from second year as per contract

v. Default mechanism

**Concessionaire – Non-fulfilment of the Conditions Precedent**

The Authority shall have the right to:

- Immediately terminate this agreement; or
- Extend the time for the concessionaire to fulfil the concessionaire's conditions under extenuating circumstances

The exceptions being:

- a) Force Majeure - unforeseeable circumstances;
- b) Authority's failure to fulfil its conditions precedent;
- c) Breach of its obligations by Authority; or
- d) Waiver of the concessionaire's obligations by Authority.

Other events of default by the concessionaire which could lead to the termination included, *inter alia*, non-replenishment of performance guarantee, failure to achieve ELA of 0.75 or more for a consecutive period of three years, failure to enrol AI students in proportion to AIII students from the 8<sup>th</sup> year onwards, failure to affiliate any of the school to CBSE or State Board, financial default to lenders, etc.

**Authority – Non-fulfilment of the Conditions Precedent**

Concessionaire could elect to:

- Seek extension of the time for the Authority to fulfil the conditions on mutually agreed terms
- Terminate the agreement

Material breach on the part of the Authority included failure to deposit payments as per the escrow agreement.

#### vi. Debt Repayment

In setting up the project, the concessionaire could resort to borrowing; the risk was to be fully borne by them, as GoR would pay the voucher amounts based on satisfactory outcomes. For any defaults, including defaults to the lenders, the Authority was entitled to suspend the concessionaire's rights under the agreement. At any time during the period of suspension, the lender's representative, on behalf of senior lenders, could substitute the Concessionaire under and in accordance with the substitution agreement, and upon receipt of a notice to this effect from the lender's representative, the Authority could withhold termination for a period not exceeding 180 days from the date of suspension, and any extension thereof under Clause 25.8(a), for enabling the lender's representative to exercise its rights of substitution on behalf of senior lenders.

#### vii. Strength and weakness of the structure and operation mechanism chosen

##### **Strengths**

- Objectives were achievable through a performance-linked payments mechanism that had inbuilt disincentives for below-par performance and incentives for better performance. The formula gave different weightage to different KPIs; for example, the weightage for dropout ratio was the highest at 40 percent, indicating this to be the major concern of the Authority. Similarly, below-par performance for a consecutive period of three years could lead to termination.
- Dovetailing the structure to comply with guidelines and rules of different entities was achieved. For example, affiliation to CBSE



requires that the entity promoting the school should be a registered Trust or a Society. But for availing VGF assistance, it should be a private sector company. Hence the concessionaire was a Section 25 Company (a not-for-profit company) under the Companies Act, 1956, meeting both requirements. Similarly, a predetermined amount of INR 5 million was to be paid as a construction grant by GoR. In terms of the VGF Guidelines, a grant cannot exceed 40 percent of the total project cost (TPC), comprising a maximum of 20 percent each from the Central Government and the State Government. VGF grant is to be the bid variable under the scheme. As the construction grant was within 20 percent of the TPC (of INR 4.148 crore), it would have been within the prescribed limits. As to whether the proposed format would vitiate the bid process, the format proposed by GoR would only result in the range of possible bids being reduced to a maximum of 20 percent of TPC (GoI portion of VGF). Thus the bidding remained an open, competitive, and transparent process.

- Strengthening of the project by the institutional mechanism put in place by GOI.
  - User charges were not fixed for the period beyond the first 10 years of the concession period as the State's Finance Department had approved the user charges only for the first 10 years. It was observed that if the voucher payments are not predetermined for the entire concession period, it would constitute a major risk for the private parties and would get reflected in their bid response. The bids would be unduly high and may become unresponsive. User charges for the entire concession period were subsequently incorporated in the DCA.

- Explicit guidelines for capacity expansion: GoR felt that it could not be conclusively stated whether capacity expansion would be required or the extent of capacity expansion required to be carried out by the concessionaires during the concession period. In case capacity expansion was allowed without prefixing the details for such expansion in terms of student intake, it could be constructed as an open-ended advantage for the concessionaries. Further, the provision would be open to interpretation by the bidders, and each bidder would assess the market potential differentially. Since no change in TPC or higher termination payments were envisaged for the higher capacity creation, some bidders could, while bidding, take into account the likely enrichment of costs through such activity at a later date and bid for higher VGF. Therefore, it could distort the process of bidding. This provision was not cost neutral. The provision would also have brought in an element of discretion. The guidelines on capacity expansion were made part of the concession agreement.
- Independent Engineer (IE): Separate provisions for IE had not been made as GoR already had an independent body named the 'Rajasthan Council for Elementary Education' to monitor implementation. This independent body has no expertise to monitor construction works. For PPP projects, third party supervision and monitoring are considered as a better model of management to ensure qualitative output envisaged in the concession agreement is fully achieved. Hence, an IE may be provided at least for the period of construction. GoR accepted this recommendation and provided for IE during the period of construction.

#### viii. Reasons for Bid failure

- **Underestimation of project cost**

The project was granted in-principle approval at the Empowered Institution (EI) Meeting held on 17.07.2012 (Department of Economic Affairs - PPP Cell, 2012). As pointed out by the EI, the cost estimates were based on 2010 prices were re-estimated, and revised costs and consequential revision in the VGF amount were reflected in the bid document. However, private sector participants were sceptical about the credibility of the costs in the DPR.

- **Prolonged bid process**

It took more than three years to issue Request for Proposal (RFP) after the issue of Request for Qualification (RFQ) which was issued on 16.04.2010. VGF approval by GoI was given on 11.01.2013 However the and RFP could only be issued on 05.06.2013.

In response to the RFQ, about 89 applications from 16 different applicants were received, GoR shortlisted 49 applications for 10 projects received from amongst seven different private parties in response to the RFQ. This was considered a good response. However, no bids were received when the RFP was issued in 2013.

- **Viability issues**

The annual student fees were fixed at INR 8,000 per student in 2010 escalated @5 percent p.a. This came to INR 9,724 in 2013-14 and INR 10,210 in 2014-15, the expected year of operation. In contrast, according to the prevailing market conditions, GoR prescribed INR 11,704 in 2012-13 under the RTE Act. Therefore, ab initio, the PPP offer was perceived as an unfair

deal. Even in the pre-bid conference, it was mentioned that the fee for voucher students of INR 8,000 per annum or INR 667 per month is too low. It did not even cover the operational expenses per child. Even under RTE, the states are reimbursing per child expenditure for EWS students incurred by the schools on actual cost basis. For example, in Delhi, the reimbursement is INR 1,500 pm per child, and Maharashtra INR 1,800 pm per child.

#### ix. Learnings

Key learnings are:

- For a programme like Gyanodaya to be successful, it must have a champion in an official or a public representative at a very high level. Such a person should be empowered to quickly cut through coordination issues and bring different stakeholders on the same page.
- As the private sector is driven by viability consideration, including very backward or remote regions for establishing schools at the very outset under the programme is counterproductive. PPPs succeed in locations or in a project where “traffic” risk is low. The demand risk would be considerably reduced if the PPP schools were located in urban or semi-urban areas, to establish the proof of concept and then scaled up.

## Annexure A

### KPI evaluation of the Senior Secondary Schools

#### I. **KPI<sub>1</sub>** - To measure the education imparted to all students

(Number of Gyanodaya AI, Gyanodaya AII and Gyanodaya AIII students in the Senior Secondary School who secured threshold marks in the CBSE Class XII Examination *divided by* Number of Gyanodaya AI, Gyanodaya AII and Gyanodaya AIII students in the Senior Secondary School who appeared for the CBSE Class XII Examination)

*Divided by*

(Number of students who secured threshold marks in CBSE Class XII Examination *divided by* No. of students who appeared for the CBSE Class XII Examination)

#### II. **KPI<sub>2</sub>** - To measure the education imparted to Gyanodaya AI and Gyanodaya AII Students

[(No. of Gyanodaya-AI and Gyanodaya-AII students in the Senior Secondary School who secured threshold marks in the CBSE Class XII Examination *divided by* No. of Gyanodaya-AI and Gyanodaya-AII students in the Senior Secondary School who appeared for the CBSE Class XII Examination)

*Divided by*

(No. of Gyanodaya AIII students in the Senior Secondary School who secured threshold marks in the CBSE Class XII Examination divided by No. of Gyanodaya AIII students in the Senior Secondary School who appeared for the CBSE Class XII Examination)]

*Divided by*

0.80

**III. KPI<sub>3</sub>** - To measure the dropout rate of Gyanodaya AI and Gyanodaya AII students

[(No. of Gyanodaya AI and Gyanodaya AII Students in the Senior Secondary School who appeared for Examinations (internal and CBSE Board) in the relevant Academic Year in each of the classes from VI to XII

*Divided by*

(No. of Gyanodaya-AI and Gyanodaya-AII students who enrolled in the Senior Secondary School at the start of the same Academic Year in each Class from VI to XII)]

*Divided by*

0.95

**IV. KPI<sub>4</sub>** - To measure English reading and comprehension skills of Gyanodaya AI Students and Gyanodaya AII Students

(Sum of percentage of marks obtained by all Gyanodaya AI Students and Gyanodaya AII Students in a Senior Secondary School in the English subject in the Ability Examination conducted by the Authority *divided by* No. of Gyanodaya-AI Students and Gyanodaya-AII Students who appeared for the Ability Examination in the Senior Secondary School)

*Divided by*

(Sum of percentage of marks obtained by all Gyanodaya AI Students and Gyanodaya AII Students in all operational Gyanodaya School in the English subject in the Ability Examination conducted by the Authority *divided by* No. of Gyanodaya I Students and Gyanodaya AII Students who appeared for the Ability Examination in all operational Gyanodaya Schools)

**V. KPI<sub>5</sub> - To measure Computer Awareness skills of Gyanodaya-AI Students and Gyanodaya-AII Students**

(Sum of percentage of marks obtained by all Gyanodaya AI Students and Gyanodaya AII Students in a Senior Secondary School in Computer Awareness in the Ability Examination conducted by the Authority *divided by* No. of Gyanodaya AI Students and Gyanodaya AII Students who appeared for the Ability Examination in the Senior Secondary School)

***Divided by***

(Sum of percentage of marks obtained by all Gyanodaya AI Students and Gyanodaya AII Students in all operational Gyanodaya School in the Computer Awareness in the Ability Examination conducted by the Authority *divided by* No. of Gyanodaya AI Students and Gyanodaya AII Students who appeared for the Examination in all operational Gyanodaya Schools)

**VI. KPI<sub>6</sub> - To measure Mathematics knowledge of Gyanodaya AI Students and Gyanodaya AII Students**

(Sum of percentage of marks obtained by all Gyanodaya-AI Students and Gyanodaya-AII Students in a Senior Secondary School in Mathematics in the Ability Examination conducted by the Authority *divided by* No. of Gyanodaya-AI Students and Gyanodaya-AII Students who appeared for the Ability Examination in the Senior Secondary School)

***Divided by***

(Sum of percentage of marks obtained by all Gyanodaya AI Students and Gyanodaya AII in all operational Gyanodaya School in the Mathematics in the Ability Examination conducted by the Authority *divided by* No. of Gyanodaya AI Students and Gyanodaya AII Students who appeared for the Ability Examination in all operational Gyanodaya Schools)

**VII. KPI<sub>7</sub> - To measure knowledge of Science of Gyanodaya AI Students and Gyanodaya AII Students**

(Sum of percentage of marks obtained by all Gyanodaya AI Students and Gyanodaya AII Students in a Senior Secondary School in Science in the Ability Examination conducted by the Authority *divided by* No. of Gyanodaya AI Students and Gyanodaya AII Students who appeared for the Ability Examination in the Senior Secondary School)

*Divided by*

(Sum of percentage of marks obtained by all Gyanodaya AI Students and Gyanodaya AII Students in all operational Gyanodaya School in the Science in the Ability Examination conducted by the Authority *divided by* No. of Gyanodaya AI Students and Gyanodaya AII Students who appeared for the Ability Examination in all operational Gyanodaya Schools)





## **Case 2: School choice as a feasible PPP in India: a case of Andhra Pradesh and Delhi, India**

### **i. Project and its objectives**

The delivery of educational services is the responsibility shared between the Central and state governments in India. Successive governments, both at the Centre and the states, have made efforts to improve access, equity, and quality of primary education. The last two decades have witnessed the implementation of large government programmes, far-reaching policy developments, and innovative and effective solutions being developed, piloted, and implemented. Though input to school education has increased significantly, there are growing concerns that these are not necessarily translated into learning outcomes.

In India, over the past couple of years, primary education has been experiencing two trends. First, the rapid growth of private schools, and second, charging a fee from students belonging to the economically weaker section of the society. Statistics on private schooling comes as a shock, especially at a time when the Indian government is increasing the spending on education, and free public primary education is widely available for all. It is believed that fee-charging private schools are gaining popularity because of parental dissatisfaction with free government schools. Private schools offer better benefits: superior hygiene, longer teaching hours, consistent academic year, comparatively smaller class sizes, lower teacher absence rate, and higher teaching activity. This growing popularity of private schools has led to concerns about further economic and social stratification and rise in inequality. There is a growing demand for expanding access to private schools for all children regardless of their socio-economic background.

The Annual Status of Education Report (ASER) and Indian Human Development Survey (IHDS) show that students from the same age group

and economic status perform considerably better in the private schools than their counterparts in government schools. To ensure that funds do not act as a barrier for students for entry-level schooling, the RTE<sup>18</sup> Act ensures free primary education by reserving seats in private schools to provide quality education to the marginalised population. However, little evidence is offered by literature on relative effectiveness of private schools in ensuring better performance of their students.

Given this context, close examination of two projects: The Andhra Pradesh School Choice (APSC) project and Delhi School Voucher Project is educative. Both these projects aimed to study the impact of “School Choice” on learning outcomes of the students. The major objectives of both the projects were similar and are mentioned below:

### ***Objectives***

- To understand the project’s impact on voucher students and their parents
- To ascertain changes in parents’ attitudes and level of engagement with child’s education upon receiving the voucher
- To determine parents’ views on the importance of education and their expectations from the education system
- To understand the family’s expenditure on education
- To ascertain the learning achievements of the voucher students
- To find shortcomings, if any, of the project and suggest corrective measures

---

<sup>18</sup> The Right to Education (RTE) Bill passed by Parliament in 2009 has a provision mandating private schools to reserve up to 25 percent seats for students from disadvantaged backgrounds.

### ***The Andhra Pradesh School Choice Project***

APSC Project was carried out under the “Andhra Pradesh Randomised Evaluation Studies (APRESt)”, a much larger programme launched in 2004 to study education-related topics in Andhra Pradesh. APRESt was set up as a research partnership, and an MoU was signed among the Azim Premji Foundation, the Government of Andhra Pradesh, and the World Bank for its implementation. The APSC research was launched to study the effectiveness of the private school in providing quality education under a PPP mode. This study was a four-year research project (2008-2012), covering more than 6,000 students in 180 villages and was the most extensive research study in India and perhaps globally. The results of the study were shared in a paper published by the National Bureau of Economic Research (NBER) in September 2013.

### ***Delhi School Voucher Project: school voucher pilot***

At almost the same time, the Centre for Civil Society (CCS), a think tank based in New Delhi, launched the School Choice Campaign in Delhi in January 2007. The objective of the campaign was to eliminate entry barriers for economically poor parents who wish to provide better education to their children by sending them to private schools. Hence, as part of the School Choice Campaign, the ‘Delhi School Voucher Project’<sup>19</sup>, was launched by CCS on 28 March 2007. The project shared many design features of APSC, except that the test run was funded through philanthropy. Under the project, school vouchers worth up to INR 3,600<sup>20</sup> per year per child were awarded to 408<sup>21</sup> students from 68 wards in Delhi. CCS engaged policymakers, education experts, grassroots-level activists, and the general public and declared the

---

<sup>19</sup> A pilot project of 3-year duration

<sup>20</sup> INR 300 per child per month

<sup>21</sup> In excess of 1.2 lakh parents applied for CCS school vouchers. Six students from each of 68 wards were selected via public lottery.

project successful. Although the pilot project was managed and implemented privately, CCS has been actively advocating a PPP model for school vouchers to scale up the campaign and implement the project in the other state of India.

Box 3.2.1: Timeline for APREST, APSC, and Delhi School Voucher Project

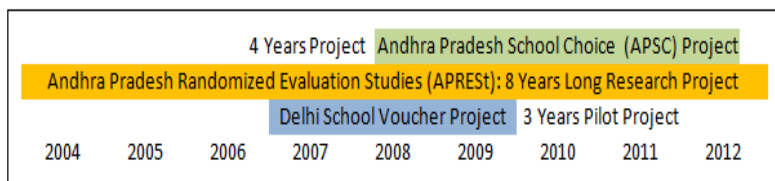


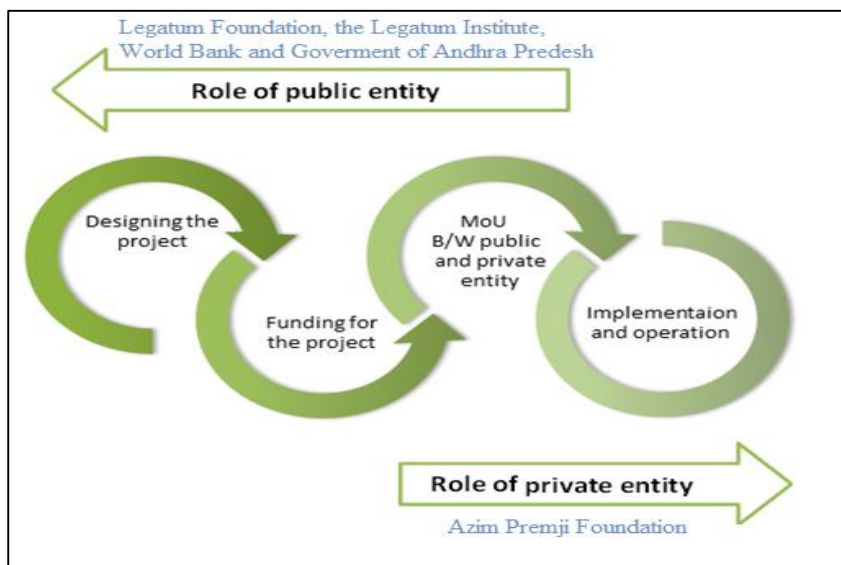
Table 3.2.1: Project Snapshots

	APSC	DSVP
<b>Launch</b>	<b>May-08</b>	<b>Mar-07</b>
Duration (Years)	4	3
Voucher Amount	INR 3,200	INR 3,600
Total vouchers	1210	408
Total cost of vouchers	INR 15,488,000	INR 4,406,400
Institutions and stakeholders	<ul style="list-style-type: none"> <li>- Azim Premji Foundation</li> <li>- Government of Andhra Pradesh</li> <li>- The World Bank</li> <li>- Legatum Foundation</li> <li>- The Legatum Institute</li> <li>- DFID</li> <li>- Participating Private schools</li> <li>- Students and their parents</li> </ul>	<ul style="list-style-type: none"> <li>- CCS</li> <li>- CMS Social</li> <li>- Government of Delhi</li> <li>- Participating Private schools</li> <li>- Students and their parents</li> </ul>

ii. Type of project envisaged

Legatum Foundation and the Legatum Institute provided the majority of funds for APRESt, with additional financial support from the UK Department for International Development (DFID) and the World Bank.

Figure 3.2.1: Framework of the Project



iii. Risk Sharing Mechanism

a. Risks borne by the Sponsor

- **Design risk:** The project was designed by the public party
- **Finance risk:** The Pilot project was completely funded by the public party.

## **b. Risks borne by the Private Partner**

- **Operational and performance risks:** The private party owned all risks associated with ground-level implementation and performance

### iv. Debt Repayment

The private partner funded the project through grants, and without any debt financing.

### v. Strength and weakness of the structure and operation mechanism

#### a. Structure

##### **Strengths**

- Parents were made to play a significant part in the project, and different perspectives were captured during the implementation phase.
- The project also included the impact analysis to ascertain the changes in attributes of the sample group.

##### **Weakness**

- Government just played a supporting role from the outside and did not provide the project with any funds.

## **b. Operational Mechanism**

### **Strengths**

- One of the feasible solutions in dealing with disparities in education quality between the poor and the rich

### **Weakness**

- Only the pilot was implemented, and even after seeing positive results, no actions were taken to expand the project further

#### vi. Success and failure

The results of both the APSC and the Delhi School Voucher projects showed a positive impact on the target students. The results from the APSC project also suggested that if the medium of instruction is not disrupted, private schools might be even more effective. It is also essential to highlight the cost-effectiveness of private schools and that the average cost per student in private schools was only one-third of per-student expenditure in government schools.

#### *Major findings*

- The students awarded with the vouchers for private schools performed better than those studying in government schools in English, Mathematics<sup>22</sup>, and Hindi in all grades
- Parents of the voucher beneficiaries were happy with the academic progress of their children, their teachers, and the standard of discipline in the schools.

---

<sup>22</sup>Improvement in mathematics score is true only in Delhi School Voucher Project case.



- Parents of the voucher beneficiaries showed significantly greater involvement in their children's education and started spending more on their education.
- Those students who opted for vouchers for private schools perceived that being educated in such schools would provide them with better life opportunities.

#### vii. Recommendation

Since a child's academic performance is the reflection on the school, its infrastructure, quality of teachers, and philosophy, changes in the performance levels of the voucher students reflect the effect of 'choice' exercised by students after receiving the vouchers. Over the years, varied approaches have been tried by different states and the Central Government to improve both the enrolments and quality of school education. There still remains a considerable gap between aspirations and actual achievements. APSC and Delhi School Voucher Project are experiments that verified the positive impact of school choice on the learning outcomes of children from the marginalised communities' vis-à-vis those attending government schools.

CCS concluded that the best dictum to follow is "Fund Students, Not Schools!" Taxpayer money should follow the child and not the school through school vouchers. The parents and students should be able to choose a school that provides better education and better learning outcomes. Under this "student first" (as opposed to "school first") system of financing is propounded. The parental choice will be enhanced when all schools, whether public or private, will compete for all children, irrespective of being rich or poor, and all schools will be accountable to all parents.

### **Case 3: Emergency response in the state of Tamil Nadu, India: A PPP service delivery panacea**

#### **i. Project and its objective**

Almost 80 percent of hospital deaths in India happen during the first hour of admission. Hence, response time is critical for medical emergencies. Lack of Emergency Response Service (ERS) has caused loss of thousands of lives in India, particularly in rural areas. Nearly 12 percent of the institutions in the trauma care sector in India have no access to ambulances. This has put pressure on health systems to provide timely, affordable, and quality medical care for reducing emergency trauma cases, including maternal and infant mortality, surgical procedures, and specialist medical attention.

The State of Andhra Pradesh was the first to pioneer the Emergency Management Services (EMS) and GVK Emergency Management and Research Institute (EMRI), which the neighbouring State of Tamil Nadu then introduced. To remove affordability barriers in ambulance services in the poorer section of rural and urban areas, the Department of Health and Family Welfare launched the EMS as part of the Tamil Nadu Health Systems Project (TNHSP), by providing free ambulance services in the entire state. The project commenced in the 2008. Government ensured commitment to the project by providing long tenures to public servants in the agencies administering the system. Strong public advocacy also garnered public support.

EMRI has been operational in several states in the country. The core purpose of EMRI has been to provide necessary emergency services through SENSE (Communication and Dispatch), REACH (Transport), and CARE (Pre-hospital Care). The vision of EMRI was to respond to 1 million calls a day and save 1 million lives a year nationally by 2010. Since the time of inception, GVK EMRI has responded to close to 22,000 emergencies per day, saving

over 500,000 lives in India through the three-digit number 108 allocated by the Government of India. This emergency number has been made toll-free across the country by the Central Government, just like some of the advanced economies with centralised EMS. The cost-effectiveness, expansion model, and innovation in 108 services are believed to have outpaced the 911 services in the US that spend close to \$100 per person treated compared to only 50 cents by EMRI (Pralhad & Mashelka, July-August 2010). The project makes a case for how a partnership between the government and private sector can successfully address gaps in emergency transportation and pre-hospitalisation care in low or middle-income countries. The main objectives of the project have been the following:

- Facilitating mitigation of human and economic impact consequential to all emergencies
- Setting up a comprehensive nationwide ERS, enabling 108 as a country-wide toll-free number, applying to fixed-line, mobile, wireless, and VOIP
- Encouraging efforts by states to deploy end-to-end emergency infrastructure (Information and Communication Technology, emergency response vehicles, emergency care centres additional trauma care facilities, and skilled personnel through PPPs)
- Improving public awareness in the country on ERS
- Enhancing quality and responsiveness of emergency management to global standards, ensuring viability and sustainability of ERS
- Encouraging and funding applied research and training activities for training Emergency Medical Technicians (EMTs), first responders, general practitioners, specialists, and trainers for improving medical direction, pre-hospital and hospital-based care

## ii. Type of project envisaged

In Tamil Nadu, the “108” PPP functions primarily as an "operate and maintain" service contract between GVK EMRI and the Government of Tamil Nadu through a management contract awarded by on the basis of technical and financial bidding criteria. It is an example of an innovative pro-poor PPP executed through a Public-Private non-profit service delivery model or grant-in-aid to Non-Governmental Organisation (NGO) mode to provide ERS free of cost to the people. The Government of Tamil Nadu assists EMRI in regulatory aspects, channelizing funds, leveraging infrastructure and promoting public awareness for the success of PPP; EMRI provides operational expertise and manages the ERS in the state. The Government of Tamil Nadu provides 100 percent capital expenditure and operational expenses, with EMRI bringing in leadership, innovation, execution and technological capabilities, and conducting research and building capability in emergency medicine and EMS.

GVK-EMRI has been operating the EMRI autonomously. As short term concessions require re-tendering, which is time consuming and a costly process, and disrupts smooth functioning of the system, the Government of Tamil Nadu has entered into a Memorandum of Understanding (MoU) with GVK-EMRI, TNHSP through Tamil Nadu Health Society for a long-term partnership detailing various functions and operational parameters (Table 1), and with the flexibility to revise or terminate the MoU based on evaluation of performance. TNHSP has a team under the Deputy Director that monitors performance on a daily basis. Evaluation reports highlighting the incidence of emergencies and the cost-effectiveness of the interventions act as inputs for allocation of resources for the project by the Government of Tamil Nadu.

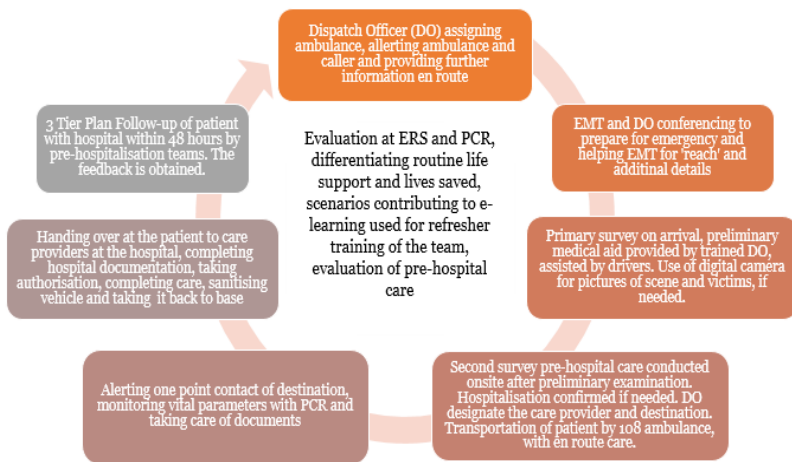
### iii. Key Performance Indicators (KPIs)

Although KPIs for the service have not been specifically defined, there are three "mission critical teams" integral to the entire process of ERS, attending to emergency calls:

- **Sense:** The call response is made within two rings, and the call taker is freed within 90 seconds for the next call. Each call is recorded and tracked with the help of GIS and GPS systems. With nearly 10,000 calls (Office Order, 2008) handled every day, the personnel are trained to identify callers' seriousness.
- **Reach:** The service aims to provide equitable access to emergency services to everyone in the state, irrespective of social, economic, or geographical differences.
- **Care:** The EMS aims to extend the right treatment/ support to ensure public safety and save lives in the context of medical, police, and fire emergencies.

The above indicators are mapped to the process map below in Figure 3.1, with evaluation at every stage:

Figure 3.3.1: The process map of EMRI, with key performances being evaluated at every stage of EMS



Source: CIRC

Photograph 3.3.1: Trained staff attending emergency calls at EMC



Source: CIRC during field visit to Chennai, Tamil Nadu, India

### Box 3.3.1: Project Snapshot

<i>Cost (Per ambulance trip):</i>	INR 600-700
<i>Dates:</i>	<ul style="list-style-type: none"> <li>• Technical and financial bids from EMRI received in December 2007, MoU signed in the year 2008</li> </ul>
<i>Stakeholders:</i>	<ul style="list-style-type: none"> <li>• Department of Health and Family Welfare, Government of Tamil Nadu under TNHSP (Authority)</li> <li>• EMRI (NGO operating on grant-in-aid mode)</li> </ul>
<i>Operational details:</i>	The Emergency Response Center (ERC) is operational in Chennai with 178 Emergency Response Officers (EROs) and a total staff of 4,186 including 1647 pilots (drivers), 1944-trained Emergency Management Technicians (EMTs), 72 operation staff and 97 support staff.

#### iv. Risk sharing mechanism

Responsibilities/risks shared by public partners and private partners under the implemented PPP framework.

Table 3.3.1: Responsibility sharing between the Government of Tamil Nadu and GVK EMRI

<b>Public Partner</b>	<b>Private partner</b>
Release of pre-operational expenses	Setting up of central control room
Provide temporary building for EMCs	Recruitment and training of EMT and drivers
Initially procure and supply of 198 ambulances initially	Recruitment of emergency management physicians for the centre
Provide facilities for conducting training programmes for	Process the procurement of IT hardware and software

Emergency Management Technicians (EMTs) and pilots (drivers)	
Identify hospitals for hospital staffs phased training of EMTs	Installation, testing / integrated testing of hardware, networks, and software
Get toll-free number 108 accessible through landline, mobile line, and connectivity from all telecom service providers, including BSNL	Installation, testing / integrated testing of software including application software, data creation, and validation
Data collection and validation and handing over to software team (including segmentation data and GIS maps)	Recruitment and training of communication officers and dispatch officers
Meet the cost on Infrastructure (Call Centre, Research Institute, Training facilities, etc.) Ambulances, equipment, manpower materials operational, contingencies, operational cost maintenance, Insurance salaries to the staff's hardware /software, Travel administration, marketing, etc.	<ul style="list-style-type: none"> <li>• Fabrication of ambulance including exterior design to ensure facile use</li> <li>• Verification of process document testing and validation</li> <li>• Promotion and awareness programme</li> </ul>
Enable a permanent establishment for training, call centre, and other related activities to institutionalise the systems of ERS. Land required for such a centre was about 20 acres	<ul style="list-style-type: none"> <li>• PCR forms and other forms</li> <li>• Integrated management of emergency response services</li> </ul>

**Source:** Note for approval to Government of Tamil Nadu, 2007



The Government of Tamil Nadu bears the financial risk by reimbursing capital and operational expenses of running the ambulances. The government also provides regulatory support for consistent operation, protecting GVK EMRI from legal exposure. The government further oversees the outcomes of the service without hampering the operational autonomy of the private partner.

#### v. Default Mechanism and Debt Repayment

Since the State government bears both capital and operation expenditure through the National Rural Health Mission (NRHM) flexible pool, both *force majeure* risk and additional operation costs are borne by the government. In case there is a delay in NRHM funding, the required funds are advanced by the state government and replenished when NRHM funds are received. The funds for both non-recurring and recurring costs is provided to EMRI by the Government of Tamil Nadu in advance. The recurring costs are released every quarter. No extra cost involved other than actuals are reimbursed by the Government of Tamil Nadu. Hence, there is no provision for debt repayment by the government in the MoU.

#### vi. Monitoring Mechanism

A monthly detailed performance report of all the activities in the EMS is collected, analysed and reported to the Government of Tamil Nadu. EMRI provides audited expenditure statements by the end of the second quarter and utilization certificates to the government at the end of the first quarter every year. Monitoring is done with respect to **staff, EMS calls, route, the process of reaching the accident site and the designated hospital, and costs** attached to these activities.

- **Monitoring of staff:** Communication Officers (CO), Dispatch Officer (DO), and CO and DO supervisors are responsible for the following activities:

CO supervisor	DO Supervisor
<ul style="list-style-type: none"> <li>• All COs for process adherence and guidance</li> <li>• All COs for schedule adherence</li> <li>• Concerns regarding any system/software/ infrastructure problems and maintaining records</li> <li>• Customer feedback management system</li> </ul>	<ul style="list-style-type: none"> <li>• All live calls of DOs for process adherence and guidance</li> <li>• All COs for schedule adherence</li> <li>• Concerns regarding any system/software/ infrastructure problems and maintaining records</li> <li>• Takes care of follow-up calls regarding dispatched cases</li> <li>• Constant updating of information about ambulance status, locations, telephone numbers and new launches, appraising all the DOs</li> </ul>
<b>Monitors</b>	
<b>CO</b>	<b>DO</b>
<ul style="list-style-type: none"> <li>• Receiving calls as per predefined process</li> <li>• Record and relay information from one person to another to ensure correct information is given, making clear who the source is</li> </ul>	<ul style="list-style-type: none"> <li>• Receive dispatches from CO and decides about ambulance assignment</li> <li>• Assists EMT in facilitating ERCP conferences</li> <li>• Decides logistics to reach victim at the earliest</li> </ul>

	<ul style="list-style-type: none"> <li>• Conveys first aid or any other help to the caller over the phone with the help of ERCP prior to the arrival of the ambulance</li> <li>• Appraises DO supervisor about any problems encountered during the dispatch process</li> </ul>
--	--

**Monitoring of EMS calls:** The CO stays on the calls and talks through the situation, giving directions, calming the caller, and providing pre-arrival instructions. Any pre-arrival medical instructions have the approval of the physician at the communication centre. The following EMS calls are received at the dispatch centre:

- Medical emergencies (such as heart attack, stroke, breathing difficulties, bleeding, seizures, broken bones, etc.)
- Vehicle accident with injury
- Sexual assault
- Shooting or stabbing
- Assault
- Drowning
- Poisoning, drug overdose or animal bites
- Delivery, burns, emotional distress, etc.

Calls pertaining to the above emergencies are monitored with respect to how COs and DOs coordinate and manage the calls, including:

- sending ambulance staff to landmarks provided by the callers
- informing the caller about the dispatch of the vehicle

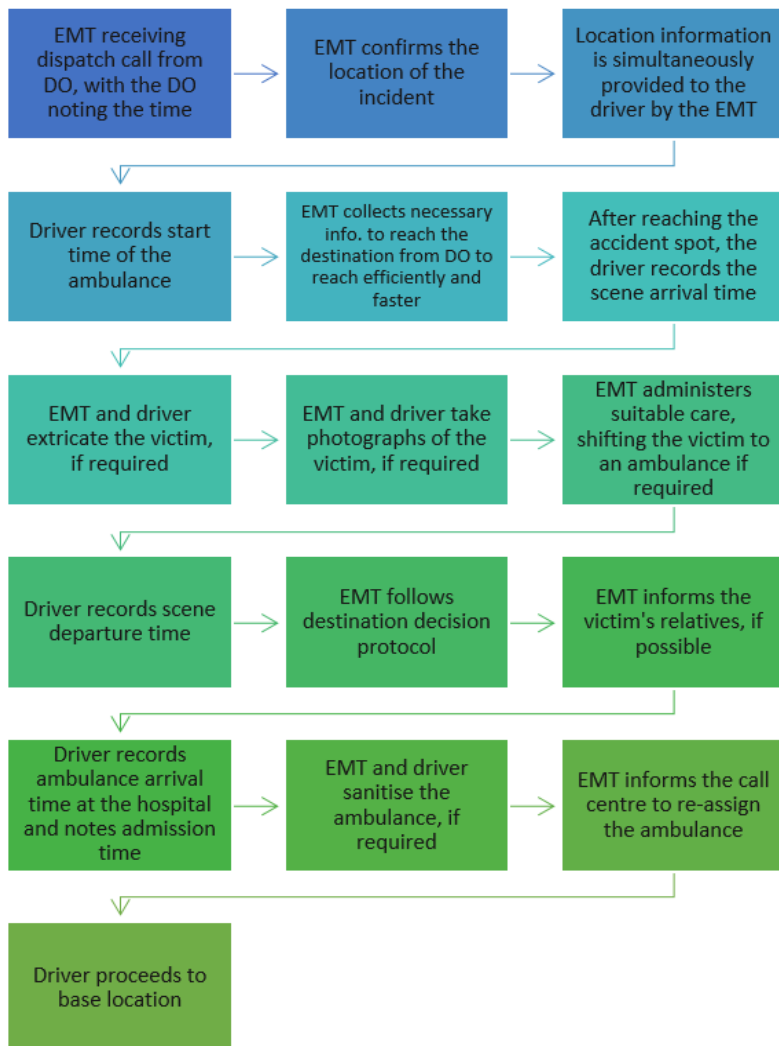
- calling 108 before proceeding to the site in case an emergency help request comes to the driver or DO directly
- making doctor's services available to the caller in case assigning an ambulance is not feasible
- asking important questions so that any other assigning agency like rescue, fire, police, etc. can also be dispatched at the same time to avoid any delay in responses

The DO conveys emergency information to the EMT, who then reconfirms the information provided by the DO. The communication consists of the following:

- The contact number of the informer
- Type of emergency
- Locality
- House/ flat number
- Street number/ name
- Landmark
- Any other special instructions documented by the CO

**Route maps:** The EMS programme operates under an administrative and operational structure that facilitates the rapid execution of necessary procedures in response to emergencies. The drivers operate ideally within the 20-kilometre radius and are required to maintain phone numbers of backup ambulances, information about road conditions, alternative routes, any disturbances en-route, phone numbers of hospitals, mortuaries, etc.

**Process of reach:** The process of reaching the victim is monitored quite closely and is carried out in a time-bound manner. The process is broadly as follows:



## vii. Strengths and Weaknesses of the Project

### a. Structure

#### **Strengths**

- An easy-to-deploy structure as established by the success of the project in Andhra Pradesh
- A centralised EMRI service enables the government to partner, manage and regulate better. This is advantageous vis-à-vis multiple small operators as was the practice in the past, which the government was unable to manage effectively.
- The centralised system enables use of ICT and GIS mapping to reach
- The highly responsive and innovative nature of the systems has been a great boon to the people of Tamil Nadu. For example, integrated services for medical, police, and fire emergencies operate smoothly.
- Easy replicability and scalability
- Constant training of manpower by the government

#### **Weaknesses**

- Being a service/management contract, it is given for short durations under ordinary circumstances. This poses challenge for of non-disruptive operations.
- In the absence of proper monitoring and evaluation, service quality suffers and costs rise. Constant supervision of monitoring system poses a challenge.
- Attrition rates of trained manpower, especially in the absence of incentives for good performance, is high.

## **b. Operation**

### **Strengths**

- Expenditure/cost-based approach rather than deliverables-based approach.
- Infrastructure, i.e., number of ambulances along with the manpower, is properly mapped to service level standards for achieving optimal performance.

### **Weaknesses**

- Selection of GVK-EMRI done on the basis of a single response received for the EOI. Scaling up throughout the country would pose a challenge without more such organisation willing to participate.
- Since the system runs on phone calls, the ERC gets several prank or abusive calls a day, diverting the focus of the staff. Although a mechanism has been put in place to block callers after 10 such calls, it continues to be a weakness of the system.
- Due to the poor condition of rural roads and less lighting, the ambulance is unable to reach patients in remote locations within the expected response time affecting access to the service.
- Due to lack of incentive structure for employees, drivers and EMTs often resort to strikes.

#### viii. Successes and Learnings

- Rural women in the state of Tamil Nadu have access to comprehensive emergency obstetric and neonatal health facilities within approximately half an hour, with more than 99.5 percent of deliveries taking place in medical institutions. The incidence of Road Traffic Accidents (RTA) handled by EMRI increased from 1,895 in 2008 to 215,928 in 2016, indicating the existence of a wide network of the service in a state with the highest RTAs. The actual reported figures of RTA from the state crime bureau of Tamil Nadu for the year 2008 are 83,035 and for 2016 are 99,361.
- EMRI services have been successful in enabling better healthcare due to rapid response, predictable time, and state-wide logistics, delivering patients in dire need to appropriate hospitals.
- It has also been very effective and efficient in using the funds provided by the state. A comprehensive managerial system replaced a defective model: this was evident in the reimbursement of costs. The fund earlier required for repairs is now far reduced, and the savings are being utilised judiciously for various operational purposes. Restrictions have also been put on the collection of fees from patients, which was previously very difficult to monitor.
- Having a PPP overcame the difficulties associated with working with both big and small NGOs pertaining to varying financial and differential abilities.
- Monitoring of ambulances through the use of GPS and GIS has helped save costs and manage response time.
- The high attrition rate of staff prior to EMRI has been overcome through mandatory training for new entrants.



- A fully-equipped central control room with the latest technology has replaced decentralised control rooms, which were not adequately responsive.
- Maintenance of vehicles, payment of salaries, fuel quota difficulties, decentralised bill settlements, etc., handled by the government staff have been replaced with professional services.
- Through EMRI, Tamil Nadu significantly extended secondary health services in rural areas, which are supplemented by secondary hospitals at the district level, which has led to improved access and quality of care for expectant mothers and infants.
- A big lesson from the experience of Tamil Nadu is the importance of Quality Assurance (QA): the process has been established and functional in a decentralised setting, oversees a variety of issues, including checking the availability of medicines, consumables, and disposables to an audit mechanism that verifies the quality of patient care in the hospital or condition of a vehicle.
- External experts have been involved in training and refresher programmes, with quality auditors making random checks of whether pre-hospital care has been provided to the patient as per the protocol. In addition, staff attached to headquarters have carried out surprise audits in the field. All these processes have helped in improving ERS over time.
- Another learning has been regarding the necessity of political will, which has been an important ingredient for successfully establishing and running of the medical ambulance services in the state. Finance from the State government has been augmented for rural ambulance service through NRHM in order to reduce

mortality, particularly of women, children, and infants in rural areas. Aside from resourcing, another element has been public education, for instance, making way for the ambulances, which has undergone a paradigm change. However, issues continue to fester in areas such as administering critical first aid and CPR (cardiopulmonary resuscitation) during the ‘golden hour’ and evacuating the critically injured. If basic first responder training is taught at schools, more lives could be saved through public awareness.

- The ERS PPP model provides a foundation in preparing the health system to move to the next level: the model has been replicated and scaled up across India, as well as in other countries since they use simplified inputs, technology and protocols that can be adapted in resource-constrained settings. GVK EMRI now has a pan-India presence in 15 States and 2 Union Territories i.e., Andhra Pradesh, Telangana, Gujarat, Uttarakhand, Goa, Tamil Nadu, Karnataka, Assam, Meghalaya, West Bengal, Himachal Pradesh, Chhattisgarh, Uttar Pradesh, Rajasthan, and two Union Territories, Dadra & Nagar Haveli and Daman & Diu.



#### **Case 4: A scientific solution to tackling municipal solid waste (MSW) under PPP framework: case of waste to energy (WTE) plant in Ghazipur, Delhi**

##### **i. Project and its objectives**

Owing to the exponential growth of population in India's capital Delhi, coupled with the expansion of housing, management of Municipal Solid Waste (MSW) poses a huge challenge for the country: more than 150,000 (Hand in Hand India, 2017)<sup>23</sup> tons of solid waste is generated on a daily basis, and share of New Delhi alone stands at around 10,000 tons (Brown, 2016). In order to tackle various kinds of pollution caused due to unmanaged waste, and align national priorities with the Swachh Bharat Mission's (SBM)<sup>24</sup> goal to create a clean India, collection, removal, and disposal of solid waste are required to be addressed in a systematic manner. Key issues relating to the management of MSW in India relate to (1) lack of comprehensive short and long-term plan with municipal authorities to handle MSW in accordance with the MSW Rules, 2016, (2) low preparedness of municipal authorities in setting up waste processing and disposal facilities, and (3) landfills crossing the threshold limit for further dumping of waste.

Shrinking urban spaces pose additional and continuous pressure on both, the provisions of landfills as well as the financial resources of state authorities, Urban Local Bodies (ULBs), and the Municipal Corporation of Delhi (MCD) for managing MSW. However, technological innovations and unbundling of services have opened up social sectors such as managing MSW to private sector participation. Authorities are making efforts to create mass awareness

---

<sup>23</sup> The figure is estimated by Hand in Hand India working in partnership with National Skill Development Corporation (NSDC). The official estimate has been a challenge to ascertain and falls between 100,000 and 150,000 tons.

<sup>24</sup> SBM is a national cleanliness campaign launched by the current Prime Minister of India in October, 2014

through various programs among citizens to ensure proper management of MSW, including collection, segregation, storage, and transportation. This provided the necessary thrust for encouraging private sector participation in promoting greener, innovative and sustainable urban development solutions such as setting up the WTE plant in Ghazipur, Delhi.

The Ghazipur dumpsite, operational since 1984 and covering an area of 29 hectares, is located in East Delhi, which is the most thickly populated area of the city, and generates close to 3,000 tons of garbage daily. With an average height of landfill being 25 meters and over 13 million tons of accumulated MSW, the site poses huge environmental, social, and disaster risks. To address these concerns, the Government of Delhi proposed Waste to Energy (WTE) plants to process waste scientifically.

Photograph 3.4.1: Ghazipur Plant



Source: IL&FS

### Box 3.4.1: Project Snapshot

#### **Dates**

- **Signing Year:** 2010 with IL&FS
- Date of commencement of operation: October 2015
- PPP Concession period: 25 Years

**Financial Plan:** The project was financed through 60 percent debt and balance 40 percent through a mix of equity plus other sources. (*Above percentages are indicative*)

- Institutions and stakeholders
  - Government of Delhi
  - IL&FS Environmental Infrastructure Services Ltd.
  - GMR Infrastructure (Initially)
  - EDMC – East Delhi Municipal Corporation
  - Delhi Jal Board
  - Local population of Delhi and nearby area

#### ii. Type of project envisaged

The Government of Delhi partnered with IL&FS<sup>25</sup> Environmental Infrastructure & Services Ltd. for incorporating a joint venture: Indraprastha Energy & Waste Management Company Ltd. (IEWMCL) for developing environmentally sustainable WTE project at Ghazipur and Okhla on PPP mode. Refused Derived Fuel (RDF) technology developed by the Department of Science and Technology, Government of India, was used for the purpose of generating renewable energy. On April 20, 2005, a Special Purpose Vehicle

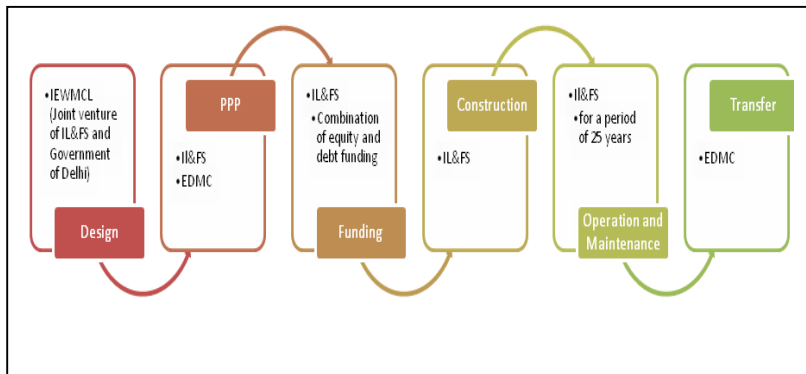
---

<sup>25</sup> IL&FS was one the largest and pioneering PPP private sector companies in infrastructure development and finance in India

(SPV), East Delhi Waste Processing Company Limited (EDWPCL), was incorporated as a subsidiary of IEWMCL to facilitate the process of approvals and allotment for the Ghazipur WTE project. Bids were administered and concluded by IEWMCL. Even before the Government of Delhi bid out the project, IL&FS had acquired Air Force, Water Board, and Civil Aviation clearances along with other NOCs and statutory clearances from various departments.

In 2009, GMR infrastructure was awarded the project to build the WTE plant at Ghazipur. However, after GMR could not implement the project, IL&FS Environmental Infrastructure Services Ltd (IL&FS Environment) entered into a PPP agreement with EDMC in 2010 on Build, Operate, Own, and Transfer (BOOT) model. Ghazipur WTE plant became operational in October 2015 and commenced commercial operations on April 27, 2017.

Figure 3.4.1: PPP Structure and Stakeholders of WTE plant at Ghazipur



Source: CIRC

### Share of responsibilities

The following table shows the structure of responsibility sharing in the PPP framework.

Table 3.4.1: Sharing of Responsibilities between Private and Public Partners

<b>Public Partner</b>	<b>Private partner</b>
Grant for filling up any gaps in project funding	Funding of the entire project
Providing land for the project	Designing and Building infrastructure – construction
Providing water and waste to the plant	Generating energy from waste
Buying electricity at premium rates	Operation and maintenance for 25 years
Project Monitoring	Installing Emission Monitoring Systems

#### iii. Costing

### Costing – Investment and revenues

The total project cost was INR 5,320 million, out of which INR 2,952 million was the hard cost of the project. The remaining amount of INR 2,368 million was due to the soft cost comprising of interest amount and other expenditures during the plant's construction phase.

The project has been funded through a mix of Equity, Debt, and Grant:



- a) Equity – INR 1,095 million
- b) Debt – INR 3,025 million
- c) NCEF Grant – INR 1,200 million

The government signed an agreement with BSES Yamuna Power Limited (BYPL) to offtake 49 percent of energy. The electricity generated in this unit will be supplied to East Delhi areas. The balance power will be sold under open access system. The Delhi Electricity Regulatory Commission (DERC) has already accepted the Central Electricity Regulatory Commission (CERC)-determined rate of INR 7.90 per unit for energy generated from similar WTE plants.

### **Revenue from electricity**

The annual revenue from the 12MW<sup>26</sup> plant @ INR 7 per unit price is around INR 50 crore (after considering transmission losses @ 30%). Total projected revenues from electricity generation for 25 years stand at about INR 1,000 crore (including degradation in efficiencies).

#### **iv. Risk Sharing Mechanism**

##### **a. Risks borne by the Sponsor**

- **Design risk**-The project has been designed by IEWMCL (a public-private JV)

##### **b. Risks borne by the Private Partner**

---

<sup>26</sup> No of units per day for 12MW =  $12 * 1000 * 24 = 288,000$  (before losses)

- **Financial risk:** To be funded entirely by a private party.
- **Operational and performance risks:** These are borne entirely by the private partner.

v. Debt Repayment

The private party for the purpose of project financing borrowed INR 3,025 million as debt, the risk to be fully borne by private party.

vi. Strengths and Weaknesses of the Structure and Operation Mechanism Chosen

a. Structure

**Strengths**

- The Ghazipur WTE project offered a unique vertical design for maximizing land use, which could be replicated in other urban areas within India or abroad, where land is a constraint.
- Incorporating livelihood aspect - The private partner also addressed the loss of livelihood of illegal rag pickers by employing over 150 of them as factory workers and educating their children. IL&FS, the parent company, is also supporting more than 2,500 families living in the project catchment area under an innovative initiative named 'Gulmeher' Green Producer Company – skilling women folk into artisans. Women, both who were formerly rag pickers and from rag picker families, are trained to

make handicraft products from discarded flowers and recycled paper, making them financially secure.

### **Weakness**

- Only 5.64 acres of land was available to build the entire project, necessitating the adoption of a vertical construction design resulting in higher costs and unwanted delays.
- The project was set up on a dumpsite; to ensure stability, a pile foundation was built, further increasing the project cost and affecting the timeline.
- The location of the plant is within 100 meters of the residential area. This necessitated the project to adapt to Euro norms of emission, further impacting the project's overall cost to a great extent.

## **b. Operational Mechanism**

### **Strengths**

- WTE plants are considered one of the feasible solutions in dealing with garbage pile-ups in the city and land availability woes.
- Collaborating with the community - Educational programs were conducted to involve localities in the development of the plant helped in partnering with local residents.

- This is India's first WTE plant compliant with Euro norms for emissions along with the highest standards of pollution control measures.
- The plant's stringent technologies used to minimize odour, noise, and pollutants led to the depletion of garbage piles and stench, benefitting the inhabitants living in the vicinity.

### **Weakness**

- Delays in obtaining some of the statutory clearances and NOCs for the project, including environmental, Right of Way for the pipeline, duty exemptions, etc., impacted the project timeline and led to cost overrun.
- Loss of livelihood for rag pickers – modelled mainstreaming rag pickers approach.
- The quality of incoming waste has deteriorated over the period and is posing huge operational challenges by negatively impacting the running cost of the plant.
- Quality of waste is a growing concern – input-based tipping fee model results in waste continuation for profit.

## vii. Success and failure

The Ghazipur WTE plant is India's first plant to be built according to Euro norms for emissions and the highest standards of pollution control measures. Over the period of 25 years, the plant is projected to mitigate over 8 million tons of Green House Gases (GHG) with the use of a sophisticated pre-processing facility. Complete processing of incoming fresh waste at the plant will gradually dilute the leachate that flows into the Yamuna (especially during monsoons). After the successful implementation of the Ghazipur WTE plant, the three municipalities: South Delhi Municipal Corporation (SDMC), North Delhi Municipal Corporation (NDMC), and EDMC, are in the process of either bidding out new PPP projects or expanding the waste handling capacity of existing plants. The Ghazipur plant has processed over 300,000 tons of waste and generated over 27 million units of green power (till the date of writing this note). Based on the performance, the Lt. Governor of Delhi has permitted EDMC to enhance the plant capacity after assessing the environmental and socio-economic advantages of the project. In this line, the present WTE plant, Ghazipur, is being expanded to manage an additional 1,000 TPD of waste per day.

Other projects:

- 1,950 TPD 16 MW Waste to Energy Plant at Okhla that receives waste from the South Delhi Municipal Area (SDMC) area. The plant is about 7 km away from the dumpsite.
- 2,000 TPD 24 MW Waste to Energy Plant at Narela Bawana that receives waste from North Delhi Municipal Area (NMC) area. The plant is located at the dumpsite and also includes a sanitary landfill (SLF).

## viii. Recommendation

The Ghazipur project is a successful and replicable example, setting a performance benchmark for the WTE industry. The project has been a pioneer in India in incorporating stringent environmental parameters in compliance with the EURO norm for emissions and integrating the affected communities by providing an alternate livelihood. The plant has been set up with the best-in-class technology available. The EDMC continuously monitors the functioning of the project: report of plant operations, various parameters, intake of waste, break-downs, etc. all form part of the daily reporting data to the municipality. While the project is under regular monitoring by EDMC and other states and Central agencies, including Central Pollution Control Board, and Delhi Pollution Control Committee, principal secretary (Power) and director (Finance), Government of Delhi and the Board of IGWPCL also monitor plant operations. IL&FS has installed a Continuous Emission Monitoring Systems (CEMS), which enables online viewing of key emission parameters on a real-time basis to ensure transparency.

The bids were conducted and concluded by IEWMCL on the basis of competitive tariff-based bidding. A more efficient model is performance or output-based, on parameters such as tipping fee. A greater need has also been felt for the segregation of waste at both the household and collection levels to maximize plant efficiency and increase energy output.



## **Case 5: Harnessing PPP efficiency from energy performance contracting: case of street lighting in the city of Bhubaneswar, Odisha, India**

### **i. Project and its objectives**

The rising demand for power is one of the major challenges that the country is facing continuously. The focus of the Indian government should remain on making finance available for increasing the overall power generation capacity along with the use of energy-efficient technologies to optimize power consumption, and to develop a more efficient power distribution system. Street lighting is an important component worldwide when it comes to power consumption, and India is no exception to this. Global statistics show that local urban authorities, on an average, spend about 25 percent of their total energy bill towards street lighting. If we are to improve the efficiency of power consumption, street lighting is one such domain that needs major attention. Not only in terms of energy and power, but also because good street lighting is essential for road and personal safety, and facilitates prevention of crime. Most urban and semi-urban cities, and towns are still working with outdated and inefficient street lighting systems and are using a combination of fluorescent, CFL, high-pressure sodium lamps, or metal halide bulbs, which are not designed to meet area-wise lighting needs. Inefficient and outdated street lighting systems pose a threat to the financial viability of public authorities and waste significant resources each year.

### ***Relevance of energy-efficient system***

According to a report by New York City Global Partners (NYCGP, 2009), street lighting can account for up to 38 percent of the total energy bill for an authority/municipality. Designing an energy-efficient street system can



significantly cut costs.<sup>27</sup> These cost savings can also facilitate authorities to expand the street lighting facility to remote areas and to increase the access to street lighting in other underserved areas.

*Example:* In 2015, the city of West Richland, Washington, upgraded its entire street lighting system to LED, and the project is expected to save USD 67,000 by reducing the energy consumption over 60 percent.

#### *Street Lighting - Bhubaneswar city*

The problem of street lighting in Bhubaneswar city was evident to the municipal authority. The overall street lighting in the city fell far below the national standards, and some smaller streets and residential areas did not have street lighting. Owing to outdated and poor quality equipment, faulty lighting systems and unmetered connections, the energy consumption was also on the higher side, putting financial pressure on the authority constantly. Bhubaneswar Municipal Corporation (BMC) was running short of funds and lacked the technological capacity to support upgrading of the entire system. To make it possible, BMC considered implementing the project under Energy Performance Contracting<sup>28</sup> (EPC) based on a PPP framework with an Energy Service Company (ESCO) under the advisory support from International Finance Corporation (IFC). IFC was also made responsible for designing the structure for future transactions between BMC and ESCO and managing the bid process for an ESCO-based street-lighting project in Bhubaneswar.

---

<sup>27</sup>Upto 60 percent

<sup>28</sup> A tried and tested model, which is been implement by World Bank in various countries

On 5 October 2013, the Bhubaneswar Municipal Corporation<sup>29</sup> (BMC) signed an Energy Performance Contract<sup>30</sup> with Super Wealth Financial Enterprises Private Limited, an Indian ESCO, to upgrade the city's street lighting system by implementing advanced energy-efficient technologies. The key responsibilities of ESCO under the Energy Performance Contract were the following:

- **Turnkey Service** – The ESCO provides all services, including long-term monitoring and energy audit.
- **Energy Efficient Measures** – The ESCO must implement a comprehensive set of measures, including replacing old infrastructure with energy-efficient technology and building a new one as well.
- **Project financing** – The ESCO must arrange the finances for the entire project.
- **Project Savings Guarantee** – The guaranteed level of energy savings produced by the project needs to be at a minimum of 30 percent.

The aim of this partnership was to achieve improved compliance with national standards for street lighting and to improve the efficiency of power consumption by upgrading the existing infrastructure, installation of feeder panels for automation and metering, and covering operation and management activities.

---

<sup>29</sup>BMC is the principal provider of services to the residents of Bhubaneswar. Services under BMC include: Health & Sanitation, Slum Development, Disaster Management, City Beautification, Citizen Services, Efficient Solid Waste Management, Underground Sewerage System in the city, Efficient Urban Planning and Development, Online Services, Vending Zones, and Parking Zones

<sup>30</sup> The implementation of the project took the shape of BOOT-PPP model

### Box 3.5.1: Project Snapshot

- Dates
  - Signing Date : October 5, 2013
  - Duration : 10 years (extendable with mutual agreement)
- Institutions and stakeholders
  - BMC (Public Partner)
  - IFC (Intermediary)
  - ESCO (Public Partner)

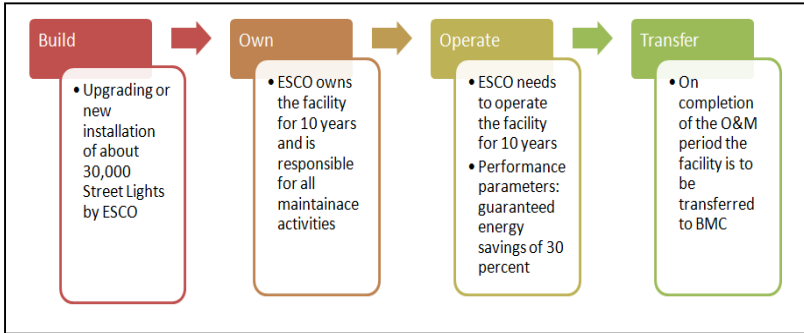
#### ii. Type of project envisaged

The project was implemented based on Energy Performance Contracting (EPC) and delivered by an Indian Energy Service Company (ESCO). IFC<sup>31</sup> and BMC worked together to design the project. The project included upgrading or new installation of about 30,000 light points in the Bhubaneswar city, making it the largest project in India. Initially, a total of 16 ESCO showed interest in implementing the project as the private partner, out of which four finally submit the bids. Shah Investments, Financials, Developments, and Consultants Private Limited was awarded the project based on bidding under the advisory of IFC. IFC recommended BMC, and Housing & Urban Development Department (H&UDD) to institute payment security mechanisms using escrow accounts with an auto-approval system for three-fourths of the billed amount by the operator to build a higher investor confidence in the project.

---

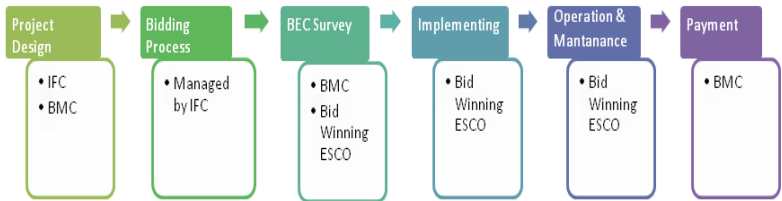
<sup>31</sup> EPC is a tried and tested model and been implemented worldwide by World Bank

Figure 3.5.1: EPC for Bhubaneswar Street Lighting project under a BOOT-PPP Framework



The project was implemented based on future savings on total energy consumption that was to be shared between BMC and ESCO (90 percent to ESCO and 10 percent to BMC).

Figure 3.5.2: Process of project implementation w.r.t. responsibilities of authorities



PPP model for upgarding and maintaing street lighting in Bhubaneswar

### iii. Key Performance Indicators

The following table shows the indicator and objective addressed by it.

Table 3.5.1: Key Indicators and Objective

Indicators	Objective
The guaranteed level of energy savings produced by the project needs to be at a minimum of 30 percent.	Project Savings Guarantee

### iv. Risk Sharing Mechanism

#### i. Risks borne by the Public Party

- **Design risk:** The project has been designed by the public party

#### ii. Risks borne by the Private Partner

- **Financial risk:** The project must be funded entirely by the private party.
- **Operational and performance risks:** These are borne entirely by the private partner

### v. Debt Repayment

The private party, for the purpose of financing the project, may take debt; the risk of repayment is to be fully borne by a private party for the same.

vi. **Strength and Weakness of the Structure and Operation Mechanism Chosen.**

**a. Structure**

**Strengths**

- The partnership contract structure is based on mutual trust, and the risk is distributed among both the partners (i.e.) BMC and the private operator. The deemed saving model demands accurate information from the field staff about the location of the streetlights, their functioning, faulty equipment, and operational hours, etc. The financial structure is such that it incentivizes both the parties upon achieving the set standards.
- The long-term nature of contracts ensures that the private party has sufficient time to deploy the necessary technological interventions in a phased manner in accordance with the available finance, which reduces the debt risks to the private player.
- The contract structure also has the flexibility to deploy additional smart solutions in the street lighting and earning revenues from other sources like security surveillance system.

**Weakness**

- Strict enforcement of penalties may not be possible upon non-compliance with standards and non-achievement of the desired results in this arrangement, which may result in disrupting the street light system.
- There is a scope for corruption in collusion with BMC officials in falsifying data in the absence of an independent third-party monitoring agency.

## **b. Operational Mechanism**

### **Strengths**

- Phase-wise replacement of streetlights over a period of years gives the much-needed flexibility to the private players.
- The selection of vendors for supplying standardized streetlights is left to the private players, which makes it easier to negotiate and reduce the price of streetlights further.
- Profit-sharing based on the deemed saving model of electricity consumption incentivize the private operator to replace high energy consuming lighting system with low consumption systems and maintain a high level of standards of operations

### **Weakness**

- Private party, owing to its own size and credit rating, may find it difficult to raise funds at one go for replacements, which may delay the process
- The baseline information on streetlights functioning and their energy consumption without any metering poses a huge challenge for both the BMC and the private player.
- Without independent verification of theft claims, damages, and other operational issues, the private party may take refuge behind such unwanted claims and ask for more time
- O&M may be a big challenge in the absence of strict regulations on the selection of material supply and its sustained operational characteristics for the long term. (Example: ISO certified or any independent agency verified materials for street light fixtures can go a long way in error-free maintenance of the system)

## vii. Success and Failure

After the successful implementation of the Bhubaneswar street lighting project, BMC will take PPP as the default path for the implementation of all new projects, as announced by the authorities. BMC is also suggesting this model to the other municipalities and local authorities of Odisha.

The upgrading resulted in cutting the cost of utility bill payment by the municipality and increased extension of the service to underserved and unserved areas of the city. It has also resulted in a reduction in illegal energy consumption by street vendors as they now have proper functional streetlights over their heads. As per interaction with the beneficiaries, they feel safer. A 24x7 online grievance system is now functional for reporting any malfunction of streetlights, and the turnaround time for addressing the complaint is reduced from 72 hours to 48 hours, saving manpower cost and enhancing satisfaction level among consumers. Also, the improved power factor of LED bulbs helps in saving energy procurement costs of the utilities providing electricity. There are also additional savings from operation and maintenance costs.

Achieving energy efficiency in street lighting comes with opportunities to significantly reduce electricity consumption, phase out technologies that are harmful to the environment, and reduce operation and maintenance costs.

### **Lessons from the project point**

It is possible to conclude that significant improvements were achieved from using the PPP model for street lighting. Upgrading outdated and inefficient systems also helps us to move towards an energy-efficient and greener economy. Some of the advantages of moving towards effective energy-



efficient systems can be enhanced quality of life for people, energy savings, capital cost savings, and maintenance cost savings.

The success of this project showcases that political buy-in and community engagement is possible when benefits are well articulated and communicated. Other learning takeaways from this project are:

1. It provides a replicable model that can be implemented in other cities with larger sizes and scales. In fact, the Bhopal street lighting project on PPP mode is based on the learnings from the BMC experiment.
2. Helps in knowledge enhancement and capacity building of civic officials, which can be demonstrated in several other projects.
3. It's an add-on to list of sustainable infrastructure assets in the city and builds an improved perception of city administrations in the minds of the local people.
4. This project's success gives local civic officials the confidence to go beyond traditional approaches and think of innovative building options. BMC officials are already looking for innovative financing instruments to generate funds: such as tapping private funds, green financing, and masala bonds.
5. A good example of a collaborative approach and risk-sharing shows that the project can be completed in a scheduled time and hence save a sizable chunk of the cost.
6. Up-gradation of infrastructure reduces indirect costs, too, like cost incurred for inspecting, human intervention through manual switching on and off being reduced through central monitoring of the system.

#### viii. Recommendation

Overall, the street light model is not necessarily retrofitting by the LED replacement only, but saving on the electricity consumption cost due to changes in technology and bringing in private sector efficiency by giving a free hand to the winning bidder to select any combination of energy conservation measures that it finds suitable to meet the prescribed targets. The Bhubaneswar model provides a project duration of 10 years, extendable upon mutual agreement per predetermined sharing of savings and minimum value of guaranteed energy savings at 30%. Sharing of savings at 90 percent to ESCO and 10 percent to BMC attracts the private players to get invested in this type of arrangement. Contrary to this model, EESL is running a flagship programme Street Light National Programme (SLNP), which has targeted all ULBs across the country for retrofitting its street lights.

While the backing of the government and the promoters' strength as in the case of the EESL programme is gaining ground in India, the PPP model based on deemed savings is also providing an alternative to the ULBs. State governments are evaluating on a case-to-case basis and studying the models for better implementation and efficiency measures. The adoption of such models on a large scale, including rural gram panchayats and peri-urban areas, would attract many serious players in this field and help all the stakeholders.



## References

1. Babu, M. (2010). *PPP in Waste Management in India: Opportunities, Barrier and Way Ahead*. Retrieved from [sustainabledevelopment.un.org](https://sustainabledevelopment.un.org/content/dsd/susdevtopics/sdt_pdfs/meetings2010/icm0310/2g_Manesh_Babu.pdf):  
[https://sustainabledevelopment.un.org/content/dsd/susdevtopics/sdt\\_pdfs/meetings2010/icm0310/2g\\_Manesh\\_Babu.pdf](https://sustainabledevelopment.un.org/content/dsd/susdevtopics/sdt_pdfs/meetings2010/icm0310/2g_Manesh_Babu.pdf)
2. Brown, W. (2016, Nov 29). *Delhi's dilemma: What to do with its tonnes of waste?* Retrieved from Aljazeera: <https://www.aljazeera.com/indepth/inpictures/2016/11/delhi-dilema-tonnes-waste-161124095624368.html>
3. CDM. (2009). *Integrated Municipal Waste Processing Complex at Ghazipur, Delhi*. Clean Development Mechanism (CDM).
4. Center for Civil Society. (2012). *Fund Students, Not Schools!* Delhi: CCS.
5. Central Public Health and Environmental Engineering Organisation (CPHEEO). (2016). *MUNICIPAL SOLID WASTE MANAGEMENT MANUAL Part II: The manual*. Delhi: MINISTRY OF URBAN DEVELOPMENT.
6. Centre for Civil Society. (n.d.). *Delhi Voucher Pilot*. Retrieved December 2017, from CCS: <https://ccs.in/education/pilot-projects/delhi-voucher-pilot>
7. Centre for Media Studies Social. (n.d.). *DELHI VOUCHER PROJECT FIRST ASSESSMENT REPORT*. Delhi: CMSS.
8. CPCB. (2015). *Consolidated Annual Review Report on Implementation Of Municipal Solid Wastes (Management And Handling) Rules, 2000*. Central Pollution Control Board.

9. Department of Economic Affairs - PPP Cell. (2012). *Empowered Institution for the Scheme for Financial Support to Public Private Partnerships in Infrastructure*. Delhi: Ministry of Finance - Government of India.
10. Department of Economic Affairs. (2009, November). POSITION PAPER ON THE SOLID WASTE MANAGEMENT SECTOR IN INDIA. Delhi: Ministry of Finance - Government of India.
11. Dr P. Umanath, P. S. (2017, October). Structured Questionnaire and Personal Interview. (P. Dey, Interviewer)
12. Dube, R., Nandan, V., P., B., & Dua, S. (2013). *Status Paper on Utilisation of Refuse Derived Fuel (RDF) in India*. Retrieved from [http://www.hrdp-network.com:hrdp-network.com/igep/content/live/hrdpmp/hrdpmaster/igep/content/e54413/e54441/e61172/e61173/20130425\\_RDFstatuspaper\\_final4.pdf](http://www.hrdp-network.com:hrdp-network.com/igep/content/live/hrdpmp/hrdpmaster/igep/content/e54413/e54441/e61172/e61173/20130425_RDFstatuspaper_final4.pdf)
13. Ebrahimian, E. (2011). *Best Practice: LED Street Lighting System*. LOS ANGELES: NYC Global Partners' Innovation Exchange.
14. Elbing, C. (2010). *PPP in Germany: street-lighting and other sustainability projects*. Partnerschaften Deutschland, Luxembourg.
15. EPEC. (2013). *Energy-efficient street lighting (EPEC)*. World Bank Group.
16. Hand in Hand India. (2017, December). *Solid Waste Management*. Retrieved from <https://www.hihindia.org/environment-solid-waste-management>
17. Hussain, S., & Yadav, V. (2016, May 25). *How the voucher system can improve the nation's quality of education*. Retrieved December 2017, from DNA: <https://www.dnaindia.com/analysis/column->

how-the-voucher-system-can-improve-the-nation-s-quality-of-education-2216116

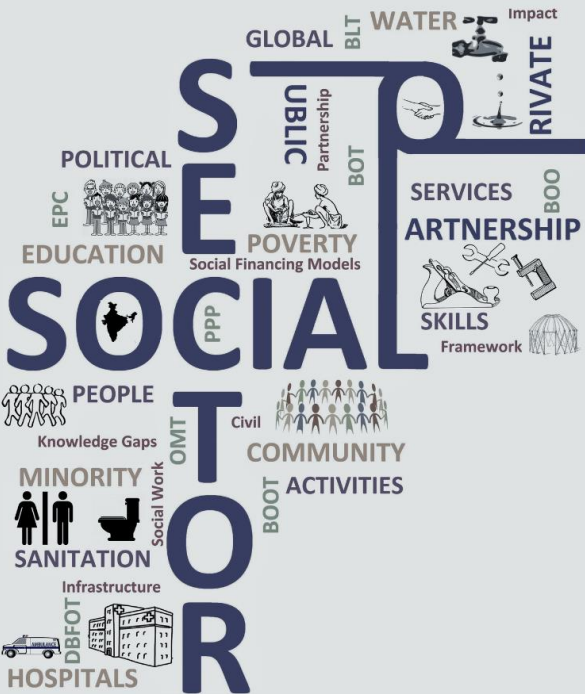
18. IFC Advisory Services. (2013). *Public-Private Partnership Stories India: Bhubaneswar Street Lighting*. IFC. Retrieved from [https://www.ifc.org/wps/wcm/connect/50ce7d00422d8c6f8ce3cf6e26473d89/PPPStories\\_India\\_BhubaneswarStreetLighting.pdf?MOD=AJPERES](https://www.ifc.org/wps/wcm/connect/50ce7d00422d8c6f8ce3cf6e26473d89/PPPStories_India_BhubaneswarStreetLighting.pdf?MOD=AJPERES)
19. Johnson, A., Phadke, A., & Can, S. d. (2014). *Energy Savings Potential for Street Lighting in India*. ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY, Environmental Energy Technologies Division. U.S. Department of Energy. Retrieved from <https://ies.lbl.gov/sites/all/files/lbnl6576e.pdf>
20. Karopady, D. D. (2014, October). Does school choice help rural children from disadvantaged sections improve their learning outcomes? Evidence from a longitudinal research in Andhra Pradesh. *A Brief Paper*. Azim Premji University.
21. Mantri, R., & Gupta, H. (2014, October 22). *The conclusive case for school choice*. Retrieved from *Livemint*.
22. Mahesh Bahu, M.D. (2017, November). Structured questionnaire and personal interview. (P. Dey, & V. Tyagi, Interviewers)
23. Muralidharan, K. (2014, Jan 21). *A renewed model of education*. Retrieved October 2017, from *livemint*: <https://www.livemint.com/Opinion/t9oSpg4VnEgK6yKx3tmAXM/A-renewed-model-of-education.html>
24. Muralidharan, K. (2014, Jan 28). Building a new school system. *Livemint*. Retrieved November 2017, from

<https://www.livemint.com/Opinion/JRx9vpFUQwl9815HvpHmYK/Building-a-new-school-system.html>

25. Muralidharan, K. (n.d.). Andhra Pradesh School Choice Project Proposal. Retrieved from <http://siteresources.worldbank.org/EDUCATION/Resources/278200-1121703274255/1439264-1178054414297/karthikmuralidharan.pdf>
26. Muralidharan, K., & Sundararaman, V. (2013). *THE AGGREGATE EFFECT OF SCHOOL CHOICE: EVIDENCE FROM A TWO-STAGE EXPERIMENT IN INDIA*. NATIONAL BUREAU OF ECONOMIC RESEARCH, Cambridge, MA. Retrieved December 2017, from [http://www.ncaer.org/uploads/photo-gallery/files/1382332164KM\\_NCAER\\_Working\\_Paper.pdf](http://www.ncaer.org/uploads/photo-gallery/files/1382332164KM_NCAER_Working_Paper.pdf)
27. Nandan, A., Yadav, B. P., Bakshi, S., & Bose, D. (2017). Recent Scenario of Solid Waste Management in India. *World Scientific News*, 66, 56-74.
28. (2008). *Office Order*. Health and Family Welfare Department - GoI.
29. Prahalad, C. K., & Mashelka, R. A. (July-August 2010). Innovation's Holy Grail. *Harvard Business Review*.
30. Rohit, T. K. (2016, October 18). *Tamil Nadu tops in road accidents*. Retrieved from The Hindu: <https://www.thehindu.com/news/cities/chennai/Tamil-Nadu-tops-in-road-accidents/article14414541.ece>
31. Saha, D. (2016, May 16). *Indians Increasingly Prefer Private Education, 71 Million Take Tuitions*. Retrieved from IndiaSpend: <https://archive.indiaspend.com/cover-story/indians-increasingly-prefer-private-education-71-million-take-tuitions-58576>

32. Saha, D. (2017, Apr 17). *In 5 years, private schools gain 17 million students, government schools lose 13 million*. Retrieved from *Hindustan Times*:  
<https://www.hindustantimes.com/education/in-5-years-private-schools-gain-17-million-students-government-schools-lose-13-million/story-6FV1ic7RLttmWcoZkhBQBM.html>
33. SFC Environmental Technology Pvt. Ltd. (2016). *India's First MSW Treatment Facility - Fully Compliant with SWM 2016 guidelines*. Retrieved from [ciiwasteexchange.org](http://www.ciiwasteexchange.org/stakeholder/Goa%20waste%20management%20model.pdf):  
<http://www.ciiwasteexchange.org/stakeholder/Goa%20waste%20management%20model.pdf>
34. USAID India. (2010). *Energy Efficient Street Lighting Guidelines*. Delhi: U. S. Agency for International Development.
35. World Bank Group. (2019). *Energy-Efficient Street Lighting PPPs*. World Bank Group. Retrieved from  
<https://ppp.worldbank.org/public-private-partnership/energy-efficient-street-lighting-ppps>
36. World Bank. (n.d.). The Andhra Pradesh Randomized Evaluation Study. *Summary*. Retrieved from  
<http://documents.worldbank.org/curated/en/126411468269411525/pdf/892780v10WPoPooPUBLICooFinaloAPREST.pdf>





ISBN 978-9-35-768175-9



9 789357 681759 >