A study on special purpose vehicle (SPV) of independent power producer (IPP) projects in Asia

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**NANYANG
TECHNOLOGICAL
UNIVERSITY**

**A STUDY ON SPECIAL PURPOSE VEHICLE (SPV) OF
INDEPENDENT POWER PRODUCER (IPP) PROJECTS
IN ASIA**

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SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

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Power Producer (IPP) Projects in Asia**

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SCHOOL OF CIVIL & ENVIRONMENTAL ENGINEERING

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SUMMARY

The Public-Private Partnership (PPP) method of procurement has been widely used in many countries for a long time. From oil and gas to electricity, toll roads to tunnels and bridges, and from hospitals to schools and prisons PPP is prominent in every sector. The two entities the Public and Private sector with their objectives of welfare and profit respectively, enter into long term Partnership Agreement, with a view to achieve value for money through shorter construction periods, streamlined contracts and simplified procurement process.

Since 1990 PPP has undergone many changes and challenges. Even though there exist many PPP models, one thing which is common and most essential in all these schemes is the Special Purpose Vehicle (SPV). Creation of SPV or Project Company is the seminal step in any PPP infrastructure projects. Private parties especially the sponsors, contractors and/or operators invest in SPV and are the promoter of SPV as well. The main purpose of SPV is to facilitate financial transaction, to establish legal rules and regulations and to frame contracts between the parties involved in the concerned project. The financing of infrastructure projects depends on the anticipated financial performance of the SPV. Ambitious and improper set up of SPV may cause delay and cost overrun to project completion, forces restructuring debt mechanism and may even lead to bankruptcy to giant companies. Many infrastructure PPP projects have suffered set-back due to failure in identifying in advance the potential barriers that the SPV would face, its legal and financial dimensions with long term uncertainties and wide risk sharing portfolios. Concerted efforts from the government and private sectors, as well as political, legal and financial issues need to be dealt with for structuring smooth mechanism of SPV. The structure of special purpose vehicle is complex and challenging because of the presence of various contracts among participants, limited recourse or non-recourse financing, multiple direct or indirect participants with different motives and interest and complexity of contractual agreements.

The objective of this research has three major dimensions. First, identify critical legal and financial factors for establishing sustainable SPV of IPP projects in Asia.

It is found that 15 factor groupings from the 75 validated factors are essential for setting up SPV of IPP projects in Asia. Among them, (1) Output contract, (2) Input contract, and (3) Parties creditworthiness factor groupings belong to contractual foundation factors. (4) Regulatory framework, (5) Host country business environment, and (6) Concession agreement factor groupings belong to enabling environmental factors. (7) Guarantees on off-taker, supplier and SPV, (8) Guarantees on tariff, (9) Government's financial guarantees, and (10) Credit guarantees by financial institutions factor groupings belong to guarantee factors. (11) Credit enhancement by shareholders, (12) Credit enhancement by government, (13) Credit enhancement by MDBs, ECAs and other parties, (14) Capital structure mechanism, and (15) Credit enhancement by commercial banks belong to credit enhancement factors. In addition to it, the perceptions of PPP professionals and academicians of Asia on these 75 factors are also reflected in descriptive analysis.

Second, set a legal strategy (i.e. decision support model) for the government in order to implement IPP projects in Asia. It is found that government needs to choose appropriate strategies for setting IPP projects in a country depending on financing terms and conditions. For example, loose condition may exist when financing jurisdiction is questionable due to opaque off-take agreement. Similarly, if a country possesses lower sovereign credit rating, the government needs to ensure strong off-take agreement, supply guarantee and performance, central bank guarantee for foreign exchange availability, convertibility and transferability as a strategy for attracting debt financing. Failure to identify these legal attributes and to incorporate them into strategies will impede project bankability as well as successful financial closeout.

Third, identify the key stakeholders, their power and position, intermediaries and obstacles in IPP structure, its structural and hierarchical pattern and characteristics of the structure. These can be found by using network theory on IPP structure. The theory addressed some important aspects, such as the distribution of power of related parties in IPP agreements and the sources. Core/periphery structure and a dense, cohesive core and a sparse, unconnected periphery are also sought in this

analysis. It is found that the power of any individual stakeholder (i.e., party) is not an individual attribute but arises from the relationships with other stakeholders in the network.

For this research, multiple cases are carried out in Bangladesh, India, Pakistan, China, Indonesia, and Thailand.

It is expected that the research will be of help to the policy makers, promoters, investors, public and private stakeholders as guideline for decision making in financing and structuring SPV of IPP projects. With the understanding of the critical legal and financing factors for establishing SPV of IPP projects, the decision support model and the stakeholders' analysis, the government/government agencies and promoters will be able to setup well structured IPP projects that are believed to be able to sustain in emerging markets in Asia.

TABLE OF CONTENTS

<u>TITLE</u>	<u>PAGE</u>
Acknowledgement	i
Summary	ii
List of Figures	x
List of Tables	xii
List of Abbreviations and Acronyms	xiv
Chapter 1 Introduction	1
1.1 Trends in Public Private Partnership	1
1.2 Asian Power Sector: Key Features	3
1.3 Anatomy of Special Purpose Vehicle	4
1.4 Problem Statement	8
1.5 Research Questions	10
1.6 Objectives of the Research	10
1.7 Scope of the Study	11
1.8 Expected Contributions	11
1.9 Organization of Thesis	12
Chapter 2 Literature Review	15
2.1 Recent Developments in Project Finance	15
2.2 Project Finance	17
2.2.1 Characteristics of Project Financing	17
2.2.2 Basic Elements of Project Financing	18
2.2.3 Participants in Project Financing	19
2.2.4 Special Purpose Vehicle	22
2.2.5 Project Financing Instruments/Sources of Capital	26
2.2.6 Categorization of Project Finance by Debt Agreement	29
2.3 Private Flows in Project Finance	31
2.4 Project Risks and Financing Strategies	35
2.5 Government Support and Guarantees	41
2.6 Capital Structure and Financial Viability Indicators	45

2.7 Network Theory	47
2.7.1 Bipartite Graph	50
2.7.2 Properties of Centrality	53
2.8 Deficiencies in previous studies and the need for studying SPV of IPP projects	54
2.9 Chapter Summary	56
Chapter 3 Methodology	59
3.1 Introduction about Methodology	59
3.2 Research Methodology	59
3.3 Research Design	60
3.4 Methodological Framework	61
3.4.1 Factors Identification	61
3.4.2 Data Collection	64
3.4.3 Data Analysis and Case Study	67
3.4.4 Conclusion and Recommendation	70
3.5 Chapter Summary	70
Chapter 4 Stakeholders and their contracts with SPV in PPP Projects	71
4.1 Background	71
4.2 Patterns of investment in different sectors	72
4.3 Participants Surrounding SPV and their roles	74
4.3.1 Contractors in SPV	76
4.3.2 Suppliers in SPV	77
4.3.3 Operators in SPV	79
4.3.4 Buyer/Off-taker in SPV	80
4.3.5 Government and/or State owned Agency	81
4.3.6 Financial Institutions and Commercial Banks	82
4.3.7 Multilateral, Bilateral and Export Credit Agencies	84
4.3.8 Insurers in SPV	85
4.3.9 Rating Agencies in SPV	85
4.3.10 Trustees in SPV	86

4.3.11 Escrow Account in SPV	87
4.4 Core Activities of SPV	88
4.4.1 Options for SPV to Raise Funds	88
4.4.2 Financial and Legal Regulations for SPV	92
4.4.3 Risk Allocation	93
4.5 Chapter Summary	97
Chapter 5 Critical Financial and Legal Factors for establishing SPV of IPP Projects in Asia – Factor Analysis	98
5.1 Background	98
5.2 Identification of Factors	98
5.3 Questionnaire Survey	100
5.4 Factor Analysis	101
5.4.1 Factor Analysis on Contractual Foundation Factors	102
5.4.1.1 Factor Grouping CF1 – Output contract	103
5.4.1.2 Factor Grouping CF2- Input contract	104
5.4.1.3 Factor Grouping CF3- Creditworthy Parties	105
5.4.2 Factor Analysis on Enabling Environmental Factors	106
5.4.2.1 Factor Grouping EE1- Regulatory Framework	107
5.4.2.2 Factor Grouping EE2- Host Country Business Environment	108
5.4.2.3 Factor Grouping EE3- Concession Agreement	108
5.4.3 Factor Analysis on Guarantee Factors	109
5.4.3.1 Factor Grouping G1 – Government guarantees on Off-taker, supplier and SPV	111
5.4.3.2 Factor Grouping G2- Guarantees on Tariff	111
5.4.3.3 Factor Grouping G3-Government’s Financial guarantees	111
5.4.3.4 Factor Grouping G4- Credit guarantees by Financial Institutions	112
5.4.4 Factor Analysis on Credit Enhancement Factors	112
5.4.4.1 Factor Grouping CE1- Shareholders	115
5.4.4.2 Factor Grouping CE2- Host Government	115

5.4.4.3 Factor Grouping CE3- MDBs, ECAs and Other Parties	115
5.4.4.4 Factor Grouping CE4- Capital Structure Mechanism	116
5.4.4.5 Factor Grouping CE5- Commercial Banks	117
5.5 Chapter Summary	117
Chapter 6 Critical Financial and Legal Factors for establishing SPV of IPP Projects in Asia – Descriptive Analysis	119
6.1 Background	119
6.1.1 Contractual Foundation Factors	119
6.1.1.1 Output Contract	119
6.1.1.2 Input Contract	120
6.1.1.3 Creditworthy Parties	124
6.1.2 Enabling Environmental Factors	124
6.1.2.1 Regulatory Framework	124
6.1.2.2 Host Country Business Environment	125
6.1.2.3 Concession Agreement	126
6.1.3 Guarantee Factors	126
6.1.3.1 Government Guarantees on Off-taker, Supplier and SPV	127
6.1.3.2 Guarantees on Tariff	127
6.1.3.3. Government’s Financial Guarantees	127
6.1.3.4 Credit Guarantees by Financial Institutions	128
6.1.4 Credit Enhancement Factors	128
6.1.4.1 Shareholders	128
6.1.4.2 Government	129
6.1.4.3 MBD, ECA and Other parties	130
6.1.4.4 Capital Structure Mechanism	131
6.1.4.5 Commercial Banks	131
6.2 Investigation of Cases	132
6.2.1 Background of Cases	132
6.2.2 Analysis of Contractual Foundation Factor of Cases	139

6.2.3 Analysis of Enabling Environmental Factors of Cases	144
6.2.4 Analysis of Guarantee Factors of Cases	146
6.2.5 Analysis of Credit Enhancement Factors of Cases	147
6.3 Discussion of Findings	150
6.4 Chapter Summary	154
 Chapter 7 Factors Influencing Finance on IPP Projects in Asia – A Legal Framework	 155
7.1 Background	155
7.2 Rationale of Choosing the Sector and the Projects	155
7.3 Role of a Government	156
7.4 Overview of Projects	157
7.5 Analysis and Results	161
7.5.1 Sovereign Credit Rating	161
7.5.2 Involvement of MDB and ECA	162
7.5.3 Purchase Agreements	164
7.5.4 Guarantees and Credit Support Agreements	165
7.6 Conclusion and Decision Support Model	166
7.7 Chapter Summary	170
 Chapter 8 Analysis of SPV and Stakeholders of IPP Projects – Case Studies	 171
8.1 Background	171
8.2 Rationale of using network theory	171
8.3 Selection of Cases	172
8.3.1 HubCo Power Project, Pakistan: Case 1 for network analysis	173
8.3.1.1 Background	173
8.3.1.2 Bipartite Graph of HubCo Project, Pakistan	174
8.3.1.3 Network Diagram of HubCo power project by Netdraw	179
8.3.1.4 Degree Centrality Index of HubCo Project	181
8.3.1.5 Closeness Centrality Index of HubCo Project	182

8.3.1.6 Betweenness Centrality Index of Hubco Project	185
8.3.1.7 Discussion of Findings of HubCo Project, Pakistan	188
8.3.2 Meghnaghat Power Project, Bangladesh: Case 2 for network analysis	189
8.3.2.1 Background	189
8.3.2.2 Bipartite Graph of Meghnaghat Power Project Bangladesh	190
8.3.2.3 Network Diagram of Meghnaghat Power Project by NetDraw	194
8.3.2.4 Degree Centrality Index of Meghnaghat Project	194
8.3.2.5 Closeness Centrality Index of Meghnaghat Project	197
8.3.2.6 Betweenness Centrality Index of Meghnaghat Project	199
8.3.2.7 Discussion of Findings of Meghnaghat Project, Bangladesh	202
8.4 Comparison between HubCo and Meghnaghat Power Project	202
8.5 Chapter Summary	204
Chapter 9 Conclusion & Recommendation for Future Research	205
9.1 Conclusions of Research	205
9.2 Contributions	209
9.3 Limitation of Research	210
9.4 Recommendation for Future Research	210
References	212
Appendices	
Appendix A: Overview of Various Special Purpose Vehicles Structure of Fifteen Cases	233
Appendix B: Factor Analysis Data	249
Appendix C: Content Validation	255
Appendix D: Questionnaire	258

LIST OF FIGURES

<u>FIGURE</u>	<u>TITLE</u>	<u>PAGE</u>
1.1	Flow of Investment	2
1.2	Formulation of SPV	5
1.3	Basics of PPP Project	6
1.4	Basic Role of SPV	7
2.1	Project Finance by Region	15
2.2	Sector-wise Project Finance	16
2.3	Basic Elements of Project Financing	18
2.4	Structure of Power Infrastructure Project Financing	20
2.5	Typical Contractual Structure for PPP Project	25
2.6	Claims of Assets	27
2.7	Limited Recourse Structure	30
2.8	Public Private Partnerships	33
2.9	PPP Schemes	34
2.10	Spectrum of PPP Model	35
2.11	Risks in a Project	36
2.12	Simple Network Diagrams	48
2.13	A Basic Social Network	49
2.14	Type of Network	50
2.15	Bipartite Graph	51
2.16	Bipartite Graph of People and Movies	51
2.17	Network Diagram of People and Movies	53
3.1	Road Map	62
3.2	Research Framework	65
3.3	Sample Design for Research	66
3.4	Flow Diagram of Input, process and Output	68
4.1	Cost Benefit Scenarios of Projects in Different Sectors	72
4.2	Possible Stakeholders in Infrastructure Projects of Public	74

<u>FIGURE</u>	<u>TITLE</u>	<u>PAGE</u>
	Private Partnerships	
4.3	Formation of SPV in Procurement Stages	76
4.4	Contractors in Special Purpose Vehicle	76
4.5	Types of Contractors in SPV	77
4.6	Suppliers in Special Purpose Vehicle	78
4.7	Types of Supplier in SPV	78
4.8	Operators in Special Purpose Vehicle	79
4.9	Buyers in Special Purpose Vehicle	80
4.10	Types of off-take Agreement	81
4.11	Government Involvements in SPV	82
4.12	Escrow A/C in SPV	87
4.13	Various Capital Structure Tools and Participants	89
4.14	Endogenous and Exogenous Factors Surrounding SPV	94
6.1	Contractual Agreements of Haripur Power Project, Bangladesh	134
6.2	Project Structure of Costal Gujarat Power Limited, India	136
6.3	Contractual Structure of BLCP Project, Thailand	138
7.1	Government's Involvement in IPP Projects	157
7.2	Project Phases	159
8.1	PPP Structure of HubCo Power Project, Pakistan	176
8.2	Bipartite Graph of HubCo Project	177
8.3	PPP Structure of HubCo Project by NetDraw	180
8.4	Contractual Structure of Meghnaghat Power Project, Bangladesh	191
8.5	Bipartite Graph of Meghnaghat Power Project, Bangladesh	192
8.6	PPP Structure of Meghnaghat Power Project by NetDraw	195
9.1	Factor Analysis and Principal Component Factors	206

LIST OF TABLES

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
2.1	Definition of special purpose vehicle	22
2.2	Investment in private participation projects in developing countries	32
2.3	Type of risks and issues	36
2.4	Risk condition and financing strategies	40
2.5	Common government supports	42
2.6	Government supports mechanism	43
2.7	Leverage ratios in project finance	46
4.1	Selected projects and the sectors	71
4.2	Participants in capital structure	91
4.3	Distinct features of selected PPP infrastructure projects	95
5.1	Factors and their sources for establishing SPV in Asia	99
5.2	Countrywide respondents' list	100
5.3	Reliability statistics for contractual foundation factors	102
5.4	KMO and Bartlett's test for contractual foundation factors	102
5.5	Rotated factor matrix (loading) of critical contractual foundation factors for establishing SPV of IPP projects in Asia	103
5.6	Reliability statistics for enabling environmental factors	106
5.7	KMO and Bartlett's test for enabling environmental factors	106
5.8	Rotated factor matrix (loading) of critical enabling environmental factors for establishing SPV of IPP projects in Asia	107
5.9	Reliability statistics for critical guarantee factors	109
5.10	KMO and Bartlett's test for guarantee factors	109
5.11	Rotated factor matrix (loading) of critical guarantee factors for establishing SPV of IPP projects in Asia	110
5.12	Reliability statistics for credit enhancement factors	113
5.13	KMO and Bartlett's test for credit enhancement factors	113
5.14	Rotated factor matrix (loading) of critical credit enhancement factors for establishing SPV of IPP projects in Asia	114
6.1	Survey results	121

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
6.2	Financing data of Haripur power project, Bangladesh	133
6.3	Basic financing data of Mundra power project, India	135
6.4	Characteristics of the project's off-takers of CGPL	141
6.5	Salient features of three IPP projects	151
7.1	Project information	160
7.2	Influencing attributes in the case studies	163
7.3	Legal attributes and risks	167
7.4	Recommended legal strategies for different conditions of IPP project financing and structuring	169
8.1	Selected cases and their features	173
8.2	Degree centrality index of HubCo project stakeholders	181
8.3	Closeness centrality index of HubCo project stakeholders	183
8.4	Closeness centrality index of HubCo project stakeholders (by Eigenvalue)	184
8.5	Betweenness centrality index of HubCo project stakeholders	185
8.6	Betweenness centrality index of HubCo project stakeholders (Edge Betweenness)	186
8.7	Betweenness centrality index of HubCo project stakeholders (Hierarchical Reduction)	187
8.8	Basic data of Meghnaghat power plant	190
8.9	Degree centrality index of Meghnaghat project stakeholders	196
8.10	Closeness centrality index of Meghnaghat project stakeholders	197
8.11	Closeness centrality index of Meghnaghat project stakeholders (by eigenvalue measurement)	198
8.12	Betweenness centrality index of Meghnaghat project stakeholders	199
8.13	Edge betweenness of Meghnaghat project stakeholders	200
8.14	Hierarchical reduction structure of Meghnaghat power project	201
8.15	Organizational Structure of HubCo and Meghnaghat power project by Network Theory	203

LIST OF ABBREVIATIONS AND ACRONYMS

AES	Allied Energy Systems (Corp.)
BLCP	Banpu Lockley China Power
BOO	Build-Own-Operate
BOOT	Build-Own-Operate-Transfer
BOT	Build-Operate-Transfer
BPDB	Bangladesh Power Development Board
CDC	Commonwealth Development Corporation
CEND	Confiscation, Expropriation, Nationalization and Deprivation
COFACE	Compagnie Francaise d'Assurance pour la Commerce Exterieur, the French ECA
CP	Condition Pr�cedence
DBFO	Design-Build-Finance-Operate
D/E	Debt to Equity ratio
ECA	Export Credit Agency
ECGD	Export Credit Guarantee Department
EPC	Engineering Procurement and Construction
ESA	Equity Support Agreement
EGAT	Electricity Generating Authority of Thailand
FCA	Financial Completion Agreement
FX	Foreign Exchange
GDP	Gross Domestic Product
IA	Implementation Agreement
IDA	International Development Association
IMF	International Monetary Fund
IFC	International Finance Corporation
IPFA	International Project Finance Association
IPP	Independent Power Producer
JBIC	Japan Bank for International Cooperation
JEXIM	Japanese Export-Import
KV	Kilovolt

kWh	Kilowatt-Hour
LNG	Liquidated Natural Gas
MDB	Multilateral Development Bank
MITI	Ministry of International Trade and Industry, Japan
MIGA	Multilateral Investment Guarantee Agency
MW	Megawatt
NAO	National Audit Office
NGO	Non-Government Organization
NEXI	Nippon Export and Investment Insurance
O&M	Operation and Maintenance
OPIC	Overseas Private Investment Corporation
PACRA	Pakistan Credit Rating Agency
PCG	Partial Credit Guarantee
PFA	Project Fund Agreement
PPPs	Public Private Partnerships
P3s	Public Private Partnerships
PFI	Private Finance Initiatives
PRC	Peoples' Republic of China
PRG	Partial Risk Guarantee
PSEDF	Private Sector Energy Development Fund
RMB	Renminbi (Chinese currency)
RSA	Resource Supply Agreement
S&P	Standard and Poor's Inc.
SCR	Sovereign Credit Rating
SPV	Special Purpose Vehicle
USEXIM	United States Export-Import
UN ESCAP	United Nations Economic and Social Commission for Asia and the Pacific

CHAPTER 1 INTRODUCTION

1.1 Trends in Public Private Partnership

In this new age, Public Private Partnership (PPP) has become the most important means of any public procurement. It has gained a very wide interest around the world. It has been used in many infrastructure developments with widespread purpose, ranging from construction of highly revenue generating projects, to economic projects, to provision of social services. Various countries have introduced PPP with different mind set, such as fiscal deficit, budgetary pressure, demand supply gap, inefficient public services to infrastructure. On the other hand, some countries choose PPP with an intention of gaining operational efficiency, innovative technological and management skills, expertise from private sector and achieve more active involvement of private players in public service. PPP has come a long way since its embryonic stage; developed genuine partnerships aimed at properly pricing scarce public resources and efficient sharing and managing risks (Sadka, 2006).

PPP has become a mandatory in United Kingdom since 1992. According to Private finance capital 1995-96, all capital projects in the public sector, requiring Treasury approval, should explore the use of private finance options, unless it was absurd or unrealistic to do so. In 2003, the National Audit Office (NAO) published the results of a survey of projects and concluded that most Private Finance Initiative (PFI) projects were delivered on time, and project managers were satisfied with the design and construction (NAO 2003). HM [Treasury \(2003\) report](#) stated that PFI would be used for projects worth more than £20 million and for large Information and Communication Technology (ICT) projects. To date, approximately 23 states within the United States have adopted legislation that permits the use of PPP solutions (Conor, 2008). In Singapore, Government applies PPP projects where the value of the project is likely to be more than \$50 Million (Ministry of Finance, Singapore 2004).

It is observed that, PPP is most readily applied to financially free-standing projects, generates high revenue which allows the full cover of investment, debt service,

operation and maintenance. Telecommunication, oil and gas, electricity etc. fall into this category. These projects are profit making and can be financially sustained. On the other side, there are projects that provide fee services to the users. These are social projects such as schools, hospitals, water and sanitation etc. These are generally capital intensive projects with low revenue generation; require long pay-back period. Due to unattractive economics, less private bodies participate into this project financing. Between these two categories, there are economic projects which generate moderate revenue. Industrial estate parks, recreation centers, hotels and resort fall in this category. Brief information on the parameters of public mechanism for public and private investment of these projects can be summarized in Figure 1.1.

Figure 1.1 Flow of Investment

The revenue stream is normally subject to a purchase agreement which may be guaranteed by sovereign government as the utilities financial strength is not sufficient enough to cover the debt repayment, operation and maintenance service. These projects typically require large sunk investment and longer period to recoup. Economic infrastructures are also more straightforward candidate for PPP than are social infrastructure because of higher rate of return, favorable user charge and better market for bundling construction with provision of related services (IMF, Economic issue no. 40). However, many countries have implemented PPP into social infrastructure projects, gained high quality service and efficiency as well.

The change in attitude from traditional financing to project financing can be attributed to a number of factors; a prime one being that most countries now rely on market mechanisms to guide their economic activity and on the private sector to supply investment. As the financial capability, resources and expertise are of sub-optimal, the government sector is now focusing on partnership with private enterprise for the development of infrastructure projects. In IFC's experience, project finance is a valuable tool though many projects faced serious strain in the aftermath of the East Asia crisis. The success of PPP contributes net benefit to the society and the economy as a whole for the public sector. According to World Bank 2006, US\$ 785 billion has been used in public private investment of infrastructures in developing countries in 2002. The popularity of PPP from government's perspective is that it allows government to avoid or defer spending on infrastructure without forgoing its benefit. This is especially attractive to governments that are restricted in current liabilities to spend but fairly unrestricted in its promise to future spending (IMF, Economic issue no. 40).

1.2 Asian Power Sector: Key Features

Electricity sector is gradually liberalizing which is causing concerns, particularly relating to prices to end users in Asia. But these concerns have been offset by relative price stability by regulatory interventions. In developing economics of China and India, the surging stability is outstripping the respective governments

funding of electricity infrastructure development. Electricity demand has risen rapidly due to population and income growth in many Asian countries. Electricity generation in this region is dominated by a few large producers, with China and India the largest producers, because of their huge populations. Many developing nations in this region such as Bangladesh, Pakistan, Indonesia and Vietnam have ambitious goals to expand their electricity infrastructure over coming decades. They need to expand and improve their power generation in order to remain competitive and to ensure growth rate. However, few governments can afford to keep on building power plants to meet the growing demand. As the development of electricity generation requires large investment, the opening up of foreign direct investment has led to the growth of Independent Power Producer (IPP) projects in this region, largely in response to strong growth and inability of these economies to finance the needed capital investments. Electricity sector reforms are underway to encourage more foreign investment. Foreign ownership restrictions are being relaxed and foreign investors are supported. Therefore, many IPP projects are set and on pipe-line in this region - some are in identification stage, some are in bidding stage, some are in development, and some are in operational stage. Not all but in most cases, IPP projects are constructed through a 'Special Purpose Vehicle' (SPV), which acts as a managing and operating company for project(s) as well as the legal body that guarantees concessions from the public authority. Concession agreement is the agreement between government and the SPV for development, construction and operation of specific projects. As part of the concession, a SPV owns and operates the facility and collects revenue which is used to repay the finance and investment costs, maintain and operate the facility and to make marginal profits (Merna and Smith, 1996). More information about SPV is explained in the following section.

1.3 The Anatomy of Special Purpose Vehicle

From the name it suggests that it is a vehicle of special purpose. The main purpose of creating SPV is to obtain funding for projects. Therefore it has an important role among various participants in the project though many agreements fastened with it. SPV introduces various parties like lenders, financial institutions, public sector, export credit agencies, guarantors, suppliers and off-takers - to outsourcing deals.

The PPP transaction is normally constructed by using an SPV which acts as the management and operating company for the projects and is the legal owner of the concession that is granted by the public sector authority. The equity of SPV is jointly owned by the prime contractor, service provider, public authority and possibly the banks involved with the financing. Moreover, SPV acts as the prime conduit of financing. In addition to the initial share capital subscription by the sponsors, the SPV is able to raise extra financing, either through subordinated debt from the project participants or senior secured debt from the capital markets or from banks. Generally a private sector consortium (i.e. investors, contractors, sub-contractors, suppliers) forms a special purpose vehicle 'SPV'.

Figure 1.2 Formulation of SPV

Thus, the SPV is a type of consortia of private bodies who are interested to work in the project and are directly or indirectly related with it. In Figure 1.2, it is shown how a project company (i.e. SPV) is formed and the interrelated agreements with various participants in the project. Normally, SPV is set to accord with various participants in the project in terms of legal and financial aspects. Side by side, SPV has an important role with the concession agencies (if any) which are backed by government for the main contract of the project. On the other hand, when revenue is generated from project it has a role too. The cash that comes into the SPV can be divided between multiple different investors based on seniority, where "Class A lenders or investors" have the first claim upon cash, and residual cash (if any) is then used to repay "Class B lenders or investors". This would imply that the SPV would issue securities which have different claims upon the incoming cash flows, and hence different (market determined) prices and rates of return. Thus SPV obtains finance, procures, designs and constructs the facility, and operates the facility during concession period. Figure 1.3 shows the basics of PPP project and contracts with various parties with SPV.

Figure 1.3 Basics of PPP Project
(Adapted from PPP Hand Book, Ministry of Finance, Singapore 2004)

A PPP project involves collaboration of various parties especially between public and private sectors. The PPP deals should be structured to be mutually beneficial to all the parties involved not only in risk allocation and sharing but also the interest of all parties regarding financial aspects. Figure 1.4 illustrates the interaction between the various parties in a typical PPP project.

Figure 1.4 Basic Roles of SPV

By definition, a SPV is a legal entity that allows for a favorable treatment of accounting, fiscal, regulatory and financial issues. A SPV is set up when the government body awards the concession or license. The concession is the primary contract between the government and the SPV. The concession normally entitles or requires the SPV to build, finance and operate the asset for a fixed period. Thus, the SPV is an independent legal entity which enters into contractual agreements that are necessary for the project. The sponsors of the SPV are usually a consortium of shareholders who may be investors or have other interests in the project. At the end

of the concession the asset is handed back to the public sector in a pre-specified condition.

Typically, creating an SPV allows privately managed infrastructure projects, either at the stage of construction and/or operation, to enjoy most degree of isolation. In most cases, the use of an SPV is a requirement imposed on the private agent by either the public sector, the financiers, the guarantors or the contractors of the project. SPV varies depending on the legal and financial agreements with stakeholders in a project. Moreover, different country has different structure of SPV for PPP projects. Even the structure of one SPV for IPP project differs from the structure of another SPV for IPP project. The legal and financial framework is therefore quite important. This research is thus limited to the analysis of legal and financial framework of SPV for IPP projects.

1.4 Problem Statement

The International Project Finance Association (IPFA) posits that “the heart of the project finance transaction is the concession company, a “Special Purpose Vehicle (SPV)”. As seen in the previous section, all the major agreements with various parties/ stakeholders of a project with respect to legal contract and financing arrangements have to be accorded with SPV. The fund raising, financial framework, linking various participants in connection to legal and financial aspects, assurance of raw material supply, production and marketability depends on well established framework of SPV. Moreover, the commitment of investors, creditworthiness of lenders, political guarantee of government, buyer’s agreement to purchase all are connected with the project financing hub the ‘Special Purpose Vehicle’. The structure of SPV is complex and challenging because of the various contracts among participants, limited recourse or non-recourse financing, multiple direct or indirect participants with different motives and interests and complexity of contractual agreements.

Financial transactions of SPV are also complex in nature and such transactions can work only if the needs of the private sector can be met in an appropriate manner. Lenders and investors want to be reasonably sure that facilities can be built and

owned without undue interference, and that they can be operated in a reasonably predictable environment at a sufficiently attractive rate of return. Various sources of finance have various strategies to invest in the project. For example, bank debt, export credit agencies, multilateral agencies, capital market, equity investors and bond finance have different strategies to make the project attractive, successful and eventually profitable to stakeholders. On the other side any element in a country's policy framework that jeopardizes these expectations will become a stumbling block for investor consortia, making projects either more expensive or simply impossible because of the increased risk involved. In many developing countries, therefore, the successful implementation of project finance requires a careful examination of the business environment for such investments and, if necessary, reform of the policy framework underlying it. New financial structures often need to be designed, laws must be amended or new legislation created and adopted, and regulatory oversight functions must be established and strengthened. Most importantly, the organization of the existing service provision should be restructured to allow for effective participation and competition by private sector operators. A proper structure of SPV can help to overcome the limitations of project financing funding, attract investors and create overall strong legal framework for success.

At the same time, though numerous research studies (Wang and Tiong, 2000; Tiong and Anderson, 2003; Tinsley, 2000; Delmon, 2009) have been conducted to establish and justify the structure of PPP projects based on contractual agreements among participating stakeholders and on existing legal frameworks of a host country, there are still questions left unanswered. Examples are: What are the factors that influence the structuring of PPP? Who are the key stakeholders? And what are the roles of participating partners in a PPP project? Therefore, the proper structure of SPV of PPP projects and identification of potential stakeholders in PPP affiliation, features like core-peripheral stakeholder(s), influential intermediary participants and their interdependence, and influences of a PPP structure on its substantive outcome are essential not only for the success of the project but also for the sanction of loan/debt agreement from banks or financial institutions.

Since the main focus of this research is on IPP projects in Asia, therefore, the researcher limits its study on SPV for IPP projects, structuring of the projects, and the involvement of the stakeholders in the project in Asia.

1.5 Research Questions

The research questions are therefore:

- (1) What are the critical financial and legal factors for establishing SPV of IPP projects in Asia?*
- (2) What factors influences financing on IPP projects in Asia and the host government's strategy?*
- (3) Who are the key stakeholders? What are their roles and responsibilities? Why they are powerful? Who are the intermediaries? Who are the weak stakeholders and what are the obstacles in PPP structure of IPP projects in Asia?*

1.6 Objectives of the Research

The aims of this research are to find out critical legal and financial factors for setting up SPV of IPP projects in Asia and the factors that influence financing on these projects. The emphasis is also placed on identifying key stakeholders, roles and responsibilities of the stakeholders, their power and opportunities, intermediaries and weak stakeholders of IPP projects. Therefore the specific objectives of this study are:

- (a) To set up SPV, identify critical legal and financial factors of IPP projects in Asia.
- (b) To develop a decision support model for different conditions of IPP project financing and structuring which can be helpful to the government to select appropriate strategies for stepping into these projects.
- (c) To find out the key stakeholders, their power and opportunities, the intermediaries and weak stakeholders as well as the obstacles in structuring IPP projects in Asia.

1.7 Scope of the Study

- The focus of this research is on Independent Power Producer (IPP) projects in Asia especially Greenfield projects (i.e. private entity or public private joint venture build and operate a new facility for a specific period. The facility may return to public authority after specified concession period).
- The research mainly focuses on financial and legal issues for setting up of SPV i.e. the project company.
- The study is narrowed down to the projects that are located into Asia region.
- This is an empirical research based on collected information from multiple sources such as journal reports, conference articles, newspaper reports, annual reports, company profiles and interviews with the practitioners and professionals involved in PPP projects.

1.8 Expected Contributions

The evidence in this research shows that not only are there common trends and techniques that are used for SPV development but also some unique features to overcome financial and legal hurdles. It gives insights for using SPV to improve financing of IPP projects in Asia. This research thus, constitutes an attempt at providing a competitive strategy that can help the government to develop a legal framework for IPP project financing. Moreover, the application of network theory helps to identify and distinguish potential stakeholders in PPP affiliation and effectively contributes to an in-depth analysis of the relationships among stakeholders. The analysis identifies important features like core-peripheral stakeholder(s), influential intermediary participants and their interdependence, and influences of a PPP structure on its substantive outcome. With the introduction of the network theory, a more thorough analysis of PPP structures can be achieved which may provide valuable information to project sponsors as well as legal and financial advisors. It is also expected that identification of essential legal and financial factors, SPV and its stakeholders, and the structure of IPP help the policy makers, promoters, investors, public and private agencies with a guideline for decision making in IPP project financing.

1.9 Organization of Thesis

The first chapter introduces the concept of project finance, particularly Public Private Partnerships (PPP); its trends and practices. In addition to it, this section also acquaints a general brush up of Special Purpose Vehicle (SPV). At the end, it describes the problem statement, objectives and scope of the research.

Chapter 2 presents literature reviews on Public Private Partnerships, Special Purpose Vehicle (SPV), PPP stakeholders and their roles & responsibilities, and project risks. It also reviews the components and essentialities of SPV that are widely used in various sectors and in various countries. Furthermore, literature review on network theory is also explored to understand the [organizational structure](#) of PPP, role of the stakeholders, the number of agreements that a stakeholder participates in, the involvement of number of stakeholders are in an agreement, and their influences in the PPP structure.

Chapter 3 outlines the roadmap for accomplishing the objectives of the research. A research framework is drawn to show how this research is executed as well as what statistical tools and techniques are used to furnish the findings. Thus, this chapter contains the methodology and data collection procedure. How to collect, organize and interpret data for this research are explained in this section.

In Chapter 4, the researcher has searched what trends and techniques are being widely used for PPP projects worldwide. Fifteen public private partnerships (PPP) infrastructure projects are evaluated from Asia, North America, Europe, Africa and Australia in order to understand the current practices of setting up SPV for PPP projects.

Chapter 5 - in this chapter, a number of factors are examined for setting up of SPV for IPP projects. A questionnaire survey is thus conducted to find out the most critical financial and legal factors in setting up SPV for power PPP projects from a wide range of personnel involved in the PPP processes in Asia. The objective of this part is to investigate the current practice of setting up SPV and associated legal and

financial impacts onto it. Given that all the factors are nominally seen critical in the literature, factor analysis is used to determine the principal critical factors groupings that underline setting up SPV for IPP projects in Asia. Factor analysis revealed fifteen factor groupings for critical financial and legal factors of establishing SPV for IPP projects in Asia. Analysis of the response data reflects expert opinions in identifying the influential factors and the choices in setting up SPV for power PPP projects in Asia.

Chapter 6 explains the descriptive analysis on the critical legal and financial factors and provides the respondents' views on these factors for establishing SPV of IPP projects in Asia. Statistical tools used for this analysis are mean, standard deviation, ranking and percentage of response per factor. At the end, case investigations on three IPP projects are also done. The findings of this chapter therefore provide a guideline for the private sector investors and public agencies in setting up SPV for power PPP projects in this region.

In Chapter 7, a research is conducted through comprehensive examination of four IPP projects in India, China, Indonesia and Pakistan. A qualitative research is done to identify various issues that a government needs to deal with for setting up of IPP projects in Asia. The objective is to evaluate and analyze government's role and involvement in IPP projects. The issues examined are related to sovereign support policy, involvement of financial institutions and export credit agencies, purchase agreements, and credit enhancement mechanism. A decision support model is thus developed from the government's perspective to attract investors, lending institutions and other private parties for better funding and project creditworthiness.

Although much research has been done in Public-Private Partnership (PPP), there are still some major unanswered questions, such as the factors influencing the structuring of a PPP, the identity of the key stakeholders and the roles of the participants. In Chapter 8, the researcher argues that the application of network theory can help answer these questions and effectively contribute to an in-depth analysis of the relationships among the participating stakeholders in a PPP

affiliation. The researcher uses two sources of data. First, a set of secondary data sources like articles, newspaper reports, online databases and World Wide Web pages are reviewed to shape the basic understanding of network theory. Second, a set of five PPP projects are documented to analyze PPP structures. Considering the five projects, the authors select the HubCo Power project of Pakistan as the best case to analyze the PPP structure using network theory. With the introduction of network theory, the authors suggest that a thorough analysis of PPP structures on power, position, opportunity and obstacles of stakeholders can be well-comprehended, so as to provide valuable information to project sponsors, and legal and financial advisors while preparing a PPP project.

The last chapter summarizes the findings of the research. It also contains contributions, limitations of the research, and recommendations for future research.

CHAPTER 2 LITERATURE REVIEW

2.1 Recent Developments in Project Finance

Last few decades there has been a new wave of global interest in economic investment- 'Project financing'. This project financing techniques are used to attract international financing for many large-scale projects, and it helps to meet investment needs in infrastructure and other sectors. The issue is very popular as it creates a technique to alleviate investment risks and raise finance at relatively low cost to the benefit of sponsor and investor alike. To build an infrastructure, project finance transaction involves the mobilization of debt, equity, hedges and variety of guarantees directly or indirectly related with the project vehicle. Since 1990s, project finance has become an increasingly diversified business worldwide. But due to East-Asian crisis (1998-1999) the trend has suffered a set back and therefore, need careful selection, investment and vast ranges of decision making. Despite, the form is still popular for large project financing especially in developing countries. New investments, notably in north America and western Europe, more than offset the capital flight from emerging economics, such that total global lending for project finance rebounded from a two-year slump, reaching a record high in 2000 which is shown in Figure 2.1.

Figure 2.1 Project Finance by Region
(Adapted from Sorge, 2004)

Since 2001, the economic slowdown and industry-specific risks in the telecommunications and power sectors have led to a substantial decline in project finance lending worldwide (as shown in Figure 2.2). The power sector has been hurt particularly by accounting irregularities and high volatility in energy prices.

Figure 2.2 Sector-wise Project Finance
(Adapted from Sorge, 2004)

Despite the financial crisis that began in mid-1997, the investment needs in many developing markets remain enormous. Meeting these needs is essential to development, not only in the more traditional sectors such as energy but also in nontraditional areas such as school and hospital construction. For most countries, this will mean a continuing reliance on private sector expertise and finance to meet demand. Once growth and investment resume, project finance techniques are likely to be an even more important means of sharing risks and of helping these projects get off the ground-particularly in some markets and sectors that may be considered more risky for some time to come. As the experience of the crisis has demonstrated, individual projects are not a substitute for economy-wide regulatory reform designed to improve competitiveness and efficiency, or for the development of local financial markets in support of local investment. But in the appropriate framework, project finance can provide a strong and transparent structure for projects, and through careful attention to potential risks it can help increase new investment and

improve economic growth. The long term need for infrastructure financing in both industrialized and developing countries remain very high. For example, there is a huge requirement to build electricity generating plant in United States as well as in developing countries.

2.2 Project Finance

Project finance is a technique of investing capital assets for an infrastructure or green-field project which involves a creation of legally independent project company financed with equity from one or more sponsoring firms and non-recourse or limited recourse debt. There is no single, generally agreed upon definition of project financing. Some of the authors have defined project financing differently:

“A financing of a particular economic unit in which a lender is satisfied to look initially to the cash flows and earnings of that economic unit as the source of funds from which a loan will be repaid and to the assets of the economic unit as collateral for the loan” (Nevitt and Fabozzi, 1995);

‘.. a term that typically refers to money lent to build power plants or oil refineries’ (Pacelle et al., 2001);

‘Project finance is not a means of raising funds to finance a project that is so weak economically that it may not be able to service its debt or provide an acceptable rate of return to equity investor’ (Finnerty, 1996);

From all above definitions, it is quite clear that Project finance refers to the development of a stand-alone project on a non-recourse or limited recourse financing structure, where debt and equity used to finance the project are paid back from the cashflows generated by the project. So the project financing requires careful selection of a project by financial engineering to allocate the risks and rewards among the involved parties in a manner that is mutually acceptable.

2.2.1 Characteristics of Project Finance

To begin with project finance discussion, it is good to look the unique characteristics of project financing first. These are as follows:

- The project company is typically a special purpose vehicle (SPV)
- The debt is of long term
- Debt is either non-recourse or limited recourse to sponsor
- In case of construction financing, the guarantee is from sponsors
- Lenders have security on project assets, cash flows, and contracts.
- Mitigation of risks and credit support from contracts.

2.2.2 Basic Elements of Project Finance

Project financing encompasses various financial instruments relating to loan, debt, equity as well as supplier of raw materials for the project, purchaser and so on. To raise adequate funding, project sponsors must settle on a financial package that both meets the needs of the project, in the context of its particular risks and the available security at various phases of development, and is attractive to potential creditors and investors. A project that can be structured to attract these investors, to supplement or even to substitute for bank lending, may be able to raise longer-term finance more easily. According to Finnerty (1996), the basic elements of project financing are shown in Figure 2.3.

Figure 2.3 Basic Elements of Project Financing
(Adapted from Finnerty, 1996)

By tapping various sources (for example, equity investors, banks, and the capital markets), each of which demands a different risk/return profile for its investments, a large project can raise these funds at a relatively low cost. Also working to its advantage is the globalization of financial markets, which has helped create a broader spectrum of financial instruments and new classes of investors. By contrast, project sponsors traditionally would have relied on their own resources for equity and on commercial banks for debt financing. Particularly significant is the increasing importance of private equity investors, who tend to take a long-term view of their investments. These investors are often willing to take more risk (for example, by extending subordinated debt) in anticipation of higher returns (through equity or income sharing) than lenders.

2.2.3 Participants in Project Finance

Like various transactions, various parties are involved in project financing. All these participants are classified into two categories

1. Participants found in all Project Finance deals, and
2. Participants found in some but not all, deals

Participants Found in All Project Financing Deals

This category includes sponsor, project vehicle, construction contractors, lenders, insurance providers, others (mezzanine investors or lenders, third party equity source etc).

Participants Found in some, but not All Project Finance Deals

Government, off-taker, resource supplier and third party operators fall into this category. Government has a very important role in infrastructure project financing and success of a project depends on its commitments, guarantee, direct or indirect support. Government serves four important roles in infrastructure (Doh and Ramamurti, 2003). These are:

- a. Government as sponsor: when government retains a share or partner and invests in greenfield project though it involves as lender, guarantor of an infrastructure project debts.
- b. Government as customer: Important customer of the output of infrastructure projects (PPA, Oil & gas etc)... or the initial customer for the output but then distributor to the final customers.

A typical structure of project financing is shown in Figure 2.4.

Figure 2.4 Structure of Power Infrastructure Project Financing

- c. Government as rule maker/ regulator: Most important role is rule-maker of various terms of investment and regulator of the overall competitive environment for infrastructure. Range of policy changes to encourage development, liberalization of trade restrictions, commitment to protection of property rights, reduce duties for capital equipment imports etc. Governments are the ultimate arbiters for regulating the conditions under which foreign investment takes place.
- d. Government as mediator/ moderator of political opposition and NGOs: Supporting/ integrating perspectives of opposition political groups/ NGOs

The increasing acceptance of international accounting standards and the resulting improvement in corporate accountability and transparency have also improved the business and regulatory framework in many countries, thereby facilitating contract-bound transactions. This last point is important for project finance, which usually brings together a number of unrelated parties to complete a project. Project finance relies on a system that can ensure that agreed obligations and responsibilities between its different parties will be met.

As shown in Figure 2.4, various parties are involved in project finance, a firm and amalgamate guarantees is essential for success of the project. It can be said that guarantees are the life-blood of project financing because high debt/equity ratio. Guarantees enable promoters to shift the financial risk of a project to one or more parties who are expert in those respective fields. In project financing, the grantor is broadly classified into two parties –

Owner Guarantee: The obvious guarantor of project finance transaction is the owners of the project. The lenders always look for owner's guarantee in case of under-capitalized subsidiary.

Third Party Guarantor: The third party guarantors nearly always receive direct/indirect benefits from a transaction as motivation for their undertaking. The objectives of third party guarantors are to sell a product/service to be used in the

project, to acquire an equity interest in the project, construction of the project or operating the project after completion. The third party guarantors are supplier, seller, contractor, government agencies and user. Guarantors are the driving force to mitigate risks that are inherent to the project at various stages.

2.2.4 Special Purpose Vehicle (SPV)

Special purpose vehicle (SPV) is the project company or concessionaire, formed by private sector promoters (or sponsors) of a project. After winning the bid, parties of a project prepare, negotiate and enter into detailed documentation. The principal document is ‘concession agreement’ signed between government and SPV. Many researchers and organizations have defined special purpose vehicle in various ways, which are as follows –

Table 2.1 Definition of special purpose vehicle

References	Definition by Researchers and Institutes
International Project Finance Association (IPFA)	The heart of the project finance transaction is the concession company, a Special Purpose Vehicle (SPV)
Harvard Business School Project Finance Glossary	An entity established for a particular purpose such as obtaining off-balance sheet financing or isolating the sponsors’ other assets from the project’s creditors.
Marsillo M. and Vecchi V. Project Finance for public investments: the Italian experience	The sole corporate purpose of the SPV is the construction and the management of the project. The SPV is the holder of fundamental rights and obligations to the project.
Wikipedia	A body corporate (usually a limited company of some type or sometimes, a limited partnership) created to fulfill narrow, specific or temporary objectives, primarily to isolate financial risk, usually bankruptcy but sometimes as a specific taxation or regulatory risk.

Table 2.1 Continued

References	Definition by Researchers and Institutes
<p>Art Glossary http://www.harperisk.com/ArtGlossary/ArtGloss3.htm</p>	<p>An organization constructed with a limited purpose or life. Frequently, these Special Purpose Vehicles serve as conduits or pass through organizations or corporations. In relation to securitization, it means the entity which would hold the legal rights over the assets transferred by the originator.</p>
<p>Business Directory http://www.businessdictionary.com/definition/special-purpose-vehicle-SPV.html</p>	<p>Legal entity created solely to serve a particular function, such as facilitation of a financial arrangement or creation of a financial instrument.</p>
<p>The Financial Express http://www.financialexpress.com/news/What-is-a-special-purpose-vehicle/129610/</p>	<p>The name SPV is given to an entity which is formed for a single, well-defined and narrow purpose. An SPV can be formed for any lawful purpose. An SPV is, primarily, a business association of persons or entities eligible to participate in the association.</p>
<p>PricewaterhouseCoopers</p>	<p>An SPV is mainly formed to raise funds by collateralizing future receivables.</p>
<p>Public Private Partnerships – A Financier’s Perspective UN ESCAP</p>	<p>The SPV is an entity created to act as the legal manifestation of a project consortium. The SPV itself has no historical financial or operating record which government can assess.</p>
<p>Business Glossary http://www.allbusiness.com/glossaries/special-purpose-vehicle/entity-spv/spe/4947193-1.html</p>	<p>A type of corporate entity or limited partnership created for a specific transaction or business, especially one unrelated to a company's main business. Their losses and risks generally are not recorded on a company's balance sheet. The SPV/SPE is usually a subsidiary company with an asset/liability structure and legal status that makes its obligations secure even</p>

Table 2.1 Continued

References	Definition by Researchers and Institutes
	if the parent company goes bankrupt. A company can use such an entity to finance a large project without placing the entire firm at risk.
E7 Guidelines Pooling of Resources and the Interconnection of Electric Power Systems	A specific entity is created to undertake the project with limited or no recourse to the underlying balance sheets of the participant and sponsor companies. Each participant or sponsor company is able to restrict its financial risks to its contribution in equity of the project company.
Debande Olivier Private financing of infrastructure. An application to public transport infrastructure	A special purpose company, called “the project company” is set up to realize the infrastructure; the assets of the company reverting to the government at the end of the contract. This project company is liable for the contractual agreement with the private contractors and the lenders.
Investopedia http://www.investopedia.com/terms/s/spv.asp	A corporation that use a vehicle to finance a large project without putting the entire firm at risk.

Therefore, it can be understood from various definitions that, Special Purpose Vehicle (SPV) is usually set up by private sponsors(s) for PPP project financing. It is a legal entity where many parties join together, facilitates the allocation and diversification of risks and financing requirements. SPV undertakes the project and therefore all contractual agreements between the various parties will be negotiated between themselves and the SPV. Thus the special purposes of this entity commonly are - raising finance, construction and management of project, allocating risks to parties that are best positioned to address, operate the project and collect the generated cash flow. In addition to it, SPV permits identifiable streams of inflows and outflows for securitization, minimum tax liability and high leverage. In the event of default, sponsors are not directly responsible to financial institutions as

SPV is the formal borrower under all loan documents. It is the entity which signs a contract with the government.

According to Sapte (1997), SPV has no or limited workforce, needs to ensure that it performs its obligations under the concession agreement by effectively sub-contracting those obligations to third parties. The principal contracting parties is construction contractor and operator of the project facilities. SPV needs to ensure that it has adequate supply contract which generally introduce some degree of price stability and certainty of supply thus reduce risk of the project. Figure 2.5 depicts a typical contractual structure for a PPP project.

Figure 2.5 Typical Contractual Structure for PPP Project
(Adapted from Sapte, 1997)

The supply and off-take contracts are the two most essential agreements which have immense influence in financiability on investment as well as risk exposure of a project.

2.2.5 Project Financing Instruments/ Sources of Capital

Equity: It is a long term capital provided in exchange of shares, representing part ownership of the company or project. It is provided primarily by sponsors and minority investors. Equity holders receive dividends and capital gains (or losses), which are based on net earnings. Equity holders take risks (dividends are not paid if the company makes losses), but in return share in profits. Equity may be in the form of common stock or preferred stock. One of two types of stock an investor may purchase in a company. Most stock is common stock. Investors who purchase it have voting rights at the company's annual stockholders' meeting. Common Stockholders are not guaranteed dividends, but they may receive higher dividends during the company's prosperous periods. If a company fails or liquidates, common stockholders are paid after bondholders and preferred stockholders. Where the equity investment is not sufficient to support the proposed borrowing, guarantees of the project debt is then necessary.

Commercial Loans/Debt: Funds lent primarily by commercial banks and other financial institutions, generally securitized by the project's underlying assets. Lenders seek: (1) projected cash flows that can finance debt repayment with a safety margin; (2) enough of an equity stake from sponsors to demonstrate commitment; (3) limited recourse to sponsors in the event of specified problems, such as cost overruns; and (4) covenants to ensure approved usage of funds and management of the project.

This is also termed as senior debt. Commercial loan/debt financing is cheaper compared to equity. Figure 2.6 shows the risk and return of various sources of capital. Senior debt has the least risk as well as lowest rate of return.

Figure 2.6 Claims to Assets
(Adapted from Public Private Partnerships-A Financier's Perspective, UN ESCAP)

It is also true, senior debt holders have prior claim to revenue and assets in the event of default. In general senior debt to a project is syndicated to a number of commercial banks.

Quasi-debt/equity: This financial instrument has the trait of both equity and debt. Quasi instruments can include subordinated debt, mezzanine and yield based preferred shares (UN ESCAP). This instrument is quite attractive due to less cost of capital, requires less covenants than traditional debt financing and does not require to relinquish any control or voting rights as it were to issue common shares.

Subordinated Debt: It takes priority over equity in repayment but secondary to senior debt (commercial loans) in their claim to assets. Since it takes higher risk than senior debt, the rate of return (risk premium) is therefore higher.

Mezzanine Finance: A kind of financial instruments similar to quasi debt/equity that are primarily in the form of debt but also share some qualities of equity capital. It occupies an intermediate position between debt and common equity. Mezzanine finance includes convertible bonds and preferred stock. Like subordinated debt, the risks in a project taken by mezzanine providers are greater than those taken by lenders of senior debt and required returns of mezzanine providers are higher (Sapte, 1997).

Bonds: It is a long term interest bearing debt instrument. These debt securities are generally purchased by institutional investors through public markets, although the private placement of bonds is becoming more common. The instruments are pension funds, insurance funds and fund managers. Institutional investors are usually risk-averse, preferring projects with an independent credit rating. Purchasers require a high level of confidence in the project (for example, strong sponsors, contractual arrangements, and country environment); this is still a relatively new market in developing countries. The main advantages of bond financing over bank loans are that they can reach a wider group of investors and therefore usually achieve a lower interest cost margin and longer maturity. Documentation also requires fewer covenants, so there is less negotiation with lenders and a faster conclusion.

Supplier Credit: Long-term loans provided by project equipment suppliers to cover purchase of their equipment by the project company. This is particularly important in projects with significant capital equipment. It is also a source of financing provided by the supplier for short term periods usually 10, 30 or 90 days (UN ESCAP).

From the above discussion, it is clear that equity is the major concern of all financial instruments. This is the relevant variable that concerns with both public and private sector. Three major parties are concerned with this equity level; equity holder (the shareholders of the project), lenders (banks, financial institutions etc.), and the government (who privatized the project and might provide guarantee or other types of support to the project). The second most important financial instrument is debt. Therefore, equity to debt ratio is vital issue in project financing. The capital structure in most BOT projects is highly leveraged (i.e. debt to equity ratio is very high). Equity financing typically covers only 10-30% of the total project costs, while debt financing is obtained for the remaining 70-90%..

1996).

2.2.6 Categorization of Project Finance by Debt agreement

There are two basic types of project finance: non-recourse finance and limited recourse project finance.

- Non-recourse project finance is an agreement where lenders look solely to the cash flows of a project to repay debt service. Lenders have no recourse against the participants in the sponsoring consortium; instead they must rely on the revenue generated by the project as the source of loan repayment. Non-recourse structures are used where the project is clearly capable of supporting debt, even under adverse scenarios. It is a pure project financing. Repayment of Loan (interest & principal) depends on project performance operation. Lenders get property right of project assets as collateral. If project fails, lenders have no recourse to the sponsor of the project.
- On the other side, limited recourse project finance permits creditors and investors some recourse to the sponsor. Lenders look mainly to the cash flows of the project to repay debt service but where, under certain conditions lenders may also have access to the sponsors' credit or legal security for repayment. In such situation, lenders require a third party guarantee to the loan. The lender has recourse to the third party guarantor. But the guarantor is only liable to the amount of guarantee. This type is most widely used in project financing. Figure 2.7 shows the structure of limited recourse of financing below;

Figure 2.7 Limited Recourse Structure
(Adapted from Khan and Parra, 2003)

Project financing depends on the financial strength of the project itself. It requires the establishment of a dedicated entity. Funding is raised by the entity through equity from the sponsors and from loans dedicated to the project. Financing is usually made non-recourse to the sponsors; reimbursement of the loans comes only from the cash flow generated by the project and no guarantees are provided to the lenders by the sponsors. During the construction phase, the banks will generally have some recourse on the sponsors if the project is never completed. During the operation period, the revenue stream will normally be subject to a Purchase Agreement which may be guaranteed by sovereign governments if the utilities' financial strength is not sufficient. Project financing requires equity funding,

generally 20-40% of total investment. Debt is not included in the balance sheet of the sponsors. Interest rates required by the lenders, however, tend to be higher than in a corporate financing framework. In developing countries, public utilities, generally not rated by agencies and often highly indebted, may have difficulty accessing the international capital markets to finance large infrastructure projects. Moreover, a dedicated entity will usually be created when an infrastructure project (such as an interconnection project) is too large for a single country, but is relevant to a whole region.

The participant or sponsor companies, moreover, may not be interested in integrating the project specific risks into their firm's overall risk. As a result, project financing is widely used in developing countries. Project financing offers an interesting alternative for a large infrastructure project, as the funding is based on the strength of the cash flows of the project. A specific entity is created to undertake the project with limited or no recourse to the underlying balance sheets of the participant and sponsor companies. Each participant or sponsor company is able to restrict its financial risks to its contribution in equity of the project company.

2.3 Private Flows in Project Finance

Acceptance of private participation in the provision of basic infrastructure is growing all across the world. The trend has given rise to a form of public-private partnership that is highly emerging in today's project financing. The limitation of the public funds available for infrastructure leads government to invite private sector entities to enter into long-term contractual agreements for project financing, construction and/or operation of capital intensive projects. On the other side, there are continuous demands to offer better public services at a lower cost within the context of an overall environment tend to encourage public sector to pursue public-private partnership (P3s). The main idea is to achieve better "value for money" from the taxpayers. Thus Public-private partnership shift government from being the owners and operators of assets to paying the private sector for services or the use of assets. The partnerships are typically characterized by Finlayson (2002) as follows:

- Shared authority and responsibility;
- Shared liabilities and risks;

- Joint investment; and
- Shared reward / mutual benefit.

The private sector is generally involved in some combination of designing, financing, building and operating the assets rather than just being involved in contract to build the assets. The purposes of P3s arrangements are lying not only borrowing money from private sector but also for the following emerging issues:

- Private sector is believed to be more efficient and innovative in undertaking the design, construction, operation and maintenance of assets over the life of a contract.
- Partnering allows focusing on their (public and private sector) respective responsibilities and strength
- Private participants' financial stake in the project guarantees their commitment to economic efficiency, as on the other side government's role serves to protect the public interest.

Table 2.2 Investment in private participation projects in developing countries

Total Investment in Infrastructure Projects with Private Participation in Developing countries by sector, region and Year 1990-1999

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Sector										
Telecommunication	6.7	13.3	8.1	11.0	19.6	24.0	29.9	42.8	54.3	39.2
Energy	1.6	1.2	1.2	14.6	17.0	24.1	33.7	47.9	25.7	14.9
Transport	8.0	3.1	4.2	7.7	8.2	10.1	16.5	22.4	17.6	8.4
Water and Sanitation	--	0.1	1.9	7.5	0.7	1.7	2.2	8.9	2.6	5.9
Region										
East Asia and Pacific	2.6	4.1	8.9	16.2	17.7	23.4	33.4	38.8	9.5	14.1
Europe and Central Asia	0.1	0.3	1.3	1.5	3.9	8.6	11.6	15.1	11.5	8.7
Latin America and The Caribbean	13.2	12.6	15.8	18.5	18.9	19.4	28.8	51.1	71.0	36.3
Middle East and North Africa	0.0*	--	0.0	3.4	0.3	0.1	0.4	5.3	3.5	2.4
South Asia	0.3	0.8	0.1	1.3	4.0	7.6	6.1	7.1	2.3	4.0
Sub-Saharan Africa	0.1	--	0.1	0.0	0.7	0.8	2.1	4.5	2.4	2.9
Total	16.3	17.8	26.1	40.9	45.5	59.9	82.3	121.9	100.2	68.5

-- None.

*0.0 means zero or less than half the unit shown. Data may not show the sum of totals because of rounding.

Source: Izaguirre and Rao, 2000. PPI Project Database.

The pressing need for more investment in public infrastructure coupled with constrained government financial resources promotes partnership with private sector. On the other side, private sector needs to emerge in public sector. In quest of partnership between Public and Private sector, a clearer idea is summarized in Figure 2.8.

Figure 2.8 Public-Private Partnerships

Therefore private sector involvements can attribute to:

- More rapid project implementation through access to additional manpower and expertise
- Removal of financial constraints through access to private finance
- Removal of technical constraints through access to wider expertise & technologies
- Transfer of risk to the private sector based on their expertise and experience
- PPP allows government to capitalize on the private sector's capacity for innovation and efficiency.
- PPP provides a mechanism for meeting, in part, the insatiable demand for infrastructure despite tight budget constraints.

In support of Public-private partnership, several generic contractual arrangements have been developed particularly in emerging market countries. The public-private partnership can be developed under various organizational structures, such as build-operate-transfer (BOT), build-own-operate-transfer (BOOT), design-build-finance-

operate (DBFO) etc. These Public-Private Partnership (PPP) arrangements are meant to provide a greater leadership role for the private sector in the delivery of public infrastructure through more closely integrated delivery processes which expand the range of services offered by the private sector. Of all these above methods, Build-Operate-Transfer (BOT) is the most popular approach. A BOT project can be described as a project based on a concession that is usually granted by a public client to a consortium, the concessionaire, who is required to “build” the project with its own financial arrangements, “operate” the project during concession period and “transfer” the facilities in an operational condition and usually at no cost to the client at the end of concession period. A very clear idea on roles, skill requirements, risks and involvement of private sector can be best summarized in Figures 2.9 and 2.10.

Figure 2.9 PPP Schemes

Figure 2.10 Spectrum of PPP Model

2.4 Project Risks and Financing Strategies

According to UN ESCAP Public Private Partnerships – A financier’s Perspective:

“Risk is a concept that is used to express concerns about the probable effects of an uncertain environment and can be characterized by its probability of occurring and the magnitude, or effect, it would have on expected returns or outcomes should it occur. “

Public Private Partnership projects involve a plethora of risks. A key aspect of PPP structure is its ability to help transferring risks to parties that is best suited to manage or minimize it. There is a miss-concept as to think that, in PPP the public sector transfers all risks to private sector traditionally borne by Government. Actually this is not the case. Risks are properly allocated and distributed to parties who are experts in their specific fields on mitigating risks. Un-identification and improper allocation of risks to parties bring frustration, even breach of contracts. There are many risks that need to be borne by the Government in PPP projects. Thus risk sharing is the other distinguishing characteristic of PPP; the success depends on the appropriate allocation of risks. Project risks therefore need to be

identified very carefully and allocate to parties who are in best position to manage it at lowest possible cost. Risk has price and each party in PPP project have different perspective and different approach to assess risks. Furthermore, each party make a price for their services taking into account a profit to compensate by bearing such risk. Identification and assessment of risk is not an easy task as risk is interrelated. One identified risk not only affects the project but also may have impact on another risk factor. Figure 2.11 shows some common risks in a project.

Figure 2.11 Risks in a Project

(Adapted from UN ESCAP Public Private Partnerships – A Financier’s Perspective)

There are various parties involved who are experts and guarantee against risks that arises in project financing. It is of high importance that the risks are carefully identified and allocated to parties best able to manage it. According to Gherzi and Sabal (2006), risks are of two types; (1) Symmetrical risks and (2) Asymmetrical risks. Table 2.3 gives a brief description of these two categories of risks.

Table 2.3 Type of risks and issues

Type of Risk	Risk	Key issues
Symmetrical Risk (tends to reflect a probabilistic profit structure that is more or	Construction Risk	Cost overrun, delay and quality. In emerging market, contractors lack required financial strength. Therefore, their responsibility tends to be limited to a certain percentage of the project value (e.g. 20%). Similarly EPC contractor does not

Table 2.3 Continued

Type of Risk	Risk	Key issues
less balanced around the mean)		guarantee the debt. A sizable portion of risk is borne by sponsors.
	Business Risk	Unexpected demand fluctuation, cost escalation etc. In principle, this risk is borne by shareholders. However, debt-holders retain this risk in exchange for large collateral. In practice, this risk is transferred through off-take and supply agreement to parties who usually have better credit rating than that of the project.
	Macroeconomic Risk	Falls into three categories (1) Foreign Exchange (2) Inflation and (3) Interest rate. To protect against fluctuations in currency exchange sponsors may require by the lenders to enter into hedging contracts such as swap. Interest rate cap and interest rate swap contracts are two types of hedging instrument for combating interest rate volatility. Like interest rate swap, currency swap allows two parties to exchange payments on specific dates at predetermined rates.
Asymmetrical Risk (tends to cause bimodal behavior in the results)	Political Risk	Unexpected government intervention (e.g Confiscation, Expropriation, Nationalization and Deprivation CEND), legal changes and unsupported government actions fall into this category. ECA and multilateral banks participation ameliorate political risks. Other practices are like incorporating local partners, bringing certain contracts associated with project to jurisdiction of

Table 2.3 Continued

Type of Risk	Risk	Key issues
		courts etc.
	Breach of Contract	This type of risk has direct impact on the capitalization of a project.
	Environmental Risk	It is related to political risk as they are related to regulations about environment. Projects like water and sanitation, mining are prone to this issue. Some standards such as WHO, ISO need to be followed to overcome this risk.
	Force Majeure	It excuses performance by parties when confronted by unanticipated events outside their control. Despite excusing a project, force majeure may lead to default depending on severity of mishap. Discrete events due to nature such as war, earthquake, cyclone, flood etc. Also due to man-made disaster such as strike, fire, riot etc. Insurance, third party guarantee and force majeure clause in contract plays vital role in this issue. Force majeure if unallocated away from project, causes BBB+ or below rating grade. Rating grades can be improved by having business interruption and property casualty insurance (S&P Handout).

Different researchers have identified the risks of PPP infrastructure projects at different perspective. Some have classified these risks according to various stages of PPP project, some classify as global and elemental risks as well. Risks may also be categorized into technical, economical and political perspective. Grimsey and Lewis (2002) stated that political, legal environmental and commercial risks are

global whereas construction, operation, finance and revenue generation constitute elemental risks. According to them an infrastructure faces at least nine risks. These are:

- Technical risk: due to engineering and design failures;
- Construction risk: because of default in construction techniques, cost overruns and delay;
- Operation risk: As of higher operating cost and maintenance;
- Revenue risk: Failure to extract resources, the fluctuation of prices and demand of product and services;
- Financial risk: Arises due to inadequate financial cost and hedging of revenue streams;
- Force Majeure risk: Act of God, war and natural disasters;
- Regulatory/ Political risk: Legal changes and indifferent government support;
- Environmental risk: Hazard and adverse impacts of environment;
- Project default: failure of the project due to combination of any of the above;

In construction phase, project is much more exposed to various risks than in operational phase. Lam (1999) has found that many risks appeared at the later part of construction stage and early part of operational stage where interest costs start to roll over. Yeo and Tiong (2000) stated that in operational phases, the maintenance agreements related to tariff rates, guarantees, regulations etc is exposed to great uncertainties. According to Tam and Leung (1999), technical risk is easiest to manage, financial risk is harder but is still manageable and political risk is the most difficult to handle. The condition of all these risks could be high or low. Schaufelberger and Wipadapisut (2003) from their extensive analysis on thirteen BOT projects suggested that construction and operation risks are mitigated by contracting out the responsibilities and by using advanced well proven technology. But for other risks sponsors may select appropriate financing strategies from the Table 2.4.

Table 2.4 Risk condition and financing strategies

Risk Conditions	Financing Strategies
Low Risk	Use high debt-to-equity ratio for maximum leverage and maximum return on invested equity
	Establish minimum contingency credit facilities to minimize financing costs
	Use capital markets to procure debt financing to reduce interest costs
	Procure long-term financing early to reduce financing costs
High Political Risk	Involve international firms or organizations to create leverage with local government authorities
	Seek assistance from influential individuals or organizations who have rapport with local government authorities
	Seek local government support and guarantees
	Procure insurance from government organizations such as the Overseas Private Investment Corporation
	Establish contingency credit facilities to cover unanticipated expenses
High Financial Risk	Obtain loans from international lending institutions
	Use fixed-rate or standardized-rate debt financing
	Denominate loans in local currency
	Structure debt financing in the same currencies as anticipated revenues
High Market Risk	Finance early phases with equity and temporary loans and refinance during the operation phase with lower-cost long-term debt
	Structure the debt repayment schedule to start low and escalate during the initial years of operation
	Negotiate contract terms that allow increases in user fees
	Establish a contingency credit facility to cover

Table 2.4 Continued

Risk Conditions	Financing Strategies
	unanticipated revenue shortfalls
	Restructure debt, if necessary, to solve cash flow problems during the concession period

Risk mitigation helps parties to take appropriate actions (1) to reduce likelihood of risk materializing and (2) to reduce the consequences of event. Therefore, it is understood that precise risk estimation and allocation to parties for mitigation is of immense importance, and it plays an important part in the cost of financing and thus for the success of PPP infrastructure projects.

2.5 Government Support and Guarantees

From the name Public-Private Partnerships (PPP) it is understood that Public sector i.e. Government is one of the major parties in PPP. Though it is theoretically believed that PPP should be entirely self supporting with no recourse or guarantees from the public or private sponsors, practical guarantees are still sometimes necessary. Private sector invests only in those projects from which they can gain profit i.e. financially sound. There are projects where economic benefits are more than financial gains. Governments are especially interested to invest into these projects. In order to attract private sectors to these projects governments need to give some support and guarantees to the private sector so that debt service obligations are made, smooth operation for revenue generation is ensured (i.e. no change in law and regulations). Private sector may also request Government guarantees against market or commercial risk. It is essential for the Government to appreciate that in order for most PPP infrastructure projects to succeed, they must shoulder certain risks such as political risk guarantee, underwriting minimum toll levels and protection against certain events of force majeure. According to Kumaraswamy and Zhang (2001), followings are the various types of guarantees that Government provides to promote private participation into PPP infrastructure projects;

- Minimum revenue stream guarantee
- Foreign exchange rate guarantee

- Repatriation of revenues
- Guarantees against high inflation and interest rate
- Government compensation in case of change in monetary laws or new regulations affecting investment
- Extension of concession period
- Emergency loan facility
- Tariff/toll adjustment mechanism
- Guarantees of raw material supply and
- Guarantees of output purchase (off-take)

According to World Bank Toolkit for Concession, Government supports are of two types. (1) Direct or indirect financial support and (2) Securities and remedies allowed to lenders and investors before termination of concession. Table 2.5 shows the common financial support provided by Government in infrastructure projects.

Table 2.5 Common government support

▪ Direct financial contribution such as grants, loans, equity participation and asset transfer
▪ Exemption from or reduction of taxes, royalties and other levies and duties
▪ Complementary investment
▪ A period of exclusivity
▪ Adoption of necessary legislation and issuance of appropriate approvals and consents for the implementation and operation of project
▪ Guarantees of Supply and Off-take agreement
▪ Exemption from restriction on the import and export of all necessary plants and equipment
▪ Guarantee of convertibility and transferability of local currency earning
▪ Right to keep foreign currency sales proceeds offshore
▪ Compensation if new planning or environmental laws detrimental to the profitability of the project are adopted
▪ A guarantee that the project development and operational plans will not be changed without prior consent of the sponsors

Source: Freshfields (1995)

For second type of support, lenders or sponsors may require to take step in rights to cure faults or remedial actions before cessation of concession.

One of the interesting things is that, guarantees do not add any cost to a project and can be as simple as assurance, such as no change in tax, no second facility and so on. However, the guarantee is not without cost to a Government. It makes contingent liabilities which require careful selection, monitoring, accounting and provisions for budget to meet future guarantee calls. In PPP infrastructure projects, some risks are still left to Government whereas Government always prefers to pass as many risks as possible to private parties. Tiong (1996) has emphasized this issue by stating that government prefers to pass more risks to the promoter that promoter can properly handle. According to Khan and Parra (2003), risks and Government guarantee mechanism are shown in Table 2.6.

Table 2.6 Government supports mechanism

Risks	Government Guarantees
Breach of Contractual Obligation	Off-take agreement and Major supply agreement
Policy/Political Risks	Currency convertibility and transferability. Change of laws that are prejudicial to the project
Interest Rate Shifts	Tariff reopener to cover a significant shift in interest rates prior to financial close
Market Risks	Specify quantity to be bought and price to be paid through off-take agreement
Price/Exchange Levels	Indexing the tariff under the change of inflation or exchange risk
Debt Repayment	Debt guarantees or portions of debt usually through Partial Risk Guarantee (PRG) or Partial Credit Guarantee (PCG).

The most widely used major guarantees against revenue risk are off-take and supply agreement. Revenue risk includes demand and price risk. The concession period of any PPP infrastructure project is normally ten to fifteen years and more. It is very complex and needs meticulous care for analyzing demand and price upfront. Supply and off-take contracts are of central importance in this aspect. In order to reduce price risk, sponsors as well as lenders carefully examine supply contract with the SPV. Major considerations are length of supply, availability, creditworthiness and whether the supplies are the major component of the product produced. It is possible to link the price of supply to the price the SPV receives for its product (i.e. from off-taker). Two widely used supply contracts are 'Supply and Pay' and 'Supply or Pay'. 'Supply or Pay' contract not only ensure feedstock but also establishes the cost to the SPV of its major raw material over a long period, usually by indexing the purchase price to relevant basket of commodities where there is no recognized market price (Sapte 1997).

Likewise supply agreement, off-take agreement reduces price risk. Moreover, it reduces the demand risk as well. Two widely used off-take agreements are "Take or Pay" and "Take and Pay". It is also noted that 'Take or Pay' arrangements are of many shades of gray and do not impose a straight forward obligation for a utility to buy full quantity of product. Minimum revenue can be guaranteed and the remaining part of risk may rest with the project. In many situations, state or state own enterprise is the off-taker from SPV. The price may be controlled by concession terms or by law establishing the framework for the industry. The investors and lenders are therefore required to understand existing legal framework and pricing structure so that they may take necessary measures against legislative changes and political risk. Government guarantee should only be used where Government has full control such as expropriation, nationalization, confiscation and so on. Government guarantee is also sought against state owned enterprise or state agency where it is the off-taker of a project. This is pointed out by Tiong and Alum (1997) on the creditworthiness of the guarantor. In most cases, the condition of state owned agencies are financially unsound and credit standing position on guarantees about off-take agreement do not add any value to the project.

Government therefore requires providing counter guarantee and backstop payment obligations in such cases.

Thus, clear and unambiguous statements of government support and guarantee provides increased level of comfort to the potential investors.

2.6 Capital Structures and Financial Viability Indicators

The capital structure of public-private infrastructure project can be defined in four dimensions as (Zhang, 2005):

- Types of financial instruments (equity, debt and mezzanine finance)
- Relative amount of different financial instruments
- The sources of financial instruments (international financial institutions, commercial banks)
- The corresponding contractual conditions on these financial instruments.

All these affect the total project cost and subsequently financial viability of the project. It is found that the equity holders and lenders have different perception on the equity level. The cost of equity is always higher than that of debt as equity holders normally expect a rate of return to their equity that is higher than the interest rate of debt. A lower level of equity reduces the total cost of the project, contrary to increasing the risks and higher interest rate imposed by the lenders too. In such case banks may not be interested to finance on this project or may charge high risk premium. There is a significant difference in the investment perception between lenders and sponsors. Lenders major concern is the downside risk whereas sponsors' upside gain.

The sources of finance are also an important factor in view of financing by the participating partners. The involvement of international institutions increase the confidence level of local commercial banks and may consequently reduces the interest rate of debt. These international institutions are Export credit agencies and multi-lateral banks such as World Bank, Area development Bank (ADB, IADB etc) etc. The same is applicable if government involvement takes place. This is a crux of

reducing, relaxing various issues that are complex and cause hindrances to successful project financing. For example, the project which is not financially viable but of significant economic value and political and environmental objectives, the government supports and guarantees make that project financially viable. Government can support by foreign exchange guarantee, arrangement against high inflation and interest rates, tax reduction and tax-holidays, government equity, new regulation favorable to specific project etc.

In project finance, the leverage ratio is significantly higher. This means that though sponsors have to create a certain portion of equity but major portion comes from debt. Table 2.7 shows a general idea on leverage ratio in project financing.

Table 2.7 Leverage ratios in project finance

Sector	Mean (in percent)
Transport	77.86
Waste/Water	75.00
Power	73.07
Roads	63.07
Telecoms	61.25

(Adapted from Linnan, 2004)

The financial viability of a project is crucial one from various points of views. Conservative projection of assured internally-generated cash flows must be prepared and justified by appropriate independent feasibility and engineering studies. The cash flow projection must be sufficient to service any debt contemplated, provide for cash needs, pay operating expenses, and still provide adequate cushion for contingencies. Assumptions used in the feasibility study must be realistic. Models should be prepared; matrices of result should be produced using different assumptions. Worst case scenarios must be considered and contingency plans should be prepared accordingly. According to Sapte (1997), financial viability is checked by (1) Importance of cash flow, (2) Project forecast and (3) Currency convertibility. Cash flow is the life blood of any project financings. It tests whether cash generated by the project meets all design and construction cost, operating expenses, debt services, taxes, royalties, all professional fees and other costs associated with a project. Bankers as well as lenders also seek 'banking case' or

‘base case’ by preparing financial cash flow forecast. There are lots of assumptions incorporated (e.g. inflation, currency exchange rate, taxation, rate of tariff, construction time, depreciation schedule etc.). These assumptions need to be precise to overcome heated debate among stakeholders as to correct assumption to be used (lenders insist too conservative assumptions). Since these infrastructures have life of fifteen or twenty years or more, it is thus inevitable that errors in forecasting will occur. A number of commonly used ratios are used for this purpose such as Debt service ratio, projected debt service coverage ratio, loan life cover ratio to measure the financial health of an infrastructure. Last but not the least, the third financial viability indicator is currency convertibility (Sapte, 1997). These include foreign currency availability, convertibility and transferability by the host government with the assurance that they will repatriate dividends and capital. Lenders and investors seek project specific foreign exchange guarantee in this issue.

2.7 Network theory

In this part, network theory and its basics are considered for analyzing PPP structure and its stakeholders. Recent advancement of the network theory and its analysis in physics, biology and social science has drawn considerable attention in engineering, computer science, genetic science, mathematics and management (Suh et al., 2008). Network analysis (social network theory) is the study of how the social structure of relationships around a person, group or organization affects beliefs or behaviors. The theory is enormously helpful to the understanding of relationships and the design of many to many marketing (Gummesson, 2007).

The theory provides a powerful tool for the representation and analysis of complex PPP structures and their interacting stakeholders. The significance of using the network theory on a PPP structure helps –

1. to identify most important stakeholder in a PPP structure
2. to recognize systematically which stakeholders are participating in a specific agreement and how many agreements a stakeholder is involved

3. to Classify how many stakeholders are involved in an agreement and the prominent stakeholders in those agreements; and
4. to analyze the structural constraints and opportunity that a stakeholder faces as well as to understand the role a stakeholder plays in PPP structure

A network is set based on the relationships, contains a set of objects (nodes) and a mapping or description of relations between the objects or nodes (Kadushin, 2004). The main focus is on the relationship between people instead of on the characteristics of people. These relationships may comprise the feelings people have for each other, the exchange of information, or more tangible exchanges such as goods and money.

The simplest network contains two objects (e.g. 1 and 2) and one relationship (e.g. 1 and 2 might be standing in a same room) that links them. The relationship could be directional such as 1 likes 2. There can be multiplex relationship (i.e. more than one). For example 1 and 2 are in the same room and both like each other. Figure 2.12 shows the graphical representation of networks. The network theory helps map out relationships between people, thus identify the opinion leader. An opinion leader is the potential person who holds the core position and many people are linked with him/her in the network.

Figure 2.12 Simple Network Diagrams

The growth of a business depends on identifying the opinion leader and his/her help in communication strategy. In a network, nodes are represented by the circles and

the lines that connect them represent the edges. In Figure 2.13, 1,2,3,4.... etc. all are actors/nodes and the lines between them are termed edges. It is observed that 5 is the most important node because he has many links to other node members, thus residing in the core position in the social network. 5 can help to get the business or personal contacts one needs.

Figure2.13 A Basic Social Network
Source: Baines and Hale (2004)

When each of the edges between two nodes of a network has a specific value assigned to it, the network is termed a weighted network. An example of this type of networks can be cities and their distances between them (Diaz, 2008). Figure 2.14 shows an example of unweighted and weighted networks. In this research, for the sake of simplicity, simple, undirected and unweighted network is used to analyse PPP structures. Weighted network requires weighing of various PPP agreements in terms of criticality/importance from the response data, which is quite difficult to achieve and the process is also complex.

When the nodes of a network are divided into two sets so that no edge connects two nodes in the same set, the network is defined as bipartite (two mode) network and can be represented by bipartite graph. A bipartite graph is very useful in representing two-mode networks (Ohn et al., 2006). Two-mode networks have been studied in a wide variety of context such as movie actors (Watts and Strogatz, 1998;

Newman et al., 2001), financial networks (Caldarelli et al., 2004; Dahui et al., 2005; Young-Choon, 1998) and management science (Kogut et al., 2006).

Figure2.14 Type of Network

2.7.2 Bipartite graph

In social science literature, the bipartite graph is called a collaboration network. In Figure 2.15, there are two sets of nodes, one representing a set of actors and the other a set of collaboration acts. An edge is a connection between an actor and a collaboration act in which the actor participates. According to Ohkubo et al., (2005) the actors participating in a common collaboration act relate to each other through that act.

Figure2.15 Bipartite Graph (Collaboration Network)
Source: Ohkubo et al. (2005)

The following examples show the bi-partite graph, matrix notation, and network diagram.

Figure 2.16 Bipartite Graph of People and Movies

$B_{ij} = 1$ if node i from the first group links to node j from the second group
 $= 0$ otherwise.

B is usually not a square matrix. Now, in matrix notation,

$$B = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{pmatrix} \dots\dots\dots(i)$$

i and k are linked if they both link to j

If B is an $n \times m$ matrix, B^T is an $m \times n$ matrix

$$B^T = \begin{pmatrix} 1 & 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 \end{pmatrix} \dots\dots\dots(ii)$$

$$A_{ik} = B_{jk} B_{kj}$$

$$A = B B^T$$

Therefore,

$$A = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} 1 & 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 & 0 \\ 1 & 1 & 2 & 2 & 0 \\ 1 & 1 & 2 & 4 & 1 \\ 0 & 0 & 0 & 1 & 1 \end{pmatrix} \dots\dots\dots(i) \times (ii)$$

Assume the nodes in group 1 in Figure 2.16 are people and the nodes in group 2 are movies. Thus, the diagonal entries of A give the number of movies each person has seen. The off-diagonal elements of A give the number of movies that both people have seen. Thus, the matrix helps to explain the properties of each actor/stakeholder of bipartite graph/collaboration network. In addition to that, by inputting the components of matrix A into the datasheet of UCINET 6.0 (for windows) helps to visualize the network diagram with NetDraw.

Figure 2.17 Network Diagram of People and Movies

Thus, the network diagram by NetDraw shows the relationships among people. It shows that 2 movies are common between 3 and 4. It also describes that, there are no relation among 1 and 5, 2 and 5, and 3 and 5 because no common movies exist among them.

2.7.2 Properties of Centrality

The primary use of graph theory in network analysis is to identify the ‘important’ actors (here, the stakeholders of PPP). This is done by centrality measurement. It measures involvement of actor/stakeholder in many relations to other actors/stakeholders. Freeman (1979) states that one of the main focuses of the network theory is to measure the centrality of actors and events through three widely used measures - (1) node degree centrality, (2) node closeness centrality, and (3) node betweenness centrality.

Measure of node degree centrality helps to identify the actor/node that has the most ties to other actors/nodes in a network. Node closeness centrality measures how close a actor/node is to all the other actors/nodes. In this case, the actor is connected to many actors in the network, but those actors have few connections among them. High betweenness means that other actors/nodes depend on this actor/node to communicate with each other and the actor/node might have some control over the network (i.e. broker role into power). Each of the three approaches describes the locations of individuals in terms of how close they are to the center of action in a network (Hanneman and Riddle, 2005). And, the power arises from occupying advantageous positions (i.e. high degree, high closeness, and high betweenness) in networks of relations. More information on the background of network theory and

its basic understanding can be found in the cited references such as Introduction to social network by Kadushin C. (2004), Research and network theory by Gummesson E. (2007), Introduction to social network methods by Hanneman and Riddle (2005), and Analysis of Bipartite Network by Diaz (2008).

2.8 Deficiencies in previous studies and the need for studying SPV of IPP projects

Thus, the previous sections narrate the literature reviews to understand the researches that are done and relevant to the topic. Many journals, books, academic papers, guidelines by various institutions, reports and publications on PPP are collected and digested to improve the researcher's understanding and significance of this research. It is found that PPP for the provision of public service in different sectors has been extensively used by the governments around the World. Examples are – water service, waste water management, transportation, health care, education, power and energy and so on. Many researches have been carried out to investigate the issues evolving PPP. Some of these are – procurement, partnerships, critical success factors, risks, government support mechanism, and value for money assessment and so on. Many case studies of PPP projects in different countries have been evaluated by researchers. Some of these are as follows –

PPP for London Underground (Transport for London, 2003)

PPP in healthcare provision in Singapore (Lim, 2003)

PPP in water supply and sanitation in the Republic of Yemen (Sahooly, 2003)

PPP in housing delivery in Kolkata, India (Sengupta, 2005)

BOT Tunnel projects in Hong Kong (Zhang and Kumaraswamy. 2001)

Promoting PPP in Bangkok Mass Rapid Transit and Other Infrastructure (ADB, 2007)

BOT of Taiwan High Speed Rail (Chang and Chen, 2001)

The Eurotunnel Project (Finnerty, 2003)

BOT of Centragas, Colombia (Davis, 2003)

PPP for school provision in UK (Goodliffe, 2002)

BOT for Izmit domestic and Industrial water supply BOT project in Turkey (Senturk et al., 2004)

PPP in Taiwan's Wastewater Treatment Sector (Zhang and Tiong 2010)

For partnerships in PPP, Mitchell (1990) has identified two forms of partnerships of PPP: hard partnership and soft partnership. Hard partnership reflects emphasis on contractual agreements among various parties whereas soft partnership highlights stress on trust, understanding and communication between private and public sectors. Reijniers (1994) stated partnership of PPP as effect of synergy through collaboration and cooperation between the public and private sectors. Grant (1996) has identified the key issues to successful public private partnerships, while Brown (1996) has assessed public private partnerships of UK context. Mustafa (1999) has evaluated public private partnerships in the provision of transport infrastructure. On the other hand, Mohr and Spekman (1994) have assessed the characteristics of successful partnerships. Zhang (2005) has identified the criteria for selecting the private sector partner in public private partnerships.

Li et al. (2005) looked at critical success factors for PPP/PFI projects in the United Kingdom construction industry. Similarly, Sanvido et al. (1992) identified a checklist of critical success factors for construction projects. Zhang (2005) has identified a number of critical success factors for PPPs in infrastructure development. Tiong (1996) explored critical success factors for private contractors in competitive bidding and negotiation in BOT projects. Jefferies et al. (2002) examined on how public clients successfully manage BOOT procurement. Qiao et al. (2001) evaluated critical success factors of BOT projects in China.

Tiffin and Hall (1998) asserted that transfer of risks from the public to private sector lies at the heart of a PPP project. Akbiyikli and Eaton (2004) stated that the transfer of risks should be considered only when better value for money can be obtained by such transfer. Various risk associated in different types of PPP projects are identified in the literature and different methods of risk classification and management have been proposed by the researchers. Tiong (1996), Wang et al.

(1998), Wood (1995), Merna and Smith (1996), and Kerf et al. (1998) have done risk identification and analysis of BOT projects. Risk management for BOOT contract has been examined by Merna and Smith (1992) and Yaworsky (1994).

Many researchers have presented the PPP structure by its contractual and financial agreements between parties. Wang and Tiong (2000) described the PPP structure of the Laibin B project by its contractual agreement. Similarly, Tiong and Anderson (2003) sketched the HubCo PPP structure through contractual agreements between project participants. On the other hand, Tinsley (2000) had drawn the HubCo PPP structure by contractual and financial agreements. There are still many questions left unanswered. Examples are: What are the critical financial and legal factors for establishing SPV of IPP projects? Who are the key stakeholders? What are their roles and responsibilities? Why they are powerful? Who are the intermediaries? Who are the weak stakeholders and what are the obstacles in PPP structure of IPP projects? It is also important to find out the critical financial and legal factors for establishing SPV of IPP projects in Asia even though Chowdhury and Charoenngam (2003) have done a research in finding the legal factors that influence financing of IPP projects in Asia, Thus, the aim of this research is to study SPV of IPP projects in Asia. It is quite new in this area and this work will provide reasonable answers to many questions so long left unanswered and fill up the existing research gap.

2.9 Chapter Summary

The literature review in this chapter explains the concept of three main things- Project financing, SPV and network theory.

In project financing and SPV part it illustrates:

- The importance and growth of project financing in today's world
- Definition and basic elements of project finance
- Special Purpose Vehicle (SPV)
- The participants and their involvement
- Types of project financing and financial instruments
- Emerging demand of PPP in infrastructure projects

- The risks in the project finance and participants/guarantors to mitigate

The ultimate goal of project financing is to arrange borrowing for the project which will benefit the sponsors and at the same time be completely non-recourse to the sponsor, in no way affecting its credit standing or balance sheet. That is why project financing sometimes called off-balance sheet financing. Moreover, it should be noted that project financing is based on a project's assets or revenue stream. But in reality it rarely happens so. Of-balance sheet does not mean that the project is self supporting. Lenders are reluctant to rely solely on revenues generated by the project to service its debt, so they generally insist on backup credit support from the project's sponsors, stakeholders or third parties interested in that project.

The core concept of project finance depends on reasonable assurance of repayment. Lenders critically evaluate the cash flow that is able to repay the debt otherwise loan may not be approved. On the other side, the sponsors are much concern about the equity at risk especially long term investment and proper incentives. Degree of structure also varies on payment priorities, cash control, funding tied to milestone and dividend release conditions. Last but not the least sound regulatory and legal framework, government support, clear regulation, transparent enforceable contracts are also essential to gain trust and successful completion of project. Moreover, risk mitigation is also important to attract lenders for financing the project. The Modigliani-Miller theorem states that the cost of capital depends on the risk characteristics of a project, and not on how it is financed. However, the source of financing can influence project risks.

In the SPV of the literature review, it illustrates that SPV or Project Company obtains finance, procures, designs and constructs the facility, and operates the facility during the concession period. Thus, SPV must have or obtain access to, resources sufficient to satisfy these obligations. SPV generally includes companies with construction, operation and maintenance, input supply and off-take purchase companies that are capable enough to fulfill their obligations. The operation of the project generates revenue from off-taker who pays the SPV for delivery of the project output. The revenue generated from the operation are intended to cover

operating costs, maintenance, repayment of debt principal, interest of loans, and finally return for the stakeholders. Lenders providing financing, bear residual risk (both for non-recourse or limited recourse financing). To minimize this risk, lenders want the SPV to pass this risk to the other project participants. Each project involves some variations on the contractual structure depending on its requirements.

In network theory part it illustrates:

- Simple network
- Basic network diagram
- Type of networks, and
- Bipartite graph

There exist many stakeholder analysis methods, such as stakeholder analysis matrix, customer relationship management and so on. In stakeholder matrix it requires systematic gathering and analyzing qualitative information (Schmeer, 1999). Workshop, focus group discussion and interviews are the three common approaches of this method. The method is quite subjective and requires prudent judgment on identifying influential stakeholders and their impact assessment on a project. Customer Relationship Management (CRM) is another stakeholder analysis method which requires substantial datasets and it uses data mining technique to assess opportunity for business growth. On the other hand, network theory focuses on the importance of relationships among stakeholders. Through mapping the relationship, this method is able to identify position, power and influences of each stakeholder.

CHAPTER 3 METHODOLOGY

3.1 Introduction about Methodology

The methodology defines what to focus on, how to collect data and what would be the strategy to find the objectives that are set for the research. Research is based on reasoning (Cooper and Schindler, 2003). Reasons are obtained from detailed synthesis after analysis of data, through case studies and literature review. Data is therefore collected based on the purpose and objectives of research. Therefore, methodology selection is thought to be one of the most important and difficult parts in research. Once the problem has been clearly identified, it is then essential for a researcher to choose the appropriate strategy to meet the objectives of the research.

3.2 Research Methodology

Yin (2003) notes that there are three conditions needed to consider when considering which research strategy to use, and those are (1) type of research question posed, (2) the extent of control that an investigator has over actual behavioral events, and (3) the degree of focus on contemporary as opposed to historical events. If the intention of a study is to answer explanatory questions like ‘how’ and ‘why’, then a case study is one of the preferred research strategies (Yin 1994).

Since the research involves mostly ‘yes/no’ questions and seeks for their explanation, so the researcher thinks that case studies will be the most suitable tools to achieve the research objectives. The strength of using case study is that, it can include both quantitative and qualitative research. According to Yin (1994), case study research can include single and multiple cases and analytic generalization can be used whether the case study involves one or several cases. This research contains multiple case analyses for with a view to understand the critical financial and legal factors for establishing SPV of IPP projects in Asia; the factors that influences financing of IPP projects; and key stakeholders, their power and opportunities, weak stakeholders, and obstacles in the structure of IPP projects in Asia.

3.3 Research Design

Research design is the vital part of methodology section since it guides a plan for the study. Without a plan the research objectives will be jeopardized and control over the process to find the overall output/outcome of the study will be lost. This section explains a guideline of research framework.

The research design is divided into two categories – Qualitative and Quantitative. Quantitative research focuses on experimental or co-relational method in order to agree to the rules and predetermined sequences. By contrast, qualitative design plays an interactive, dynamic and emergent character in which the aims, strategies, data, analysis and validity are woven together in the process of study (Hammersley & Atkinson, 1995; Maxwell, 1996; Becker, 1996). Johnson (1995) suggests that technology educators "engage in research that probes for deeper understanding rather than examining surface features." He notes that qualitative methodologies are powerful tools for enhancing our understanding of teaching and learning, and that they have "gained increasing acceptance in recent years". Qualitative research, broadly defined, means "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss and Corbin, 1990). The simple difference between quantitative and qualitative research is that, quantitative research primarily answers the question 'how much' whereas qualitative research answers 'how and why'.

Whatever method is chosen, there must be enough valid reason for selection of quantitative/qualitative research. The researcher has preferred to use qualitative method mostly because of the nature of research problem. The research focuses on examining and analyzing legal and financial factors; factors that influence financing; and stakeholders' analysis. Strauss and Corbin (1990) claim that qualitative methods can be used to better understand any phenomenon about which little is yet known. They can also be used to gain new perspectives on things about which much is already known, or to gain more in-depth information that may be difficult to convey quantitatively. Thus to [attend the objectives](#), the researcher used qualitative research mostly because of the following reasons -

- Development of SPV involves structuring legal and financial framework logically which depends on government situation, market condition, stakeholders participation
- The focus is on emergent (as opposed to pre-determined) design as well as the outcomes or product of the research
- Another focus is on identifying the key stakeholders; explaining their powers, roles and responsibilities, opportunities and obstacles in PPP structure

As the objectives are to provide explanation, clarification and illustration, a qualitative research method is selected as the most appropriate (Robson, 2002). Patton (1990) points out that these are not "absolute characteristics of qualitative inquiry, but rather strategic ideals that provide a direction and a framework for developing specific designs and concrete data collection tactics". According to Patton, the design of qualitative research depends on the purpose of inquiry, the useful and credible information. There are no strict criteria for sample size (Patton, 1990).

At the same time, the research has used some quantitative tools side by side for solidifying the findings. Thus a triangulation is done (i.e. both qualitative and quantitative analysis) to reduce or eliminate disadvantages of each individual approach. Figure 3.1 shows a roadmap for conducting this research in chapter wise fashion. The detail and in-depth descriptions are given through research framework.

3.4 Methodological Framework

This section consists four parts which are (1) Factors identification, (2) Data collection, (3) Data analysis and (4) Conclusion and Recommendation. Figure 3.2 describes the research framework.

3.4.1 Factors Identification

The literature review and the identification and evaluation of various components of SPV

Figure 3.1 Road Map

(i.e. Chapter 2 and Chapter 4) provide a concept development. It also helps extracting preliminary factors that are widely used for formulating SPV in PPP infrastructure projects. Since the selections are developed based on theoretical concept, the information from the experts need to be investigated. The purpose is to confirm that those factors obtained from literature reviews and case investigations are being considered in the real practice of IPP projects during the time of SPV setup. The factors are then validated by a group of experts. This is done through the structured interviews to the experts. The objective of this step is to maximize the validity of preliminary factors that influences establishing SPV for IPP projects. Gay (1990) mentioned that interview has a number of unique advantages and disadvantages. If well conducted, it can produce in-depth data which is not possible with a questionnaire. Content validity is determined by expert judgment. Seven experts are thus selected from Thailand, India, Pakistan, Bangladesh and Taiwan who are involved in IPP projects for more than 20 years. The validation is performed by using a structured interview. The interview starts with a brief explanation of the research objectives and scope so that the selected experts can get better understanding of the study. Then, the experts are asked to react on the contents indicating whether the factors listed in the form are considered when considering setup of IPP projects. Table C1 in Appendix-C shows the result of the validation by the experts. The validated factors are the factors which four out of seven experts (Majority) agreed to consider for setting up SPV of IPP projects in Asia. The content validation by the experts is to confirm that the factors influencing development of SPV for IPP projects obtaining from the literature review and practitioners covers all the area of this study. Prior to interview, sufficient information such as the objective and purpose of the research had been sent to the interviewees. All the seven interviewees were selected based on networking of meetings, seminars and conferences (such as PFI conference in Singapore, Singapore-Commonwealth Leadership Programme on PPP, ADB conference in Thailand, Eleventh East Asia-Pacific Conference on Structural Engineering and Construction in Taiwan, PPP in Development in Malaysia, Second International Postgraduate Conference on Infrastructure and Environment in Hong Kong, International Conference on Construction and Real Estate Management in Brisbane and so on) and personal rapport (such as acquaintance with supervisor, co-supervisor, advisors etc). No probing happened

during the interview as the interviewees were subject matter experts and the questions were very specific and asked for fixed range of answers (i.e. Yes/No). The researcher feels that semi-structured interviews would be a good choice for further research to obtain the answer of “why” and to pursue more details if it is possible to get more spare times from the interviewees.

After content validation, a questionnaire survey is made to the respondents who were lawyers, consultants, academic experts, financiers, contractors or from public clients in Asia. Detail of questionnaire survey is explained in Chapter 5 section 5.3 “Questionnaire survey”.

3.4.2 Data Collection

This part explains the process of survey for gathering data to carry out research study.

First, the objectives of the survey must be clearly stated at the beginning of the survey. Why it is being done, what would the researcher get from this survey needs to be understood properly. At the same time, these issues need to be addressed in short paragraph by addressing the respondents in the questionnaire also (as shown in Appendix-D).

Second, there must be clear definition about who the target population is for this survey. For this hypothetical research the target population are PPP professionals of government/ government agencies, officials of power Project Company, the legal and financial consultants of PPP projects and so on, which is clearly mentioned in the Questionnaire (i.e. Part 1-Personal Information) in Appendix-D.

Third is the sampling frame, it must closely relates to population. It is the list from which the sample is drawn (e.g. in this research, it is the directory of Ministry of Energy and Power and lists of IPP project companies). For example, Meghnaghat Power Limited and Allied Energy Systems Haripur (AESH) of Bangladesh, Hub Power Company (HubCo) Ltd of Pakistan, Banpu Lockley China Power (BLCP) of Thailand, Tata Power and Coastal Gujarat Power Limited (CGPL) of India.

Figure 3.2 Research Framework

Fourth is the sample size; this issue is the most critical one; and we need to decide some principles which influences the sample size. These are - the dispersion of the population, desired precision, confidence correlation, and adjustment of sample size (reduce the sample size) when $n/N > .05$ for same degree of precision.

Figure 3.3 Sample Design for Research
(Adapted from Cooper and Schindler, 2003)

For this hypothetical research, the researcher used non-probability sampling technique, especially, judgmental sampling. The study is conducted only on the PPP projects professionals who have been/had running IPP infrastructure projects in Asia particularly in Thailand, Singapore, Malaysia, Taiwan, India, Pakistan, Indonesia, Vietnam and China.

It is well known that non-sampling error may affect the accuracy which is influenced by biasness on sample survey. In addition to that, by pre-testing (pilot test), the researcher has reduced non-sampling errors which allows careful test of survey questionnaire and procedure.

One of the important reasons to use non-probability sampling for this research is, it satisfactorily meets the research objectives (e.g. the perception of financing in IPP projects in Asia; setup of SPV for IPP projects etc.). The objective is not to generalize the findings to a population, rather looking for the range of conditions and the variations. And, the researcher believes, carefully controlled non-probability sampling can give acceptable results.

Fifth, survey questions must be clear, precise and brief. In other words, these should be very straight forward. Particular attention will be given while preparing the questions that fully reflect the objectives about the survey. Three types of questions are widely used (i.e. 1. Multiple questions, consisting a. Rating scale b. Agreement scale, 2. Numeric open end, and 3. Text open end). In the questionnaire, the researcher would like to use multiple questions for easement of respondents. The questionnaire is printed in color page purposefully, in order to attract the attention of the respondents. Moreover, extra attention is required as not to prepare bulk questions and many pages. The Questionnaire should not be more than 4 to 5 pages.

Finally, the researcher has disseminated the questionnaire through private correspondence to the listed respondents' office or through email. With short introduction, requested them to complete the questionnaire and post it by air-mail/email no later than a certain date. The method though bit expensive but more effective; offers the respondents to answer at their convenient time (e.g. leisure time).

3.4.3 Data Analysis and Case Study

In this part, the statistical methods that are used for data analysis is explained. According to the methodology, quantitative research (Factor analysis and Descriptive analysis) and

qualitative research (case study and network theory) are opted for conducting this research.

Nowadays, there is increasing recognition of the value and appropriateness of qualitative studies. Tesch (1991) identified three categories of approach to the analysis of qualitative data. These are (1) Language based, (2) Descriptive or Interpretive and (3) Theory building. For qualitative studies, the researcher applied descriptive or interpretive approach which attempts to develop a coherent and comprehensive view of subject material from the perspective of those who are being researched; the participants, respondents or subjects. In order to conduct qualitative research, Figure 3.4 flow diagram shows a guideline as adapted from Eisner (1991).

Figure 3.4 Flow Diagram of Input, Process and Output

In the input stage, fifteen worldwide public private partnership projects are examined. This is done to identify and evaluate the components of special purpose vehicle. In diverse situation and conditions, the research is to look at the forces governing the factors in the structure of SPV.

In the process stage, what are the governing factors to make the project sellable and self sustained, sources of fund and methods, enabling environment for PPP, contract and tariff structure, guarantees are the area to examine. Sovereign support and credit enhancement factors are further analyzed to look at the essential feedback from the stakeholders for financing strategy of special purpose vehicle. The rating agencies assessment about the project and prevailing market conditions at the time of contract agreement and financial closeout is analyzed to examine the government initiatives and options by the stakeholders for financing the project vehicle. The factors regarding legal and financial issues, sources of funds, securities and agreements, sovereign support, credit enhancement, stakeholders' role and responsibilities, power, position and obstacles in PPP structure are the focal area of analysis.

Case studies employ a variety of data collection techniques. Interviews can be used accompanied by collection of many hard documentary data. Case study yields deep but narrow results. Thus a multiple case studies are done for this research. Multiple case studies are done - (1) to identify the essential of legal and financial factors for establishing SPV of IPP projects; (2) to identify various legal issues (related to financing) that a government needs to deal with for setting up of IPP projects in Asia, and (3) stakeholders' analysis. When choosing the cases for this research, the main considerations are - these are very popular in this region; are published in various journals, books and internet; being the first in their own country; have huge impact on the economic growth to their country.

On the other side, data collected from the questionnaire survey is also measured by quantitative approach. According to Fellows and Liu (1997) the objective for using quantitative study is that the research is 'value free'; that the work is unaffected by the

beliefs and values of a Researcher. Two major questions for these aspects are (1) what is to be measured and (2) how should the measurement be made.

Therefore, after the collection of questionnaire, (i.e. essential legal and financial factors for establishing SPV of IPP projects), factor analysis and descriptive analysis are done. These analyses yield statistical evidence of correlation among the factors and their strength. Detailed of quantitative analysis is explained in Chapter 5 and Chapter 6.

In the output stage, the findings of the study are interpreted. Hoepfl (1997) suggested that a good study helps to anticipate the features, a kind of road-map or guide. This research is attempted to make a guideline to anticipate the attribute for decision making in financing on special purpose vehicle of IPP projects in Asia.

3.4.4 Conclusion and Recommendation

After conducting data analysis, this part describes the result and finding of this research. Major outputs of quantitative research i.e. what has been found out under this study are presented in Chapter 5 and Chapter 6 (i.e. Discussion of Findings part). They include major findings and themes that are raised and investigated. The findings and discussion of qualitative research is explained in Chapter 7 and 8 (i.e. Discussion of Findings part). Above all, the conclusions and recommendation of this research study is described in Chapter 9.

3.5 Chapter Summary

This chapter illustrates the roadmap for accomplishing the objectives of the research. A deterministic framework is set which inter-relates each step (i.e. from theoretical framework to output) for finding facts. The research is conducted to reveal various aspects of special purpose vehicle of IPP projects in Asia. A research framework is drawn to show how this research has been executed as well as what tools and statistical techniques are used to furnish the findings.

CHAPTER 4

STAKEHOLDERS AND THEIR CONTRACTS WITH SPV IN PPP PROJECTS

4.1 Background

In this chapter, fifteen public private partnership infrastructure projects have been studied from Asia, Australia, Mediterranean Middle East, North America and Europe to understand the development of special purpose vehicle. Table 4.1 shows the location and sector of projects that have been examined. Details of these projects information are shown in Appendix A.

Table 4.1 Selected projects and the sectors

	Location of the projects				
Sector	Asia	North America	Australia	Europe	Mediterranean Middle East
Power Generation	1. Dabhol, India 2. AES Lal Pir, 3. Pak Gen and 4. HubCo, Pakistan 5. Laibin B, China 6. Paiton 1, Indonesia				
Oil & Gas	7. Ras Laffan, Qatar	8. Hibernia, Canada			
Transport	9. BTS, Thailand			10. Euro Tunnel	
Industrial Products	11. KUFCO, Bangladesh		12. Hammerslay Iron Ore		
Water Treatment	13. Tuas Desalination, Singapore				14. Skikda, Algeria 15. Ashkelon, Israel

The aim is to identify what financial and legal tools and techniques have been used and the underlying reasons. Moreover, this chapter also discusses the trends and techniques that are widely being used in PPP infrastructure projects.

Conceptually, a Special Purpose Vehicle (SPV) is created to act as a nodal agency for bringing together private investors and concerned government agencies for the project. The SPV and the lenders sign financing and security agreements for

financing conditions and other aspects. The two prime movers in the financing of infrastructure projects are the developers/sponsors which implement the project and provide equity, and the financing institutions which provide the debt portion of the fund.

4.2 Patterns of Investment in Different Sectors

Investors mainly focus on cash flow generation of the project to repay debt and pay interest payment and dividends. This is the first and foremost fundamental for investment. On the other hand, Government can do a great deal to facilitate private financing for projects by providing a legal and judicial framework that is conducive to private contractual activity (International Finance Corporation, 1999).

Scenario 1 of Figure 4.1 depicts cost benefit picture of the projects which generate high revenue i.e. financially free standing projects. Projects fall into this category generate cash flow which is more than sufficient to repay debt and expenditures and above all attractive profit (i.e. dividend) to the shareholders.

Figure 4.1 Cost Benefit Scenarios of Projects in Different Sectors
(Adapted from Structuring Project Finance, Charoenngam, 2006)

Here, the financial gain is proportionately more than socio-economic gain. This type of project is always attractive to private sector; may not require government guarantees and other forms of support. *Scenario 2* depicts cost benefit pictures of projects that fall into economic sector. These projects generate almost equal financial and socio-economic gain to a country. For economic and socio-economic projects which fall into *scenario 2 & 3*, Government generally attracts private investment in infrastructure in different ways. It offers financial support to private investors in the form of grants, cheap loans, or guarantees in order to compensate them for low tariffs, unstable macroeconomic conditions, poor performance by state-owned enterprises and other problems. *Scenario 4* reflects cost benefit pictures of projects where government is the sole and major investor. Here, financial gain is so little that it is quite difficult to attract private sectors. Some Non-government organization may involve them into this project financing. Experiences have shown that PPP transaction in this sector has no competition even under competitive bidding circumstances. Since cash flow or revenue is primarily reflected by tariff rate, it is one of the significant issues for convincing investors. Investors are only attracted when tariff will be set and periodically adjusted in a manner that it ensures an adequate return to investors. Despite a large buoyancy of PPP in financial sector project (i.e. in oil & gas, electricity etc), some service like prison and school, water supply and sewage are nowadays gaining preference of PPP framework. UK has been extensively using PFI model in social infrastructures such as hospitals, prisons and schools. Government needs to ensure that tariff be as fair as to the customers. Thus PPP can achieve social and environmental objectives. Proper setup of SPV not only enables to raise finance for a project but also ensures successful delivery to construction and management.

It is important to look at the concept of project finance for an appreciation of real issues where to engage interest in Special Purpose Vehicle. Project finance differs from traditional financing in the way of loan disbursement. The loans are given to SPV which holds the fundamental rights of the project. The sponsors has tie to the project with legal implications as they contributes equity in the SPV. The structure helps sponsors isolate them from the risks inherent in the project. The establishment

of SPV thus represents fundamental condition for the achievement of project financing.

This section investigates the stakeholders and their contracts with SPV in fifteen world-wide PPP infrastructure projects.

4.3 Participants surrounding SPV and their Roles

The stakeholders in a project can be classified into four following groups who are involved directly/ indirectly into it. The groups are –

1. Financer
2. Customers /Buyer
3. Supplier
4. Experts /Others

Figure 4.2 Possible Stakeholders in Infrastructure Projects of Public-Private Partnerships

All these parties involved into a project with the aim of -

- Raising Finance
- Building utility
- Operating and maintaining service
- Providing service or output management
- Ensuring Guarantees

The first footstep of public-private partnership (PPP) project development is the formulation of special purpose vehicle (SPV). Different stakeholders have different view over SPV. *Such as sponsors consider that;*

The SPV is setup by sponsors who in exchange for shares representing the ownership in SPV, agree to lead the project and contribute to long term equity capital (Public Private Partnerships – Financier’s perspective, UN ESCAP). SPV is a stand alone entity to whom the project loan is advanced and who is liable for its repayment. Therefore, they can avoid liability for the project loan from SPV’s separateness. This means that sponsors can enjoy non-recourse for debt repayment in the event of default. In addition to it, risks are better transferred to various parties involved in a project who are in best position to handle it. Notwithstanding sponsors secure SPV by contributing equity in it. Moreover, the operation is usually left to the sponsors as it takes the responsibilities to manage the project.

On the other side, lenders consider that;

Security has more weightage than just relying on trust for lending funds into a project. It plays a vital role for considering debt repayment. The cash flow rather than physical assets are a project’s true collateral. Therefore, loan is directed towards SPV instead of sponsors of a project. Since SPV has no track record of business (in Greenfield project) and assets are too little to backup its loan repayment, lenders still grant the loan based on sponsors’ credit rating. The reality is, future revenue stream of a project is the sole instrument for loan repayment. Lenders reduce their risk by critically appraising the project to ascertain that it would generate income. To reduce risks, the lenders also consider the amount of equity contributed by the sponsors in the SPV, participation of other multilateral agencies, off-taker’s agreement (if any), resource supply agreement (if any), government’s financial and legal involvements in a project.

Government considers that;

Some major risks are borne by the Public sector promoters via procurement process. The concession agreement with the SPV is therefore crucial for successful development of public-private partnership project.

Figure 4.3 Formation of SPV in Procurement Stages
(Adapted from Alfen, 2006)

If the government contributes equity in SPV, then it has equal rights and equivalent interests to the assets within the SPV as other shareholders. SPV has to pass Memorandum of Understanding (MoU) from project definition stage through consortia agreement at pre-qualification and tendering stage. In negotiation stage, concession agreement is formulated which eventually kicks-off SVP. The life of SPV depends on (1) revenue flow, (2) economic conditions of operating and maintenance contracts and (3) financial conditions of SPV's liabilities.

4.3.1 Contractors in SPV

The promoters of special purpose vehicle are contractor, operator, supplier and buyer. The initial attempt to form SPV generally comes from the private contractors. These contractors contribute equity in a project. Sometimes, the equity investment by a contractor is a must to ensure its interest in the project and to assure lenders for forwarding loans. Contractor plays an important role in project financing. Figure 4.4 shows the agreement between contractor and SPV.

Figure 4.4 Contractors in Special Purpose Vehicle

As the aim is to build infrastructure, the main focus is therefore construction. The construction contractor(s) is the entity that builds the project under an engineering, procurement and construction (EPC) contract. It has to contribute funds as equity to some extent not only to prove it's creditworthiness to the lenders but also its sincere interest in the project as for its timely completion and contingency support. The contractor is paid for construction agreement and gets dividend as shareholders for equity contribution. Thus the main objective of the contractor is to make profit from construction contract and return on investment as they have shares in investment.

Figure 4.5 Types of Contractors in SPV

The investigation of 15 PPP infrastructure projects reveals that, contractor is the major player for SPV formulation. Almost all projects used foreign contractors who took part in equity as well. Moreover it is seen that from the group of equity sponsors, lead equity investor takes the role of construction and management. For example, in Laibin B power project, Electricite de France (EDF) provided 60% and acted as operator & management. Similarly in Hibernia Oil project, Mobil contributed 33% of total equity and was the Management contractor.

4.3.2 Suppliers in SPV

Supplier's role is of immense important in special purpose vehicle. Lenders want to ensure uninterrupted supply of energy (i.e. coal, gas, electricity etc) for the continuous operation of a project. Therefore, ensuring reliable supply contract can ease raising money from banks / financial institutions as well as for other investors as well.

Figure 4.6 Suppliers in Special Purpose Vehicle

Raw materials are supplied by them under special supply contract (‘Supply or Pay or ‘Supply and pay’). The suppliers may vary –

Figure 4.7 Types of Supplier in SPV

The supplier need not to invest in the project but make a contract to ensure continuous supply of raw materials at an agreed price for a certain period of time. In some cases, supplier need to supply their materials in credit what is known as supplier credit.

Resource Supply Agreement (RSA) ensures positive sign to the SPV for raising funds from the lending institutions and strength of a project. If the supplier is from equity investor then it is more creditworthy for the success of a project. In Karnaphuli Fertilizer Project, Bangladesh government was the supplier of gas (equity investor) and counter guarantor for offshore escrow account which made the project creditworthy. Four projects were found very successful where the government agency acted as supplier and buyer of the product. These are Laibin B China, HUBCO, AES Lal Pir and AES Pak Gen of Pakistan.

4.3.3 Operators in SPV

One of the major objectives of SPV is to operate and maintain project. The operation and maintenance of infrastructure is crucial as the asset has to be transferred in good service quality to the govt. entity after an agreed concession period. This part is done by Operation and Maintenance (O&M) companies. O&M companies use their operation and management skill to operate and maintain the project. If O&M provides equity, their objective would be same like contractor as to make profit from operation and gets return from investment.

Figure 4.8 Operators in Special Purpose Vehicle

The Project Company/ SPV typically enters into a long-term agreement for the day-to-day operation and maintenance of the project facilities with a company having the technical and financial expertise to operate the project in accordance with the cost and production specifications for the project. The operator may be an independent company, or it may be one of the sponsors who forms SPV. The operator typically be paid a fixed compensation and may be entitled to bonus payments for extraordinary project performance and be required to pay liquidated damages for project performance below specified levels. The operation of the project is usually left to the sponsors as it possesses the expertise to manage the project.

In addition, risk allocation considerations have to be taken into account. In case of non-recourse and in absence of guarantees, payment to the operator depends exclusively on project revenues. Clearly, for the project to be self-sustaining revenues have to exceed the cash flows needed for the operating contract; otherwise the project needs subsidy.

4.3.4 Buyers/ Off-taker in SPV

Buyer/off-taker has the most significant importance in SPV. Depending on concession agreement, this can be market-led or contract-led. For example, in power/oil project the buyer or off-taker is normally the government agency which eventually distributes the utility to the citizens. The government agency set purchase agreement upfront the contract agreement with the SPV/ Project Company. Whereas in expressway/ bridge projects public directly pay the toll.

Figure 4.9 Buyers in Special Purpose Vehicle

In some projects the purchaser of the project's output may also be an equity investor in the project. This purchaser always looks for the long-term source of supply at the lowest possible price.

Figure 4.10 Types of off-take Agreement

The purchase agreement has many shades of gray such as forward contract, future option, indexation etc. This is the most important issue for the project for financeability consideration. Off-take agreement may not cover all the output. In some projects the purchaser of the project may also be an equity investor. The project's output is sold to the off-taker under purchase agreement and the critical point is the off-taker's reliability throughout the project life.

Off-take agreement ensures stable revenue stream for a project. Off-take agreements are typically long-term purchase and sale contracts over an agreed period. The most common off-take agreement today in power purchase agreement (PPA) is 'take-or-pay' contract. It is also found that government owned off-taker (SOE) assumes extensive demand and force majeure (FM) risk in developing country.

4.3.5 Government and / or State Owned Agency

Government participation in a project enhances the value and creditworthiness. Though most of the stakeholders are from private side and may be one or two bodies from public side, the government or government owned agency has a profound influence and role in SPV for infrastructure project financing. The role and involvement of government in SPV can be best understood from the Figure 4.11.

Figure 4.11 Government Involvements in SPV

In Figure 4.11, it is seen that the presence of Government and/or government owned agency in PPP project is profound and immense. From the concession agreement with SPV, Government participates directly or indirectly in providing off-take guarantee if state owned enterprise be the purchaser; counter guarantee; performance guarantee if government agency be the supplier; debt guarantee; foreign currency convertibility, transferability and availability on behalf of central bank and so on. Details of government guarantees are discussed in guarantee section.

Government involves into four major activities with special purpose vehicle such as (1) investor (2) consumer/customer (3) regulator ad (4) mediator/moderator. From the investigation of 15 PPP infrastructure project, it is found that –

Equity investor	Loan guarantor	Supplier	Off-taker
3	3	5	10

Only in Paiton 1 project, Indonesian government did not provide any payment guarantee on behalf of PLN for power purchase agreement to SPV (PT Paiton).

4.3.6 Financial Institutions and Commercial Banks

Historically banks are the pioneers in Project Financing of oil, gas and mining projects and subsequently in infrastructure projects nowadays. They are the largest source of private finance for infrastructure development in developing countries.

Traditionally, commercial banks have undertaken project finance in two phases – (1) construction/completion phase (generally 2 years) and (2) permanent financing with maturities ranging between 10 to 15 or 20 years. Banks involve in project financing as -

- Syndicator
- Arranger
- Technical Advisor
- Insurer

A study conducted in IPP projects in developing countries from 1990-97 revealed that 80% of the debt was raised from foreign sources particularly from a small pool of banks (Khan and Parra, 2003). Banks are the first choice to raise funds as SPV look in it and its interest rate. Unfortunately for developing countries the commercial banks are unlikely to contribute in projects because of long term loan, influenced by different criteria as to when and how to proceed in a distressed project. Two major issues that commercial banks face while participating in project finance are – (1) assets liability mismatch and (2) exposure to market risk. Though these banks have expertise and appetite for appraising and taking credit risk but they lack in market risks associated with infrastructure projects. Market risks arise from tariff rate, off-take risk, toll fixation, payment security mechanism etc.

The investigation reveals the fact that in all 15 worldwide infrastructure projects bank acted in loan syndication or direct lending to SPV. In Paiton 1 project, 36 commercial banks acted in loan syndication. 12 banks form the syndication in Hamersley Iron Ore Project, Western Australia

These loans are secured through the project's cash flow and assets. In case of Karnaphuli Fertilizer Project, Bangladesh the bank loan was secured over plant, property and equipment. In spite of project's revenue stream bank loan focuses on the project's asset as collateral as well.

4.3.7 Multi-lateral, Bi-lateral and Export Credit Agencies

The presence of multi-lateral or bi-lateral banks in project financing is advantages for SPV. Sometimes, a limited amount of equity support is available from multilateral organizations. Although they provide small amount of capital in a project, their participation provides comfort to other investors. Most cases MDBs require counter guarantee from the host government. The role of Multilateral Development Bank changes for project to project, even for country to country. These organizations generally provide equity, loans, technical assistance and advice, guarantee particularly on political risks. Recently it reduces its concentration on traditional lending activity and increases two other types of activities: credit enhancement and strengthening the legal and regulatory framework. So it contributes in the way of-

- Direct lending
- Credit enhancing
- Strengthening legal and regulatory framework

These multilateral agencies use many innovative tools for guaranteeing capacity to extend maturities of commercial banks, such as World Bank uses Partial Credit Guarantee (PCG) and Partial Risk Guarantee (PRG). Maturities of commercial bank loans are extended. On the other side, bi-lateral agencies now focus their investment on social infrastructures and in public sector projects. Like multilateral agencies these institutions also play an important catalytic role in promoting private sector investments such as co-financing with multilateral agencies.

Export credit agencies are also dominant source of direct finance and guarantor of commercial banks in infrastructure project financing. Traditionally they funded public sector projects backed by sovereign guarantee. It is a kind of trade support program to promote country's exporters. In addition to direct loan, ECA has wide range of guarantees scheme. These include short, medium, long term financing, guarantee, insurance program. It depends on the selection of appropriate ECA which would provide the desired risk coverage expected by SPV. The coverage is commercial risk, political risk ranging from currency inconvertibility and

bankruptcy to war. For example, political risk is covered by COFACE, ECGD, MITI etc.

From the investigation of 15 worldwide infrastructure projects, it is found that though ECA participates in loan, loan guarantee, insurance and political risk guarantee but most of cases their participations come in the form of loan guarantee and insurance. Nowadays, the ECA participation raise question to transparency in PPP infrastructure project financing. For example, in HUBCO project Pakistan ECA provided loan guarantee and in Karnaphuli Fertilizer, Bangladesh it provided insurance.

4.3.8 Insurers in SPV

Insurer also plays a significant role as SPV is surrounded by various risks. They are the party who assumes most of the risks that only involve the possibility of loss and are not undertaken by any other parties. Special types of insurance coverage are therefore required. These are political risk coverage, special construction coverage in addition to general coverage such as construction, delay in start up, environmental risk and business interruption. A broader portfolio of insurance coverage and policy is often required by sponsors and lenders for service agreement and lending agreements.

4.3.9 Rating Agencies in SPV

All large projects are normally rated by rating agencies. This would facilitate raising resources from market. Over the year, credit ratings have achieved wide investor acceptance for judging credit quality and reliability in the market. Though credit rating agencies pay attention to publish credit records (e.g. liquidity risk, currency risk, interest risk, prepayment risk etc), the main focus is to measure the future debt servicing capability of a project. Credit rating has significant impact on a project for raising finance. Credit enhancement mainly focuses on -

- Credit risk
- Sovereign risk
- Servicer performance risk

- Interest risk and currency risk
- Prepayment risk
- Legal risk
- Financial guarantee

Moody's explains that ratings are intended to provide capital market participants with a framework for comparing credit quality of debt securities. A credit rating compresses an enormous amount of diverse information into a single symbol (Moody's, 1999). The sponsors of a project always aim for getting better rating (such as AAA or Aaa) to achieve trust and financial support from banks, multi-lateral or bi-lateral agencies. Better the credit rating, easier to get fund from lending institutions and other commercial banks. On the other side, if project financing is raised from issuing bonds, then credit rating is mandatory. There are significant numbers of cases, where financing is structured so well that the project rating is higher than country rating.

In Ashkelon Project (Israel), debt financing was arranged from Commercial Bank named Bank Luemi and through pension fund route due to small numbers of bank in the market and liquidity constraint. This subordinate loan acts as a catalyst in financing and helps perfect adjustment with long term debt with moderate interest rate. In order to tap such institutional market participation requires AA⁻ credit rating from the local credit agency in Israel. Ashkelon project was successful to acquire a credit rating of AA⁻ from Mallot, a local credit rating agency in Israel. This sort of structuring (bank and high level of institutional financing) was the first in Israeli financial market. The tenor of debt is 23 years.

4.3.10 Trustees in SPV

It is the obligation of the trustee to track deal performance, based on data provided monthly from the servicer and take actions according to legal covenants in the structure required to preserve interest of the SPV. The ideal SPV requires a legal framework that allows for tax neutrality, flexibility to design contracts and free access to products and markets. In all these cases a trust or similar juridical instrument is required. Normally, the trustee is appointed by lenders to manage all

of the project's cash flow, write checks and pay bills. In addition dividend payments from the project vehicle to its parent would be met by the trustee after paying all the necessary payments.

Enforcement of securities as instructed by inter-creditor agent is the prime role of security trustee. Security trustee works for the lenders as a trust agent for execution, perfection and holding of all project securities. In case of Ras Laffan Qatar project, the country had various troubles related to regional conflict in the Arabian Gulf area as well as weak legal system, therefore offshore trustee played an important role for gaining trust to all participants in that project.

4.3.11 Escrow Account in SPV

At the request of financier, an escrow a/c is set up by SPV from management by a third party to safeguard project's revenue with the aim that debt service obligation is met and ensured. The construction contractor, sponsors as well as lenders are paid by the SPV from this account. The third party maintains the funds obtained from the market in an escrow account (either onshore or offshore), and pays following standard procedures of control and supervision for repayment. It is found that if foreign contractors and /or international financial institutions are involved in project financing then offshore escrow account is set for repayment.

Figure 4.12 Escrow A/C in SPV

SPV deposits revenues directly into lender-managed escrow accounts, so that lenders can control distribution of cash flow according to a strict cash-flow waterfall.

4.4 Core Activities of SPV

From the definition discussed in literature review, it is found that special purpose vehicle has some core activities in addition to construction and operation and maintenance which are as follows –

- Raise Fund
- Abide legal and financial regulations
- Perform its obligation through proper risk allocation

It is therefore necessary to understand the know-how of achieving these major activities by SPV. This section will describe each of the core activities.

4.4.1 Options for SPV to Raise Funds

Project implementation depends on the ability of SPV to develop attractive financial package with a mix of suitable finance for a project. The mix varies from sector to sector, even from country to country. SPV can raise funds for PPP infrastructure in a variety of ways. Since construction of assets and services are sold to the public, the promoters (i.e. the private sector) can go to the market using projected income stream from a concession (e.g. toll revenue) as collateral. Soon after the promoters form SPV for a project, the next task is to quest financing. Normally the capital (equity) contributed by promoters is not sufficient to construct and operate the projects.

Higher equity is required for projects with higher level of perceived risks. Sponsors are the main source of equity participation and commit a substantial portion of equity at preconstruction and development stage. Foreign investors are keen to involve domestic investors in equity capital in order to reduce political risks. A long term equity stake by sponsors ensures that management has long term interest in a project and cash flow growth leads to capital appreciation. International

infrastructure funds (e.g. Private Sector Infrastructure Development fund, Global Power fund etc.) can also be mobilized for limited amount of equity capital. Figure 4.13 shows the capital structures and participants in PPP project.

Figure 4.13 Various Capital Structure Tools and Participants

It may also be possible to tap a wider range of equity once cash flow starts generating from project through partial commissioning. Generally the equity from the promoters is less than 30% of investment cost. They therefore look for financial institutions, commercial banks, World Bank, Area Development Banks, Foreign Investment Banks and other sources to collect fund. Therefore, most of the financing comes from domestic and/or external debt financing. Debt financing though contribute a large part in capital structure, yet has limitation particularly in

developing countries. The number of international banks involved in project financing is small, and often requires syndication. This is not only time consuming but also involves complex procedures. Banks generally participate in senior debt of a project financing and the tenure is relatively much shorter than project life cycle. In emerging markets, multilateral institutions play a key role in infrastructure financing. Loans provided by multilateral institutions are less risky and less costly compared to commercial bank loans. Many researchers have pointed out of developing domestic debt market which they believe could be a valuable source of tapping money for PPP infrastructures (Ahluwalia et al. 1997). Though debt from domestic capital market may be small, this surely reduces the foreign exchange risks and political risks to some extent. Similarly bond market has gained overwhelming success nowadays in infrastructure project financing. Because of certain unique advantages such as better disclosure, better discipline in reserve maintenance and rated by credit agencies bond market is getting popularity. Worldwide practice is to introduce bond financing either at initial stage or at commercial operation stage. Financing arrangement by export credit agencies are also becoming very popular as A loan or B loan where multi-lateral institutions act as lender of record and also participate in portion of original loan with participate banks (Gherssi and Sabal, 2006).

One of the most important aspects of raising capital structure is, Government should participate in infrastructure projects. Government needs to institute investment tool such as subordinated debt under the Multi-lateral Development Banks (e.g. the World Bank) in power projects similar to Private Sector Energy Development Fund (PSEDF) or Private Sector Infrastructure Fund (PSIF) in Pakistan and Bangladesh respectively. This debt mechanism not only relieves the investors but also attract other offshore and domestic lending institutions to finance (Chowdhury and Charoenngam, 2007). The role of specialized financial institutions is aimed at addressing deficiencies in domestic debt market. Examples are Jamaica Private Sector Energy Fund, Infrastructure Development Finance Company India. These institutions play important role between government and private investors in PPP infrastructure projects. Thus, the leverage is always high in PPP financing which yields some advantages such as (1) it guarantees benefit of more attractive income

tax shield, and (2) alleviates any capital restrictions to sponsors (Ghersci and Sabal, 2006).

From investigation of 15 PPP infrastructure projects, it is seen that most of the debt financing was arranged through commercial banks and financial institutions. These are senior debt. In HUBCO and Ashkelon project, subordinated debt was committed by Multilateral Banks and bond market. Two projects, Las Raffan Qatar and Ashkelon, Israel have been capitalized through bond (Private Placement) financing.

As it is seen that various participants are engaged in project financing and their interest also differ. The investment tools have different characteristics and have different impacts on infrastructure financing. Risks of a certain project are one of the major decisional factors in determining what investment tools should be incorporated in capital structure, yet guarantees and coverage against some risks help sponsors for considering wider variety of capital structure which would be best fit for PPP infrastructure. Table 4.2 describes general participants in capital structure and their interests.

Table 4.2 Participants in capital structure

Participants	Perceptions	
	Inject/Agreement	Reward/Returns
Sponsors	Equity Capital Completion Guarantee/Funding shortfalls Price Guarantees Letter of Support/Comfort letters	Capital + Profit (dividends)
Government	Incentives Permits Licenses Approvals Equity (in some cases)/Subordinated Debt Loan guarantee	Social Benefits Value for Money (VfM) Efficiency gain i.e. cost reduction over the project life cycle and better service
Debt Providers	Debt Capital Credit Agreement Security Documents/ Payment Mechanism (Waterfall A/C)	Risk premium (Principle+ interest)
Purchasers /Off-takers	Credit-worthy commitment Purchase agreement, marketing agreement, Distributing agreement	Energy, Product with an agreed price set upfront

Table 4.2 Continued

Participants	Perceptions	
	Inject/Agreement	Reward/Returns
EPC Contractors	Equity Contract Agreement/Warranty Agreement,	Returns on capital + Profit (dividends)
Suppliers	Credit Supply Agreement	Comprehensive Price for RSA
Insurers	Assumes risks that are not taken by any other parties	Premium
Operator	O&M Agreement	Fixed compensation, sometimes bonus payment
Multilateral Development Banks	Loan/Guarantees e.g. Partial Credit Guarantee (PCG), Partial Risk Guarantee (PRG) – loans and guarantee must be counter guaranteed by host government for the project. Advisory/ Fund Creation role for the Host government	Global, regional development commitment
International Finance Corporation	Equity, quasi-equity, debt, Loan syndication(s) “IFC is the largest multilateral source of loan and equity financing for private sector projects in developing countries – ‘A loan’, ‘B loan’	Global, regional development commitment
MIGA (Multilateral Investment Guarantee Agency)	Political risk coverage for a project	Global, regional development commitment
OPIC (Overseas Private Investment Corporation)	Equity/Direct loans Political risk insurance	To facilitate participation of US private capital skills in developing countries
Export Credit Agencies	Direct loans/Guarantees Political & Commercial Risk Coverage Insurance Buyer credit in form of direct loan	Encourages domestic companies to invest in overseas projects; Protect exporters against default

4.4.2 Financial and Legal Regulations for SPV

Since project debt is normally secured by the direct assignment to lenders of the project's right to receive payments under various contracts, it is therefore essential to check lender's security packages for SPV's financial regulation to them. Apart from loan agreements, most project finance deals three key finance documents; the equity support agreement (ESA), the accounts agreement (AA) and the agency agreement. Lenders are reluctant to provide debt until and unless they are certain about the equity support agreement to be made and revealed to them. Lenders' interest in the sponsors' equity support agreement goes beyond due diligence. The lenders also require the project vehicle to enter accounts agreements as conditions of loan disbursement. The drawdown requires fulfillment of complete conditions precedent (CPs). In addition to concession agreement, other agreements are -

- Project Funds Agreement
- Financial Completion Agreement
- Credit Agreement
- Off-take agreement
- Supplier's credit agreement
- Resource supply agreement (RSA)
- Construction Contract
- Operation and Maintenance Agreement and so on.

Public sector focuses on cost effective and efficient delivery by the private sector and economic viability. On the other hand, Private sector focuses on more business opportunities, profit maximization, financial viability. Since SPV is formed by Public Private Partnership, it essentially requires proper and workable balancing on various points of interest. All these agreements have been made upfront to mitigate various risks involved in the projects.

4.4.3 Risk Allocation

From a conceptual view point SPV has two distinct responsibilities, legal and financial. So it can be said that special legal purpose vehicle and special financial purpose vehicle; with the understanding that in all cases the purpose of the vehicle is risk allocation. Figure 4.14 shows the factors that are needed to be considered for development and functional operation of SPV. The factors that affect SPV can be categorized into two classes - (1) Exogenous and (2) Endogenous. Legal and financial factors that fall beyond the control of SPV are exogenous factors which are in the jurisdiction of host government.

Government rules and regulations, policy, initiatives to foreign direct investment, tax-efficiency, political stability, expropriation, guarantee and counter guarantee by the government for the project all these fall in this category. These are the legal considerations. Government along with multilateral development banks and export credit agencies can play key role in terms of providing guarantees to make infrastructure investment viable.

Figure 4.14 Endogenous and Exogenous Factors Surrounding SPV

The co-operation and action among these stakeholders can help to cover policy risks, breach of contract by government entities, political risks assurance. Financial factors are inflation, exchange rate, demand risk, market opportunities and condition, concession period, pay back period, sovereign credit rating, private capital market etc. The projects that are considered tariff sensitive e.g. those whose revenue stream are in local currency and depend on individual consumers such as, toll roads, power, water and sanitation, must be unattractive to foreign investors who prefer to remit profits and capital in foreign currency. The SPV can try to avoid excessive reliance on foreign funds, convert it to local currency finance. This reduces currency risks since both assets and liabilities will be in local currency. Another mechanism is swap currency. This can be applicable especially during the initial phase of mobilizing funds for the project. In addition to that an escrow account can be set which allows converting hard currency earning from the project to foreign currency in a special escrow account.

The concession authority plays the significant role to deal with the exogenous factors in PPP projects. Normally, the host government makes concession agreement with the SPV regarding legal system, property rights, regulations, permits, and some guarantee agreement. The contractual instrumentation of the concession is important in case of amendments or breaches. Though concession agreement is a contract between SPV and Host government to construct, develop and operate a particular project, it has profound influence on the success of a project. Table 4.3 shows some distinct features that are identified from investigation of fifteen worldwide PPP infrastructure projects.

Table 4.3 Distinct features of selected PPP infrastructure projects

Distinct Features	Description	Implication
Off-take Agreement	To ensure sell of product and repayment of debt service, this agreement is normally for contract led projects	For Karnaphuli Fertilizer project, Bangladesh the off-takers are Transammonia (Switzerland) and Marubini (Japan)
Escrow Account	Primary security of the project's cash receivable; not only ensures contract obligations but also control projects expenditure	In HUBCO project, offshore and domestic escrow account was set as for payment security mechanism.
Offshore Escrow Account	Normally sets offshore if off-taker is of overseas or financial institutions pressure, needs host government approval	Almost all projects where foreign investment is involved i.e. in HUBCO, Dabhol project.
Offshore-Trustee	Liable to collect revenue and pay lenders , Due to various regional conflict and weak legal system	Ras Laffan LNG project where Security trustee was set in New York (to gain trust of the participants)
Concession Agreement	An agreement with the govt. to construct, operate or provide service of a project for certain period of time	Exists in All projects
Put or Pay/ Supply Agreement	Reduce the supply cost escalation and ensure uninterrupted production	Karnaphuli Fertilizer Co. Ltd, where BGSL agreed to supply gas for 20 years backed by Bangladesh Govt. for the project
Counter Guarantee by the	Requires by the	Dabhol Power Project, India

Table 4.3 Continued

Distinct Features	Description	Implication
Government	International Financing Institutions as assurance from host govt. for releasing loans (due to poor credit rating of off-taker, the promoters require other guarantees from state govt.	where GOI and GOM gave counter guarantee to MSEB for 20 years PPA
Govt. as Buyer/ Off-taker	Initial custom of the output (power, oil, gas) and or distributor to the final customers	Dabhol Power Project India, Paiton Energy Project Indonesia, HUBCO Pakistan
Export Credit Agency as Insurer	Trigger if govt. interferes in the escrow account agreement and expropriate the project	Karnaphuli Fertilizer Project, Bangladesh Political and commercial risk guarantee by COFACE in Laibin B, China
Offshore SPV	Due to underdeveloped legal and commercial infrastructure (capital market, credit rating agency, credit enhancement facility)	PRC sets offshore SPV in Cayman Island as SPV in Cayman island receives triple A rating, abundance of first-class financial institutions,
Bank Syndicate	A group of banks for lending in the project	Hamersley Iron Ore Project (9 US and 3 Canadian Banks), Paiton 1 project 36 banks
Project Bonds	To extend financing and reduce cost by tapping debt securities in the market	Ashkelon desalination project, Israel
Project Funds Agreement	Additional costs require to complete the project and meet debt service obligations by the sponsors	The sponsors CRA and Kaiser agreed to contribute additional funds to SPV to cost overrun of Hamersley Iron Pty. Ltd
Third Party Guarantee	Completion guarantee, cost overrun guarantee, collateral warranties, Equity contribution agreement (sometimes)	In Paiton 1 project, Central bank of Indonesia was the third party guarantor
Host Govt. as Counter Guarantor	Assures no change of law, no expropriation, exchange control	Dabhol Power Project, India IPP
No Counter Guarantee from Host Govt. or Backstop payment obligation	When the host government is not sure about the performance of Supplier or off-taker	Paiton 1 Energy Project, Indonesia
Third Party Guarantee	For credit enhancement, due to risk associated to debt	In West Java Project, ASIA Ltd guaranteed the interest and

Table 4.3 Continued

Distinct Features	Description	Implication
	repayment for revenue stream of the project	principal to the investors
Govt. as Supplier of raw materials and Buyer of end product	Government's commitment, most expected from all point of view	Laibin-B Power Plant Project, China, HUBCO Power Project in Pakistan

4.5 Chapter Summary

The objective of this chapter is to understand the development of Special Purpose Vehicle in various sectors at different location, its function, internal and external factors surrounding SPV. In this line, fifteen PPP infrastructure projects have been examined. The aim of the investigation is to find out common and unique features of SPV in PPP infrastructure projects. What components have been chosen and why, at different political and economic conditions are the major findings of this chapter.

CHAPTER 5

CRITICAL FINANCIAL AND LEGAL FACTORS FOR ESTABLISHING SPV OF IPP PROJECTS IN ASIA – FACTOR ANALYSIS

5.1 Background

In this chapter, a questionnaire survey is conducted to identify most important attributes/factors in setting up SPV for IPP projects from a wide range of personnel involved in the PPP processes in Asia (as discussed in Questionnaire Survey section 5.3). The objective of this chapter is to investigate the current practice of setting up SPV and associated legal and financial impacts onto it. Analysis of the response data gives expert opinions in identifying the influential factors and the choices/options in setting up SPV for IPP projects in Asia. The findings of this chapter therefore provide a guideline for the private sector investors and public agencies in setting up SPV for IPP projects in this region.

5.2 Identification of Factors

A comprehensive collection of literature regarding IPP projects (as discussed in Chapter 4) has been carried out while focusing mainly on the structure of SPV, legal and financial agreements, relevant laws, guidelines, standard of practice and support mechanism. Besides, cases on power generation projects in India, Pakistan, China, Thailand, Bangladesh, Singapore, and Philippines are investigated to identify the financial and legal factors for establishing SPV in Asia. These include Dabhol Independent Power Project (IPP) project in India, HubCo, AES Lal Pir and Pak Gen power project in Pakistan, Laibin B IPP project, Shajiao B and Meizhou Wan Power Project in China, Meghnaghat power project in Bangladesh, and PT Paiton Energy (Paiton 1) power project in Indonesia. Table 5.1 shows the summary of sources and cases from where the groups of factors are identified for questionnaire survey.

Table 5.1 Factors and their sources for establishing SPV in Asia

Factors	Sources	Cases
Contractual Foundation Factors	Khan and Parra (2003), pp. 220-245 Yescombe (2002), pp. 69-101 Tiong and Anderson (2003), pp. 235-243 Kumaraswamy and Zhang (2003) pp. 263-280 Wang and Tiong (2000), pp. 69-78 Chowdhury and Chen (2010), pp. 64-88 Chowdhury and Charoenngam (2008), pp. 267-283 Hoffman (2008) pp 17, 209-221 Finnerty (1996) pp. 60, 65 Shrestha and Ogunlana (2009) pp. 250-266 Lang, L.H.P (1998) pp. 241-244 Smith et al (2004) pp. 407-413	HubCo, Pakistan Laibin B, China Shajiao B, China AES Lal Pir, Pakistan Pak Gen, Pakistan Huaibei power plant, China
Enabling Environment Factors	Khan and Parra (2003) Andrew Walsh (2003), pp.153-180 Hardcastle and Boothroyd (2003), pp. 31-56 Henry A Davis (2003), pp. 78-93, 94-112 Tiong and Anderson (2003), pp. 225-243 Hoffman (2008), pp.23-24, 151 Qiao et al. (2001) Zhang et al. (1998) Jefferies et al. (2002) Lang, L.H.P (1998) pp. 255-257 Jefferies <i>et al.</i> (2002) Stonehouse <i>et al.</i> (1996) Kater (1999) Qiao <i>et al.</i> (2001)	Casecan Water and Energy Project, The Philippines Dabhol Power, India Paiton 1, Indonesia AES Lal Pir, Pakistan Shajiao C, China
Guarantee Factors	Jeffrey Delmon (2009) pp. 185 ADB: Loans and Political Risk Guarantee (2008) Henry A. Davis (2003), pp. 39- 44 Chowdhury and Charoenngam (2009), pp. 51-58 Khan and Parra (2003), pp. 264-266 Lang, L.H.P (1998), pp. 267 Sudong, Y. (2001)	HubCo, Pakistan Meghnaghat Power Project, Bangladesh Meizhou Wan, China Pak Gen, Pakistan
Credit Enhancement Factors	Chowdhury and Charoenngam (2008), pp. 267-283 Khan and Parra (2003), pp. 254-264 Gatti (2008), pp.292-295 Chowdhury and Charoenngam (2009), pp. 51-58 Sudong, Y.(2001)	Dabhol Power, India HubCo, Pakistan Paiton1, Indonesia Laibin B

5.3. Questionnaire Survey

After the validation of preliminary factors by the [seven](#) experts (as shown in Table C1 of Appendix C and discussed in Chapter 3 of section 3.4.1), the designed questionnaire was prepared comprising a total of 75 factors (contractual: 16; enabling environment: 15; guarantees: 17; and credit enhancement: 27) for the set up of SPV for IPP projects. These factors were gathered through comprehensive study of literature (as discussed in Chapter 4) and from the above mentioned cases (as shown in Table 5.1). The author conducted a questionnaire survey from October 2009 to March 2010. The aim of the survey is to consolidate knowledge and expertise that would contribute to identifying the important legal and financial factors for setting up SPV and to know the practices widely used in structuring SPV for power projects in Asia. Respondents were asked to rate the importance/criticality of each factors on a five-point Likert rating scale ranging from 1 (least important) to 5 (most important). The questionnaire is divided into three parts – (1) financial part; (2) legal part; and (3) credit enhancement. To remove any ambiguities in the questionnaire, a pilot test was carried out. Minor amendments were made according to the results of the pilot test and a glossary was attached to reduce confusion and to refresh the memory of the respondents prior to mailing the questionnaire to selected academicians and professionals in Asia. [Table 5.2](#) shows the respondents’ list of each country.

Table 5.2 Countrywide respondents’ list

Country	Number of Respondents	Type of Organization
Bangladesh	7	Public: 4 Private: 3
Taiwan	3	Public: 1 Private: 2
India	7	Public: 2 Private: 5
Pakistan	6	Private: 6
Thailand	8	Public: 3 Private: 5
Singapore	8	Public: 1

Table 5.2 Continued

		Private: 7
Malaysia	6	Public: 2 Private: 4
Vietnam	4	Public: 2 Private: 2
Indonesia	2	Public: 1 Private: 1
Total	51	Public: 16 Private: 35

51 (out of 120) respondents have returned completed questionnaires from various different organizations in countries from Bangladesh, India, Pakistan, Thailand, Taiwan, Singapore, Malaysia, Indonesia and Vietnam. Of these, 16 responses came from public sector organizations, and 35 from the private sector. According to the central limit theorem, the relatively small sample (here, $n=51$) is still valid for normal distribution (Cooper, Schindler 2003). All these respondents were involved in PPP projects and/or have done research in this area and have experience of 10 years or more. Some respondents were from organizations that have rich experience and knowledge in PPP such as Infrastructure Investment Facilitation Center (IIFC, Bangladesh), Infrastructure Development Company Limited (IDCOL, Bangladesh), Gammon Construction (Singapore), Hogan Lovells Lee and Lee (Singapore), Plenary Group (Singapore), 3PU in Malaysia, Commonwealth Secretariat Advisory Unit, Indonesia Infrastructure Guarantee Fund (IIGF), International Finance Corporation (IFC), Asian Development Bank (ADB), and the World Bank. In other words, the respondents were lawyers, consultants, academic experts, financiers, contractors or from public clients.

5.4 Factor Analysis

Factor analysis is done to reduce the dimensions; which in other words, identify a relatively small number of factor groupings that can be used to represent relationships among sets of many inter-related variables (Kleinbaum *et al.*, 1988; Norusis, 1992). This technique is applied to the survey data to find out the groupings that might exist among the essential legal and financial factors for establishing SPV of IPP projects in Asia. The following sections describe the factor

analysis of (1) contractual foundation factors, (2) enabling environmental factors, (3) guarantee factors, and (4) credit enhancement factors. Factor analysis was used to determine the principal success factor groupings that underlie establishing SPV of IPP projects in Asia. This reveals fifteen factor groupings that are critical (both legally and financially) for establishing SPV of IPP projects in Asia. Statistical Package for Social Science (SPSS) version 17.0 is used for this analysis. The following sections show the factor analysis and the factor groupings.

5.4.1 Factor Analysis: Contractual Foundation Factors

The sixteen contractual factors for establishing SPV of IPP projects in Asia which have been identified from the literature review and case studies (Chapter 2 and 4) are now analyzed by statistical tools such as descriptive analysis, reliability test using Cronbach's alpha, and Factor Analysis. Table 5.3 shows the Cronbach alpha reliability for the factors is 0.709, which suggests that the data collected for these essential factors analysis are reliable (Norusis, 1992).

Table 5.3 Reliability statistics for contractual foundation factors

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.709	.710	16

Moreover, Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sampling adequacy are both used to determine the factorability of the matrix as a whole. Kaiser (1974) recommends accepting values of greater than 0.5 as acceptable. Here the KMO value is 0.688 (as shown in Table 5.4) which reflects that factor analysis is appropriate for these data.

Table 5.4 KMO and Bartlett's test for contractual foundation factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.688
Bartlett's Test of Sphericity	Approx. Chi-Square	232.058
	df	110
	Sig.	.000

Table 5.5 shows that sixteen essential contractual factors can be grouped into three principal factors and be interpreted as follows;

Table 5.5 Rotated factor matrix (loading) of critical contractual foundation factors for establishing SPV of IPP Projects in Asia

Factor Components	Component		
	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>
1. Take or Pay off-take agreement	0.7827		
2. Guarantee from the off-taker to indemnify SPV for all costs/losses incurred converting payments from local currency to foreign currency	0.7521		
3. If off-taker does not dispatch the plant, it makes a capacity payment, but not energy payment			
4. SPV is obliged to make certain payments to compensate the off-taker, if it fails to meet its delivery obligation	0.7301		
5. Merchant Facility			
6. Provision of third party sales in case of default of off-taker	0.5742		
7. Hell or High Water off-take agreement	0.5661		
8. Long term 'Supply or Pay' agreement		0.8347	
9. Long term 'Supply and Pay' agreement		0.6970	
10. Secure certain amount of energy through long term supply agreement		0.6657	
11. Spot Purchase		0.6390	
12. Credit quality of the off-taker			0.7046
13. Credit quality of the supplier			0.6735
14. Rated O&M contract with performance damage			0.6670
15. Country's history on international borrowing records			0.6054
16. Credit quality of the sponsor particularly an EPC contractor			0.6021

*Note: Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 7 iterations.*

(a) Factor Grouping CF1 represents Output Contract

(b) Factor Grouping CF2 represents Input Contract

(c) Factor Grouping CF3 represents Creditworthy Parties

These three factor groupings account 71.7% of the overall variances between contractual foundation factors (as shown in Table B2 of Appendix B).

5.4.1.1 Factor Grouping CF1- Output Contract

The critical contractual factors in this grouping (i.e. Output contract) are:

- Take or Pay off-take agreement

- Guarantee from the off-taker to indemnify SPV for all costs incurred converting payments from local currency to foreign currency
- If off-taker does not dispatch the plant, it makes capacity payment but not energy payment
- SPV is obliged to make certain payments to compensate the off-taker if it fails to meet its delivery obligation
- Provision of third party sale in case of default of off-taker
- Hell or High water off-take agreement

This factor grouping accounts for 32.2% of the total variances between the critical contractual factors of IPP projects in Asia. The types of off-take agreement and its conditions are crucial to decide the magnitude of financing by the lenders as well as from the SPV's point of view. It also becomes a vital issue in some instances for the failure of IPP projects. Take or Pay off-take agreement and guarantees from the off-taker for capacity payment enhance project value. Another higher loading component is that the off-taker makes capacity payment but not energy payment if it does not dispatch the plant. This suggests that the SPV can get capacity/availability payment to pay its fixed cost and repay debts to its lenders. This is essential from the lender's point of view as they want to be sure that their principal and interests are being paid regardless of the plant's operation. In contrast, a lower loading is associated with Hell or High water off-take agreement in this group. Though Hell or High water off-take agreement contributes high indirect credit enhancement to the lenders, it needs to be projected carefully, keeping in mind that the project will be capable enough to produce the utility.

5.4.1.2 Factor Grouping CF2- Input Contract

This factor grouping accounts for 23.8% of the total variances between critical contractual factors of IPP projects. There are four components in the supply agreement group. These are:

- Long term supply or pay agreement
- Long term supply and pay agreement
- Secure certain amount of energy

- Spot purchase

There are two components in this principal factor that got very higher loading. These are ‘long term supply or pay’ and ‘long term supply and pay agreement’. The market risks are eliminated through the long term supply agreement. In a recent study, it is found that Tata Group of India has given up its US\$ 3 billion investment plan on fertilizer, power and steel projects in Bangladesh due to host government’s inability to ensure long term gas supply to the projects. A lower loading is reflected on ‘spot purchase’ in this factor grouping which relates that the numbers of supplier are limited and chances of price escalation are high in the power industry of Asia.

5.4.1.3 Factor Grouping CF3- Creditworthy Parties

The factor grouping is responsible for 15.7% of the total factor variances in the critical contractual factors analysis. The components in this group are:

- Credit quality of the off-taker
- Credit quality of the supplier
- Rated O&M contract with performance damage
- Country’s history of international borrowing records
- Credit quality of the sponsor, particularly an EPC contractor

Higher loading are associated with two components in this grouping. They are – ‘credit quality of off-taker’ and ‘credit quality of supplier’. Credit quality of the off-taker and supplier are very important for IPP project development particularly in Asia where the market conditions are very unstable. Economic insecurity is a big issue in these markets due to inability of project users to support the project through use or purchase of the project’s output. The government agencies (in most cases, both the off-taker and the supplier) are the monopoly players in the market. Moreover, the economic situation as well as the creditworthiness of an off-taker can change considerably in just a few years, not to mention over the term of a PPA. The investors and lenders are therefore, very cautious on the financial conditions of these agencies in order to reduce payment and market risks. High loadings are also found in ‘rated O&M contract’ and ‘credit quality of EPC contractor’ which reflects

that SPV needs to consider these two factors for being confident on project success. This factor grouping also relates to minimize counter party risk (such as project off-takers default) which is quite common in Asian power market.

5.4.2 Factor Analysis: Enabling Environmental Factors

Favorable investment environment is very important to the private sector for investment in a country. The government can increase the confidence of investors by improving investment environment. When government put in place good policies, investors are willing to invest without special government support (Dailami and Klein, 1997). Like contractual foundation factors (in previous analysis), the fifteen enabling environmental factors for establishing SPV of IPP projects in Asia are analyzed by statistical tools such as descriptive analysis, reliability test using Cronbach's alpha, and Factor Analysis. Table 5.6 shows the Cronbach alpha reliability for the factors is 0.860. Table 5.8 shows the rotated factor matrix (loading) of critical enabling environmental factors for IPP Projects in Asia respectively.

Table 5.6 Reliability statistics for enabling environmental factors

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.860	.864	15

The KMO value is 0.712 (as shown in Table 5.7) which also reflects that factor analysis is appropriate for these data.

Table 5.7 KMO and Bartlett's test for enabling environmental factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.712
Bartlett's Test of Sphericity	Approx. Chi-Square	221.013
	Df	105
	Sig.	.000

Table 5.8 shows that fifteen essential enabling environmental factors for establishing SPV of IPP projects in Asia are grouped into three principal factors and be interpreted as follows;

Table 5.8 Rotated factor matrix (loading) of critical enabling environmental factors for establishing SPV of IPP projects in Asia

Factor Components	Component		
	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor3</i>
1. Comprehensive and transparent concession law	0.7362		
2. Competitive bidding award	0.7121		
3. Strong political commitment (Clear Objective, Dispute Resolution)	0.7007		
4. Institutional environment (such as skill and dedicated Government staff to oversee design and implementation of PPP)	0.6862		
5. Government allows dispute resolution in international arbitration	0.8010		
6. No significant instance of expropriation, currency inconvertibility or contract abrogation by the government	0.7685		
7. Government to carry out all preparatory work including land acquisition and utility removal at its cost	0.7821		
8. Long track record of country's legal stability		0.7817	
9. Established government's template for infrastructure financing		0.7501	
10. Government issuance of policy guideline		0.6557	
11. Well developed legal system and significant precedent exists		0.5845	
12. Legal statutes for project finance		0.5448	
13. Trade liberalization, Privatization or deregulation of key sectors (such as electricity, utilities etc.)			
14. Concession Agreement, off-take and fuel supply agreement are in one agreement i.e. "all in one package"			0.8170
15. De-linking PPA and fuel Supply Agreement			0.8130

*Note: Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 7 iterations.*

(d) Factor Grouping EE1 represents Regulatory framework

(e) Factor Grouping EE2 represents Host Country Business Environment

(f) Factor Grouping EE3 represents Concession Agreement

These three factor groupings account 67.5% of the overall variances between factors (as shown in Table B4 of Appendix B)

5.4.2.1 Factor Grouping EE1: Regulatory Framework

A favorable regulatory framework is very important for establishing SPV of IPP projects in Asia. Such framework allows the SPV to develop IPP projects without

undue restrictions and project operation. Regulatory framework must be sufficiently defined so that its operation is transparent. In such case, concession law, clear objective, underlying bidding procedure, permits of land, and dispute resolution through arbitration are the major parameter for establishing SPV. Many IPP projects in Asia had suffered due to unclear concession law and absence of competitive bidding. Table 5.8 shows that all these components are associated with high loading in this group ranging from 0.6862 to 0.8010. This factor grouping is responsible for 38.2%% of the total factor variances in the critical enabling environmental factors for establishing SPV of IPP projects in Asia.

5.4.2.2 Factor Grouping EE2: Host Country Business Environment

This factor grouping is responsible for 18.7% of the total factor variances in the critical enabling environmental factors. Higher loading in this group is associated with ‘Long track record of country’s stability’ and ‘well developed legal system and condition precedence’. Needless to mention that the host country must be stable enough to encourage long-term investment by developers and loans by financial institutions as most of the IPP project financing is of long term (i.e. 10-30 yrs). In order to ensure business environment, the country must have in place a detailed systems such as policy guidelines, general business regulations, and rights, duties and powers of off-take purchaser for dealing with foreign lenders and investors. These are also reflected in the higher loading of ‘government issuance of policy guidelines’ and ‘government’s template for infrastructure financing’. Government should maintain a stable and growing economic environment so that the private sector can operate with confidence.

5.4.2.3 Factor Grouping EE3: Concession Agreement

This factor accounts for 10.6% of the total variability between critical enabling environmental factors. There are only two components under this factor grouping. A closer examination of this factor grouping reveals that ‘concession agreement, the off-take agreement and/or input supply agreement in one package’ scores higher

loading than ‘de-linking PPA and fuel supply agreement’. This may be due to the fact that if power purchase agreement (PPA) and/or fuel supply agreement are de-linked, sponsors would have to take higher fuel procurement and price risk in emerging markets in Asia. The government must be willing to acknowledge the need to develop concession contract laws in advance to introduce IPP projects.

5.4.3 Factor Analysis: Guarantee Factors

Guarantees from the government, multi-lateral and bilateral agencies are often critical to the successful financing of IPP projects in Asia particularly during the early years and transition from state dominance to a more market oriented economic system (Malhotra, 1997). The seventeen guarantee factors for establishing SPV of IPP projects in Asia are now being analyzed by statistical tools, such as descriptive analysis, reliability test using Cronbach’s alpha, and Factor Analysis. Table 5.9 shows the Cronbach alpha reliability for these factors is 0.868, which suggests that the data collected for these essential factors analysis are reliable (Norusis, 1992).

Table 5.9 Reliability statistics for guarantee factors

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.868	.874	17

Moreover, Bartlett’s test of sphericity and the Kaiser-Meyer-Olkin measure of sampling adequacy are both used to determine the factorability of the matrix as a whole. The KMO value is 0.651 (as shown in Table 5.10) which also reflects that factor analysis is appropriate for these data.

Table 5.10 KMO value and Bartlett’s test for guarantee factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.651
Bartlett's Test of Sphericity	Approx. Chi-Square	244.400
	Df	118
	Sig.	.000

Table 5.11 shows that the seventeen guarantee factors can be grouped into four principal factors and interpreted as follows;

- (g) Factor grouping G1 represents government guarantees on off-taker, supplier and SPV
- (h) Factor grouping G2 represents guarantees on tariff
- (i) Factor grouping G3 represents government's financial guarantees
- (j) Factor grouping G4 represents credit guarantees by financial institutions

These four factor grouping account for 66.7% of the overall variances between factors (as shown in Table B6 of Appendix B).

Table 5.11 Rotated factor matrix (loading) of critical guarantee factors for establishing SPV of IPP Projects in Asia

Factor Component	Component			
	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>
1. Government's guarantee on supplier's performance (if supplier is State Owned Enterprise)	0.705			
2. Government's counter guarantee on payment (if off-taker is SOE)	0.827			
3. Force majeure event by government is 'deemed dispatched' and oblige to make capacity payment to SPV	0.742			
4. Use of stabilization clause or stabilization guarantees in the contract between the host government and SPV	0.718			
5. Off-taker's guarantee for payment (Letter of credit from the off-taker)	0.768			
6. Price regulation guarantee on market by the host government		0.577		
7. Agreement that protects SPV from increases in country taxes or a change in country law		0.552		
8. Central bank's guarantee on Currency Availability, Convertibility and Transferability		0.822		
9. Limited counter guarantee in monetary value by the government on behalf of the off-taker		0.572		
10. Government's commitment to renegotiate tariff in the event of currency devaluation				
11. Government's guarantee on debt			0.694	
12. Unconditional and irrevocable guarantee by the host government			0.656	
13. Support letter from the host government which causes off-taker to discharge its payment obligation			0.607	
14. Multi-lateral Development Banks' credit guarantee				0.716
15. Export Credit Agencies credit guarantee				0.750
16. Credit facilities by the commercial banks				0.712
17. Letter of credit from a bank to tide over temporary liquidity mismatches on behalf of off-taker				0.774

*Note: Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 7 iterations.*

5.4.3.1 Factor Grouping G1: Government Guarantees on off-taker, supplier and SPV

Higher loading is associated with government guarantees on ‘supplier’s performance’, ‘off-taker’s payment’ and ‘force majeure event’. In Asia, the private sector does not have confidence in the payment of IPP projects and subsequently demands revenue guarantees or strong commitment from the government to ensure that their investment is secured and protected. It is also seen that the total variances for this factor grouping is very high, 34% (as shown in Table B6 of Appendix B). A higher loading is given to ‘government’s counter guarantee on payment on behalf of off-taker’. This ensures lower market risk and can increase the opportunity for project success as well.

5.4.3.2 Factor Grouping G2: Guarantees on Tariff

This factor accounts for 14.4% of the total variability between guarantee factors of IPP projects in Asia. A very high loading component in this group is ‘central bank guarantee on currency convertibility, availability and transferability’ (i.e. 0.822 as shown in Table 5.11). This guarantee ensures the lenders against currency mismatch between revenues and the costs. This type of obligation from the central bank helps SPV to make repatriation of profits and the servicing of foreign debts to its investors and lenders.

5.4.3.3 Factor Grouping G3: Government’s Financial Guarantees

There are only three principal components in this factor grouping and the factor accounts for 10.2% of the total variability between guarantee factors. A fairly high loading is found in ‘government’s guarantee on debt’ which is 0.694. This guarantee ensures lower cost of project financing and is also able to gain confidence to the financial institutions for funding.

Lower loading is associated with ‘support letter from the host government which causes off-taker to discharge its payment obligation’ in this factor grouping. Though in an economic crisis, the value of a government support letter diminishes (for example, in Paiton 1, Indonesia), however, the government still considers its support letter to be an important moral obligation that it does not want to breach.

5.4.3.4 Factor Grouping G4: Credit Guarantees by Financial Institutions

All the four components in this factor grouping account higher loadings ranging from 0.712 to 0.774. A fairly high loading is associated with “letter of credit from a bank to tide over temporary liquidity mismatches on behalf of off-taker”. In Asia, the state-owned enterprises and their underlying economic conditions are not sound enough to provide payment guarantees. Moreover, the market condition is so volatile that even a stable off-taker finds it difficult to make payment during some stages of project life-cycle.

The involvements of financial institutions such as MDBs and ECAs have significant value in establishing SPV for IPP projects in Asia. MDBs offer standard guarantees to private bank loans used to finance projects whose risk is of a sovereign or quasi-sovereign nature. Similarly, partial credit guarantees from MDBs enhance the market receptivity to bond issues (such as EGAT, in Thailand) as well. Another benefit of partial credit guarantee is access to long-term financing that is otherwise unavailable.

5.4.4 Factor Analysis: Credit Enhancement Factors

Though literally credit enhancement means a third party’s assurance for payment, and performance or obligations to major stakeholders, there are various ways to enhance the credit of a SPV. Financial credit enhancement tools include subordinated debt, contingency equity, claw back guarantee and so on. On the other side, political risk coverage, both pre-construction and post-construction, commercial risk coverage by ECAs, and the enhancement by state owned agencies

(such as off-taker and supplier) obligation are all credit enhancement tools from legal perspective. Hence, twenty-seven credit enhancement factors for establishing SPV of IPP projects in Asia are being factor analyzed to reduce the dimension of factors by groupings. Like other factor analyses on contractual foundation, enabling environmental and guarantee factors, this part also uses statistical tools such as descriptive analysis, reliability test using Cronbach's alpha, and Factor Analysis. It shows that factor analysis is suitable for the data of the credit enhancement factors as Cronbach alpha reliability is 0.856. Table 5.12 shows the reliability statistics of the data.

Table: 5.12 Reliability statistics for credit enhancement factors

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.856	.860	27

The KMO value is 0.629 (as shown in Table 5.13) which also represents that factor analysis is appropriate for these data.

Table 5.13 KMO and Bartlett's test for credit enhancement factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.629
Bartlett's Test of Sphericity	Approx. Chi-Square	251.101
	Df	124
	Sig.	.000

Table 5.14 shows that the twenty-seven credit enhancement factors can be grouped into five principal factors and be interpreted as follows;

- (k) Factor Grouping CE1 represents shareholders
- (l) Factor Grouping CE2 represents host government
- (m) Factor Grouping CE3 represents MDBs, ECAs, and other parties
- (n) Factor Grouping CE4 represents capital structural mechanism
- (o) Factor Grouping CE5 represents commercial banks

These five factor groupings account for 66.84% of the overall variances between factors (as shown in Table B8 of Appendix B).

Table 5.14 Rotated factor matrix (loading) of critical credit enhancement factors for establishing SPV of IPP Projects in Asia

Factor Component	Component				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1. Contingent Equity support by the sponsors	0.8490				
2. Standby credit guarantee by the sponsors	0.8450				
3. Shareholder's retention agreement	0.6630				
4. Ability to Exit through sales of shares from SPV					
5. Shareholders' agreement that SPV reserves a maintenance account for O&M before making any distribution to shareholders	0.6250				
6. Claw back guarantee by the project sponsors and passive equity investors	0.5473				
7. Letter of Credit by the host government		0.8160			
8. Establishment of government funded debt reserve account if state-owned off-taker is unable to make necessary payments to the lenders		0.9010			
9. Presence of host government grants					
10. Presence of Subordinated Debt (by Host Government)		0.7980			
11. Presence of Equity from Government/ Government Agency		0.7930			
12. Involvement of Multilateral Agencies			0.663		
13. Involvement of Export Credit Agencies			0.648		
14. Involvement of security trustee			0.622		
15. Involvement of insurance companies (Business interruption and casualty insurance policies in place)					
16. Presence of Subordinated Debt (by Multilateral Agency)			0.573		
17. Establishment of specialized intermediary (such as Infrastructure Development Finance Company etc) with equity participation from government, domestic financial institutions.			0.677		
18. Financing with political risk insurance from Multi-lateral agencies or Export Credit agencies or insurance companies			0.798		
19. Creation of Debt Service Reserve Fund				0.719	
20. A trust that grants SPV a priority interest in portion of off-taker's cash collection in case the off-taker defaults in payment obligation				0.646	
21. Indexation formula that adjusts the local currency tariffs for inflation and changes in tax				0.613	
22. Establish an escrow agreement between SPV and off-taker to capture revenues from off-taker customer to support off-taker's payment obligation				0.556	
23. Establish a lender managed escrow account for deposit revenues				0.508	
24. Standby letter of credit backing Contractor's performance to fulfill its obligation					0.755
25. Commercial Paper from Banks					0.672
26. A subordination agreement among government, SPV and lenders for short term cash flow pressure					0.634
27. Senior lender's acceptance of back-ended payment profile (i.e. flexible repayment schedule					0.764

Note: Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 7 iterations.

5.4.4.1 Factor Grouping CE1: Shareholders

Shareholder's credit enhancement is very important at the early stage of IPP project development particularly at the time of project construction. There are five principal components in this factor grouping which account for 28.9% (as shown in Table B8 of Appendix B) of the total variances in the factor analysis. Higher loadings are associated with 'contingent equity support' (i.e. 0.8490) and 'standby credit guarantee' (i.e. 0.8450). These are the commitments in lieu of completion guarantee and also mitigation tools against abandonment risk to a project. These devices are frequently used to provide the SPV and the lenders a degree of protection against certain perceived risks (i.e. construction and completion). Though a lower loading is associated with 'claw back guarantee' (i.e. 0.5437), however, it gives confidence to the lenders and the SPV against debt service improvement and other similar needs.

5.4.4.2 Factor Grouping CE2: Host Government

This principal factor is responsible for 18.3% of the total variances between critical credit enhancement factors for establishing SPV of IPP projects in Asia. Host government's equity, subordinated debt, letter of credit etc. are the ways to enhance the credit of a SPV. These attempts play essential roles in lowering the cost of financing and enhancing credit by financial institutions to a given project. It is seen that all the four components are associated with very high loading, ranging from 0.7980 to 0.9010.

5.4.4.3 Factor Grouping CE3: MDBs, ECAs and Other Parties

In this factor grouping, there are six principal components, of which the highest loading (i.e. 0.798) is associated with 'Financing with political risk insurance from multi-lateral agencies or export credit agencies or insurance companies'. This is particularly true in the Asian context, as the lenders see the political risk guarantees by MDBs or ECAs not just a political risk coverage, but a commitment by these agencies to monitor the project and encourage the government to meet its

commitments. In the emerging market in Asia where political issue is very volatile and unpredictable, such guarantee is critical in attracting commercial lenders and affords less time in setting up SPV for IPP projects if the guarantee had been introduced earlier. MDBs' participation in debt and guarantees (such as partial credit and partial risk) and their roles act as a conduit for funding from other commercial banks to their participation on subordinated debt. It is true that the involvement of MDBs can help to raise local currency bonds, currency swaps to provide long term debt financing. Involvements of ECAs help SPV to cover credit risk, inflation, pre and post completion risk. Moreover, some ECAs provide political risk coverage, currency convertibility and transferability to SPV.

The second highest loading is associated with 'Establishment of specialized intermediary (such as Infrastructure Development Finance Company etc) with equity participation from government, domestic financial institutions'. Such debt mechanism not only relieves the investors but also attract other offshore and domestic lending institutions to finance in a project (Chowdhury and Charoenngam, 2009).

5.4.4.4 Factor Grouping CE4: Capital Structure Mechanism

Capital structural mechanism has indirect credit enhancement to the SPV and eventually to the project. There are five principal components in this factor grouping. Higher loadings are associated with 'establishment of lender managed escrow account' and 'creation of debt service reserve fund'. Normally projects do not receive a rating higher than the host country's sovereign credit rating. In order to get improved credit rating for a project, it is necessary to set up escrow account either off-shore or onshore depending on lenders' requirement. For example, in Dabhol power project in India, the lenders had suspended their disbursement as the Maharashtra state government and Maharashtra State Electricity Board (MSEB) had not implemented the escrow account. Similarly, a widely used capital structure enhancement tool is debt service reserve fund. Establishment of such fund provides

confidence to the lenders when pledged cash flows are insufficient to satisfy the debt repayment. This ensures timely payment of debts.

5.4.4.5 Factor Grouping CE5: Commercial Banks

There are only four components under this factor grouping: commercial paper from banks, standby letter of credit backing contractor's performance, lender's acceptance of back-ended payment profile, and a subordination agreement among lenders, SPV and government for short term cash flow pressure. Of them, two components are associated with higher loading. One is 'lender's acceptance of back-ended payment profile' (i.e. 0.764) mechanism, which is particularly helpful if the base case differs from the reality (such as during cash flow pressure). Though it is not widely used, but presence of such clause (i.e. senior lenders' acceptance for extended loan maturity) can enhance the credit of the project and reduce market risk. The other one is 'standby letter of credit backing contractor's performance to fulfill its obligation'. This is particularly important for SPV and the investors. Though standby letter of credits are often not called upon, but when they are present, the bank cannot dishonor this instrument as inadequate for direct credit enhancement against EPC contractor's default in performance.

5.5 Chapter Summary

Thus, in this chapter, the questionnaire survey examines the relative importance of seventy-five critical financial and legal factors for establishing SPV of IPP projects in Asia. Given that all the factors are nominally seen critical in the literature, factor analysis is used to determine the principal critical factors groupings that underline setting up SPV for IPP projects in Asia. Factor analysis revealed fifteen factor groupings of critical financial and legal factors for establishing SPV for IPP projects in Asia. They are as follows;

for Contractual Foundation:

- (1) Output Contract
- (2) Input Contract

(3) Creditworthy Parties

for Enabling Environment:

(4) Regulatory Framework

(5) Host Country Business Environment

(6) Concession Agreement

for Guarantees:

(7) Guarantees on off-taker, supplier and SPV

(8) Guarantees on Tariff

(9) Government's Financial Guarantees

(10) Credit guarantees by financial institutions

for Credit Enhancement:

(11) Shareholders

(12) Government

(13) MDBs, ECAs and Others

(14) Capital Structure Mechanism

(15) Commercial Banks

CHAPTER 6

CRITICAL FINANCIAL AND LEGAL FACTORS FOR ESTABLISHING SPV OF IPP PROJECTS IN ASIA – DESCRIPTIVE ANALYSIS

6.1 Background

The former chapter (i.e. Chapter 5) describes the factor analysis of the seventy five factors that are nominally seen critical for setting up SPV of IPP projects in Asia. Identification of these factors and their sources are described in chapter 5. In this chapter, descriptive analysis such as mean, standard deviation, ranking and percentage of response per factor on these factors are analyzed. This chapter also explains the respondents' perception on these critical financial and legal factors (i.e. contractual: 16; enabling environment: 15; guarantees: 17; and credit enhancement: 27) for establishing SPV of IPP projects in Asia. In conclusion, three cases from Bangladesh, India and Thailand are investigated to validate the critical financial and legal factors of establishing SPV for IPP projects in Asia.

6.1.1 Contractual Foundation Factors

There are sixteen factors in the group. All of these contractual foundation factors are essential for setting up SPV of IPP projects in Asia. The following sections describe the survey results of these factors and the respondents' view on these factors.

6.1.1.1 Output Contract

From the literature review and case investigation, it is found that two off-take agreements are widely used: (1) take or pay and (2) hell or high water. In the questionnaire survey, respondents were asked to indicate which of these agreements they would like to recommend. Although responses vary from one respondent to another, they typically tend to center around a single value which can be deemed to be “representative” of criticality. Table 6.1 shows the survey result of questionnaire survey for establishing SPV of IPP projects in Asia.

It can be seen that “take or pay” is selected by majority of the respondents. (Note: The mean ratios for “take or pay” and “hell or high water” are 3.83 and 3.03, respectively.) Though the “hell or high water” off-take agreement contributes high indirect credit enhancement to the lenders, but it needs to be projected carefully due to the reason that the project is capable enough to produce its utility. It is interesting to find that “hell or high water” has high standard deviation which signifies that the data are spread over a large range of values. The rank of this factor is 72. From the survey, it is also seen that the culture of merchant facility (here the mean is 2.71) is not yet a popular practice in the emerging market of Asia. It is also noteworthy that none of the respondents gave maximum value (i.e. extremely important) to this factor. The rank of this factor is 73. Thus, it signifies that the respondents preferred to use long term off-take contracts to reduce market risks which are prominent in nature in Asia. It is also noted that the respondents made a moderate to high rating on “provision of third party sales in case of default of off-taker” with a mean of 3.58.

6.1.1.2 Input Contract

Among the three types of supply agreement (i.e. long term ‘supply or pay’; long term ‘supply and pay’ and, spot purchase), the long term “supply or pay” agreement (where the mean is 3.80 and std. dev. is 0.83) is the one mostly preferred by the respondents. A closer examination on supply agreement between “supply or pay” and “supply and pay” reveals that respondents, in general, rated the latter lower than the former. These observations again reinforce the assertion that experts prefer long time “supply or pay” agreement with a quality credit supplier (here, the mean is 4.3 and std. dev. is 0.74). This type of agreement gives the SPV a maximum degree of flexibility as long as yearly minimum purchase requirement is maintained. The SPV can buy fuels from other suppliers if the original supplier fails to deliver or the fuel is off-spec and the supplier pays the liquidated damage to SPV to buy on-spec fuel in the open market. Among the three type of supply agreement, spot purchase got the lowest mean value of 2.61 (as shown in Table 6.1) and also ranked at the last (i.e. 75). This may be due to the fact that the respondents have found that in this

Table 6.1 Survey results

Factors of Special Purpose Vehicle of IPP Projects in Asia	Min	Max	Mean	SD	Rank	% of Response Per Factor				
						1	2	3	4	5
Contractual Foundation Factors: (16 Factors)										
<i>Output Contract – CF1: (7 Factors)</i>										
Take or Pay off-take agreement	2	5	3.83	0.93	13	0	6.4	32.3	32.3	29
Hell or High Water off-take agreement	1	5	3.03	1.13	72	9.7	19.4	41.9	16.1	12.9
SPV is obliged to make certain payments to compensate the off-taker, if it fails to meet its delivery obligation	1	5	3.45	0.92	58	3.2	9.7	35.5	41.9	9.7
If off-taker does not dispatch the plant, it makes a capacity payment, but not energy payment	2	5	3.25	0.93	69	0	22.6	38.7	29	9.7
Guarantee from the off-taker to indemnify SPV for all costs/losses incurred converting payments from local currency to foreign currency	2	5	3.32	0.83	66	0	16.1	41.9	35.5	6.5
Merchant Facility	1	4	2.71	0.93	73	9.7	32.3	35.5	22.5	0
Provision of third party sales in case of default of off-taker	2	5	3.58	1.08	44	0	19.4	29	25.8	25.8
<i>Input Contract – CF2: (4 Factors)</i>										
Long term 'Supply or Pay' agreement	2	5	3.80	0.833	14	0	3.2	35.5	38.7	22.6
Long term 'Supply and Pay' agreement	1	5	3.22	1.02	70	3.2	19.4	41.9	22.6	12.9
Spot Purchase	1	5	2.61	0.88	75	6.5	41.9	38.7	9.7	3.2
Secure certain amount of energy through long term supply agreement	2	5	3.87	0.92	10	0	9.7	19.3	45.2	25.8
<i>Parties Creditworthiness –CF3: (5 Factors)</i>										
Credit quality of the off-taker	2	5	4.13	0.92	4	0	6.5	16.1	35.5	41.9
Credit quality of the supplier	3	5	4.30	0.74	1	0	0	16.1	38.7	45.2
Rated O&M contract with performance damage	2	5	3.58	0.84	42	0	6.5	45.2	32.3	16.1
Country's history on international borrowing records	2	5	3.45	0.88	56	0	12.9	41.9	32.3	12.9
Credit quality of the sponsor particularly an EPC contractor	2	5	3.51	0.85	51	0	9.7	41.9	35.5	12.9
Enabling Environmental Factors: (15 Factors)										
<i>Regulatory Framework –EE1: (7 Factors)</i>										
Comprehensive and transparent law	3	5	4.25	0.68	2	0	0	12.9	48.4	38.7
Competitive bidding award	2	5	3.70	0.90	28	0	6.4	38.7	32.3	22.6
Strong political commitment (Clear Objective, Dispute Resolution)	2	5	4.25	0.85	3	0	6.4	6.4	41.9	45.2
Institutional environment (such as skill and dedicated Government staff to oversee design and implementation of PPP)	2	5	3.80	1.07	17	0	16	19.4	32.3	32.3
Government allows dispute resolution in international arbitration	2	5	3.77	0.88	19	0	9.7	22.6	48.4	19.4
No significant instance of expropriation, currency inconvertibility or contract abrogation by the government	2	5	3.71	0.97	27	0	9.7	35.5	29	25.8
Government to carry out all preparatory work including land acquisition and utility removal at its cost	1	5	3.42	0.92	60	3.2	9.7	38.7	38.7	9.7
<i>Host Government Business Environment –EE2: (6 Factors)</i>										
Long track record of country's legal stability	2	5	3.90	0.74	7	0	3.2	22.6	54.8	19.4
Established government's template for infrastructure financing	2	5	3.80	0.87	15	0	6.5	29	41.9	22.6
Government issuance of policy guideline	2	5	3.77	0.88	19	0	6.4	32.3	38.7	22.6
Well developed legal system and significant precedent exists	3	5	3.90	0.65	6	0	0	25.8	58.1	16.1
Legal statutes for project finance	2	5	3.90	0.90	8	0	6.5	25.8	38.7	29
Trade liberalization, Privatization or deregulation of key sectors (such as electricity, utilities etc.)	1	5	3.61	1.02	40	3.2	6.5	38.7	29	22.6
<i>Concession Agreement –EE3: (2 Factors)</i>										
Concession Agreement, off-take and fuel supply agreement are in one agreement i.e "all in one package"	2	5	3.51	0.82	50	0	12.9	32.3	45.2	9.7

Factors of Special Purpose Vehicle of IPP Projects in Asia	Min	Max	Mean	SD	Rank	% of Response Per Factor				
De-linking PPA and fuel Supply Agreement	1	4	3.38	0.71	62	3.2	3.2	45.2	48.4	0
Guarantee Factors: (17 Factors)										
<i>Guarantees on Off-taker, Supplier and SPV- G1: (5 Factors)</i>										
Government's guarantee on supplier's performance (if supplier is State Owned Enterprise)	2	5	3.71	0.90	26	0	9.7	29	41.9	19.4
Government's counter guarantee on payment (if off-taker is SOE)	2	5	3.71	0.78	23	0	3.2	38.7	41.9	16.1
Force majeure event by government is 'deemed dispatched' and obliges to make capacity payment to SPV	2	5	3.87	0.95	11	0	6.4	32.3	29	32.3
Use of stabilization clause or stabilization guarantees in the contract between the host government and SPV	2	5	3.67	0.90	29	0	9.7	32.3	38.7	19.3
Off-taker's guarantee for payment (Letter of credit from the off-taker)	2	5	3.54	0.80	47	0	6.5	45.2	35.5	12.9
<i>Guarantees on Tariff –G2: (5 Factors)</i>										
Price regulation guarantee on market by the host government	2	5	4.0	0.89	5	0	3.2	29	32.3	35.5
Agreement that protects SPV from increases in country taxes or a change in country law	2	5	3.67	0.90	29	0	9.7	32.3	38.7	19.3
Limited counter guarantee in monetary value by the government on behalf of the off-taker	2	5	3.51	0.81	48	0	9.7	38.7	41.9	9.7
Central bank's guarantee on Currency Availability, Convertibility and Transferability	2	5	3.64	0.83	34	0	9.7	29	48.4	12.9
Government's commitment to renegotiate tariff in the event of currency devaluation	2	5	3.64	0.79	33	0	3.2	45.2	35.5	16.1
<i>Government's Financial Guarantees –G3: (3 Factors)</i>										
Government's guarantee on debt	1	5	3.48	1.12	55	6.5	12.9	22.6	41.9	16.1
Unconditional and irrevocable guarantee by the host government	1	5	3.58	1.14	45	6.4	12.9	16.1	45.2	19.4
Support letter from the host government which causes off-taker to discharge its payment obligation	1	5	3.61	0.92	38	25.8	35.5	22.6	16.2	0
<i>Credit Guarantees by Financial Banks –G4: (4 Factors)</i>										
Multi-lateral Development Banks' credit guarantee	2	5	3.67	0.94	31	0	6.4	45.2	22.6	25.8
Export Credit Agencies credit guarantee	2	5	3.30	0.86	67	0	16.1	48.4	25.8	9.7
Credit facilities by the commercial banks	2	5	3.77	0.76	18	0	3.2	32.3	48.4	16.1
Letter of credit from a bank to tide over temporary liquidity mismatches on behalf of off-taker	2	5	3.61	0.72	37	0	3.2	45.2	38.7	12.9
Credit Enhancement Factors: (27 Factors)										
<i>Shareholders –CE1: (6Factors)</i>										
Contingent Equity support by the sponsors	2	5	3.87	0.84	9	0	6.5	22.6	48.4	22.6
Standby credit guarantee by the sponsors	2	5	3.51	0.85	51	0	12.8	32.3	45.2	9.7
Shareholder's retention agreement	2	5	3.71	0.82	24	0	6.4	32.3	45.2	16.1
Ability to Exit through sales of shares from SPV	1	5	3.06	1.03	71	6.5	25.8	25.8	38.7	3.2
Shareholders' agreement that SPV reserves a maintenance account for O&M before making any distribution to shareholders	2	5	3.83	0.73	12	0	3.2	25.8	54.9	16.1
Claw back guarantee by the project sponsors and passive equity investors	2	5	3.42	0.76	59	0	6.5	54.8	29	9.7
<i>Government –CE2: (5 Factors)</i>										
Letter of Credit by the host government	2	5	3.71	0.82	24	0	6.4	32.3	45.2	16.1
Establishment of government funded debt reserve account if state-owned off-taker is unable to make necessary payments to the lenders	1	5	3.67	0.94	31	3.2	3.2	35.5	38.7	19.4
Presence of host government grants	1	5	3.51	1.09	54	3.2	12.9	35.5	25.8	22.6
Presence of Subordinated Debt (by Host Government)	1	5	3.42	0.92	60	3.2	9.7	38.7	38.7	9.7
Presence of Equity from Government/ Government Agency	1	5	3.38	1.05	63	6.4	12.9	25.8	45.2	9.7
<i>MDBs, ECAs and other Parties –CE3: (7 Factors)</i>										
Involvement of Multilateral Agencies	2	5	3.51	0.81	48	0	6.5	48.4	32.3	12.9
Involvement of Export Credit Agencies	2	5	3.45	0.88	56	0	12.9	41.9	32.3	12.9

Factors of Special Purpose Vehicle of IPP Projects in Asia	Min	Max	Mean	SD	Rank	% of Response Per Factor				
Involvement of security trustee	2	5	3.61	1.02	40	0	16.1	29	32.3	22.6
Involvement of insurance companies (Business interruption and casualty insurance policies in place)	2	5	3.64	0.91	36	0	6.4	45.2	25.8	22.6
Presence of Subordinated Debt (by Multilateral Agency)	1	5	3.25	0.81	60	3.2	6.5	58.1	25.8	6.4
Establishment of specialized intermediary (such as Infrastructure Development Finance Company etc) with equity participation from government, domestic financial institutions.	2	5	3.54	0.72	46	0	6.5	38.7	48.3	6.5
Financing with political risk insurance from Multi-lateral agencies or Export Credit agencies or insurance companies	2	5	3.80	0.87	15	0	9.7	19.4	51.6	19.4
<i>Capital Structure Mechanism – CE4: (5 Factors)</i>										
Creation of Debt Service Reserve Fund	2	5	3.74	0.81	22	0	3.2	38.7	38.7	19.4
A trust that grants SPV a priority interest in portion of off-taker's cash collection in case the off-taker defaults in payment obligation	2	4	3.35	0.66	64	0	6.5	54.8	35.5	3.2
Indexation formula that adjusts the local currency tariffs for inflation and changes in tax	2	5	3.64	0.87	35	0	9.7	32.3	41.9	16.1
Establish an escrow agreement between SPV and off-taker to capture revenues from off-taker customer to support off-taker's payment obligation	2	5	3.77	0.88	19	0	6.4	32.3	38.7	22.6
Establish a lender managed escrow account for deposit revenues	2	5	3.51	0.92	53	0	12.9	38.7	32.3	16.1
<i>Commercial Banks – CE5: (4 Factors)</i>										
Commercial Paper from Banks	1	4	2.61	0.80	74	0	16.1	48.4	25.8	9.7
Standby letter of credit backing Contractor's performance to fulfill its obligation	2	5	3.58	0.84	42	0	9.7	35.5	41.9	12.9
Senior lender's acceptance of back-ended payment profile (i.e. flexible repayment schedule	2	5	3.61	0.95	39	0	12.9	32.3	35.5	19.4
A subordination agreement among government, SPV and lenders for short term cash flow pressure	2	5	3.35	0.80	65	0	12.9	45.2	35.5	6.4

region, there are limited numbers of supplier and chances of raw material price escalation are high.

6.1.1.3 Creditworthy Parties

Very high scores are obtained by “credit quality of supplier” and “credit quality of off-taker”. 45.2% and 41.9% of the respondents gave highest rating (i.e. 5 = extremely important) on these two factors respectively. Credit quality of supplier and credit quality of off-taker have ranked first and forth in this analysis. The respondents have significantly considered this issue as they are concerned that a project may get downgraded due to the poor financial condition of the off-taker and supplier. “rated O&M contract with performance damage” is being accounted as another dominant factor (i.e. mean 3.58 and std. dev. 0.84) in considering credit quality of counter parties. The sponsor also can become a source of counter-party risk if it fails to provide equity in the construction stage of a project. This issue is also being reflected in the questionnaire survey of the respondents as we see that “credit quality of EPC contractor” also achieved higher mean (i.e. 3.51). A creditworthy contractor with a fixed price and certain- dates turnkey contract is able to bear completion risks. The experiences in Asia have shown that counterparty’s weak underlying economy and financial mismanagement can put the SPV into financial difficulty or even lead to restructuring of PPP to survive in the market.

6.1.2 Enabling Environmental Factors

There are fifteen factors in the group. All these enabling environmental factors are essential for setting up SPV of IPP projects in Asia. The following sections describe the survey result of these factors and the respondents’ view on these factors.

6.1.2.1 Regulatory Framework

Among the seven regulatory factors the majority of respondents considered “comprehensive and transparent law”, and “strong political commitment” as the most

important factors (with a mean of 4.25). Between these two, comprehensive and transparent law is the first and foremost factors due to its lower standard deviation than that of strong political commitment (as shown in Table 6.1). Factors “well developed legal system” and “long track record of country’s legal stability” are ranked 3rd and 4th in this group. It is noteworthy that 54.8% of the respondents gave higher weightage (i.e. 4 = very important) to “long track record of country’s stability”. A very high mean is also associated with “government’s allowance in dispute resolution in international arbitration”. It is thus inferred that respondents have profoundly considered dispute resolution mechanisms (such as arbitration and mediation) for overseas cases, especially when there is any suspicion that the courts of the host country will not treat a foreign investor fairly. The waiver of sovereign immunity converts the government into a commercial party for purposes of resolving legal issues. The respondents also considered “expropriation, currency inconvertibility or contract abrogation by host government” an important legal factor which is associated with a mean 3.71. To kick-off a project on time the factor “government to carry out land acquisition” has also got significant importance with a mean of 3.42. To accelerate project implementation, the government may, to some extent, furnish all these facilities to the private investors in advance. All these factors require due diligence before setting up SPV for PPP projects.

It is interesting to see that all the seven factors have scored a mean higher than 3.42. This indicates that the respondents have considered the factors of this group with significant importance for setting up SPV of PPP projects. Moreover, the mean score of this group is 3.84, which is much higher than any mean score of the contractual foundation or guarantees group. This implies that most of the respondents admitted the importance of regulatory framework as a cornerstone for setting up SPV of IPP projects in Asian countries.

6.1.2.2 Host Country Business Environment

From the analysis, the most dominant factors considered by the respondents are “long track record of country’s legal stability”, “well developed legal system” and “legal

statutes of project finance”. All these three factors got a very high mean (i.e. 3.90 as shown in Table 6.1). The least score gained in this group is by “trade liberalization, privatization or deregulation of key sectors” whose mean is also considerably higher (i.e. 3.61), compared to the mean of other factors of another groups. In order to setup SPV for IPP project in Asia, all these factors need to be seriously attended in advance. The higher means associated with all these six factors reflect that the respondents have cautiously considered all these factors as the experience have shown that many IPP projects had suffered badly or even could not kick off due to lack of these factors.

6.1.2.3 Concession Agreement

A closer examination on concession agreement between “de-linking PPA and fuel supply” and “all in one package” reveals that the respondents made higher ranking to the latter one. De-linking Power Purchase Agreement (PPA) and fuel supply agreement have attained a mean score of 3.38 which indicates that the respondents did not prefer/prioritize this mechanism as an influencing factor for setting up SPV. Though developers are considering PPA and fuel supply agreements separately nowadays, it is seen in many IPP projects in Mexico (Davis, 2003). This may due to the fact that if Power Purchase Agreement (PPA) or and fuel supply agreement are de-linked, sponsors would have to take higher fuel procurement and price risk in emerging markets in Asia. The respondents preferred to have the concession agreement, the off-take agreement and/or input supply agreement in one package, which is reflected in the outcome of the questionnaire survey.

6.1.3 Guarantee Factors

There are seventeen factors in the group. All these guarantee factors are essential for setting up SPV of IPP projects in Asia. The following sections describe the survey result of these factors and the respondents’ views.

6.1.3.1 Government Guarantees on Off-taker, Supplier and SPV

Among five types of government guarantees factors, “force majeure event by government is deemed dispatched and oblige to make capacity payment to SPV” got the highest mean (i.e. 3.87). It is to be noted that the risk of force majeure events, if unallocated away from the project, will limit most projects to the “BBB” category or below (S&P, Project and Infrastructure Finance Review). It is also important to note that the respondents made equal importance to “government’s counter guarantee on off-taker’s payment” and “government’s counter guarantee on supplier’s performance”. Both these factors have achieved a high mean 3.71. This reveals that the respondents have considered these two factors equally important for setting up SPV. Though the experiences from India (i.e. Dabhol Project) and Indonesia (i.e. Paiton 1 Project) show that counter guarantees from the host government can be unreliable, there is still a strong belief that these guarantee instruments have significant importance on decision making for setting up SPV of IPP projects.

6.1.3.2 Guarantees on Tariff

In this group, higher means are associated with “price regulation guarantee” and “central bank guarantee on currency convertibility, availability and transferability”. The respondents have chosen these factors important because these factors have immense impact on the structure of tariff rate. This guarantee ensures the lenders against currency mismatch between revenues and the costs. This type of obligation from the bank helps SPV to make repatriation of profits and the servicing of foreign debts to its investors and lenders.

6.1.3.3 Government’s Financial Guarantees

Though 25.8% of the respondents rated as not important (i.e. 0 = not important) to “support letter from the government”, yet it got a mean of 3.61 which is high enough compared to other factors considered in the questionnaire. It reflects that support letter

has significant importance, as it provides a statement of support and moral obligation from the highest level in the government.

6.1.3.4 Credit Guarantees by Financial Institutions

It is found that, the respondents have made highest rank to “credit facilities by the commercial banks” (i.e. 3.77 as shown in Table 6.1). A higher mean is also possessed by “letter of credit from a bank to tide over temporary liquidity mismatches on behalf of off-taker” (i.e 3.61) in this group. This may be due to the fact that almost all the off-takers in this region are state-owned enterprises and their underlying economic condition are not sound enough to provide payment guarantees. Moreover, the market condition is so volatile that even a stable off-taker finds it difficult to make payment during some stages of project life-cycle. In a developing country, the political and economic situation as well as creditworthiness of an off-taker can change considerably in just a few years. Thus the higher mean (i.e. 3.61) reflects the respondents’ prudent judgment to have letter of credit from bank on behalf of off-taker to tide over temporary liquidity mismatch during the course of dry market condition.

6.1.4 Credit Enhancement Factors

There are twenty-seven factors in the group. All these credit enhancement factors are essential for setting up SPV of IPP projects in Asia. The following sections describe the survey result of these factors and the respondents’ view on these factors as well.

6.1.4.1 Shareholders

The strength of the shareholder is measured not only by its financial condition but also by its commitment to the project. These are measured by contingent equity support, standby credit support, completion guarantee and their interest on shares, and received distribution. A very high mean (i.e. 3.7) was achieved by “contingent equity support from sponsors” from the respondents. This is a commitment in lieu of completion

guarantee and also a mitigation tool against abandonment risk to a project. This device is frequently used to provide the SPV and the lenders a degree of protection against certain perceived risks. The respondents have judged this factor with high priority because such commitment helps to share the burden of risks during the time of debt restructuring in many past PPP projects in Asia. The respondents gave a high weightage to “retention agreement” which has a mean of 3.71 and a standard deviation of 0.82. This signifies that the respondents do not want a shareholder to exit from SPV where the relevant shareholder’s obligations remain unperformed. They prefer to see continued presence of the sponsors within the SPV. The result is also reflected in “ability to exit” which has scored a mean of 3.06 and a standard deviation of 1.03. It is seen that none of these factors in this group got minimum weightage (i.e. Minimum 1), which indicates that the respondents have considered all these factors quite important in setting up SPV. “Contingent equity support by the sponsors” has achieved the highest mean (i.e. 3.87) followed by “shareholder’s agreement that SPV reserves a maintenance account” with a mean of 3.83. A higher percentage of responses on greater weightage (i.e. 4= very important and 5= extremely important) are found for these factors as well.

6.1.4.2 Government

The length of concession period and degree of government involvement has significant influence on the financial structuring of SPV. Five factors fell into this group. With a mean of 3.71, “letter of credit by the government” has gained highest rank from the respondents. Other significant factor is “establishment of government funded debt reserve account for off-taker”. This factor helps SPV with economic control on revenue stream which ensures lenders to get their debt service in case of off-taker’s inability for payment. From the survey, it is seen that the government’s grant (mean 3.51 and standard deviation 1.09) is also a significant credit enhancement factor for a PPP project. SPV can enhance project economics through government non-repaying grants and subordinated debt. Though the equity and debt guarantee from the government have higher impact on the ability to raise finance (Fishbein and Babbar, 1996), but it is interesting to find out that the respondents in this questionnaire survey made higher

ranking on government grants. It reflects that the respondents prefer to use less government financial exposure considering among equity, debt and grant.

6.1.4.3 MDB, ECA and Other Parties

Seven factors fall in this group and the highest mean is associated with “financing with political risk coverage from MDBs/ECAs” with a mean of 3.80 in this group. Some ECAs and MDBs provide guarantees or insurance of loans in relation to political events. 51.6% of respondents gave higher value (i.e. 4= very important) to this factor. It is needless to mention that political turbulence and instability in some developing Asian countries is quite prominent. Examples are Thailand and Pakistan. Experiences from the past PPP projects show that the governments make greater efforts to ensure loan repayments to MDBs/ECAs in case of political events. Therefore, the involvement of MDBs or ECAs with this type of loans helps SPV to make payment due to occurrence of political event and protects it from insolvency risk.

The sources of finance are also an important factor in view of financing by the participants. The involvements of international institutions increase the confidence level of local commercial banks and may consequently reduce the interest rate of debt. This has been reflected in the questionnaire survey where “involvement of multilateral development bank” has scored a high mean of 3.51. It is interesting to see that the respondents gave a moderate rating to “MDBs subordinate debt”. This may reveal that the respondents prefer MDBs’ more participation in debt and guarantees (such as partial credit and partial risk) and their roles [act](#) as a conduit for funding from other commercial banks to their participation on subordinated debt. It is true that the involvement of MDBs can help to raise local currency bonds, currency swaps to provide long term debt financing. One of the significant credit enhancement factors used in many PPP projects in Asia is “establishment of specialized intermediary with equity participation from government and/or domestic financial institutions” such as Private Sector Energy Development Fund (PSEDF) of Pakistan or Private Sector Infrastructure Development Fund (PSIDF) of Bangladesh. 48.3% of respondents gave higher rating

(i.e. 4= very important) to this factor. The survey reveals that this factor got a moderate rating (i.e. within the range of important to very important) with a mean of 3.54.

6.1.4.4 Capital Structure Mechanism

The SPV is required to maintain numerous bank accounts with funds earmarked for different purposes. Amongst them, one is debt service reserve fund (DSRF) which meets debt services in circumstances where there are insufficient funds in the revenue account. The respondents of the questionnaire survey have mentioned high importance to this factor which is reflected from its obtained mean 3.74. On the other hand, escrow account is set up to prevent siphoning of the project's revenue for other purposes by sponsors. The SPV needs to ensure this account abided by the covenants of the lenders as they wanted to control the cash available for debt service (CADS) and free cash flow (FCF) of a project. The respondents made a moderate rating to "establish a lender managed escrow account for deposit revenue" which has a mean of 3.51 but they made a high rank (i.e. mean 3.77) to "establish an escrow agreement between SPV and off-taker to capture revenue from off-taker to support off-taker's payment obligation" which is different from lender managed escrow account. This is a kind of security package that grants the SPV a priority interest in a portion of off-taker's operating cash collection in case of off-taker's default on payment obligation. For the reader's information, this kind of mechanism has been used in TermoEmcali power plant in Colombia.

6.1.4.5 Commercial Banks

One interesting credit enhancement mechanism is 'senior lender's acceptance of back-ended repayment profile'. The respondents of this questionnaire made a moderate to high rating (i.e. mean 3.61) to this factor as they believe that base case scenario is sometimes difficult to achieve in the Asian market. Therefore senior lenders' acceptance to longer maturity is beneficial for SPV to structure its payment profile.

6.2 Investigation of Cases

Now, three cases on IPP projects in Asia have been examined to validate the critical financing and legal factors for establishing SPV of IPP projects in Asia. These are Haripur Power Project in Bangladesh, Costal Gujarat Power Project in India and [Banpu Lockley China Power](#) (BLCP) Power Project in Thailand. The rationale of choosing these projects are: (1) the governments of these three countries have recognize that the pace of power development has to be accelerated in order to achieve overall economic development targets of the country and avoid looming power shortages, (2) the countries have created policy to encourage private power generation since early 1990s, and (3) all the projects are of high national interest in terms of project size and financing. Another important point to note is - all the governments of these countries have taken several initiatives together with various multilateral agencies to encourage IPP markets through benchmarking of these projects.

6.2.1 Background of Cases

Now, the following section describes the background of three selected IPP projects of Asia.

1. Haripur Power Project, Bangladesh

Haripur power project is a 360 MW combined cycle gas fired plant in Bangladesh. It is a build, own and operate (BOO) project by an independent power producer, [Allied Energy Systems](#) (AES) Corporation of USA. The total project cost was US\$183 million of which US\$68 million is provided by AES as equity. A debt facility of US\$115 million was provided through [International Finance Corporation](#) (IFC) A-loan, B-loan and commercial loans guaranteed by PRG. This partial risk guarantee was offered by [International Development Association](#) (IDA) which was critical to securing financing for the project. This provided coverage of loan default by AES Haripur (Private) Ltd. on scheduled debt service payments, of both principal and interest of the IDA partial risk guarantee (PRG) loan facility, resulting from the government's failure to meet its

payment obligations under the implementation and government guarantee agreement.

Table 6.2 shows the basic financing data of the project.

Table 6.2 Financing data of Haripur power project, Bangladesh

Equity:	68.00
Debt:	
IFC A loan	40.00
IFC B loan	14.10
IDA PRG	60.90
Total Project Financing (US\$ in million)	183.00

AES was awarded the project after an international competitive bidding process which came up with the lowest tariff (i.e. 3 cents/kWh). The price at which the project supplied power was particularly attractive and well below the average sale tariff of the utilities in the international market. The project company Allied Energy Systems Haripur (AESH) Private Ltd. signed an implementation agreement (IA) with the government of Bangladesh and a power purchase agreement (PPA) with Bangladesh Power Development Board (BPDB)– the off-taker to deliver electricity for 22 years on a ‘Take or Pay’ basis. The power of the project was fully dispatchable to BPDB. On the other side, a gas supply agreement (GSA) was signed between AESH and Titas Gas Transmission and Distribution Company Limited (i.e. Titas) – an estate own enterprise which guarantees fuel availability. The supply agreement also recognizes that Titas would pay penalties to cover lost revenues and/or the price difference of substitute fuel if it fails to deliver fuel on time which might result in noncompliance in providing power by AESH. Under an implementation agreement, the government has guaranteed both BPDB’s and Titas’ respective obligations under the PPA and GSA. Moreover, the Land Lease Agreement was signed with Ministry of Industries for the project. Figure 6.1 shows the contractual structure of Haripur power project.

Figure 6.1 Contractual Agreements of Haripur Power Project, Bangladesh

IDA and IFC played a key role in catalyzing this important commercial financing package for a term of 15 years, which is the first-term financing of its kind for Bangladesh. The project went into commercial operation on 30 June 2001.

2. Coastal Gujarat Power Project, India

Costal Gujarat Power Project is one of the first five ultra mega power projects (UMPP) in India, located at 1.5 kilometers from Mundra Sea Port of Gujarat. The project is awarded to Tata Power in Dec 2006 after a competitive bidding process assisted by IFC. It is a 4000 MW (i.e. 5x800) build own and operate (BOO) project in India where the output would be delivered to state-owned utilities in five states: Gujarat (47.5%), Rajasthan (36.1%), Maharastra (10%), Punjab (3.6%) and Raryana (2.8%) for 20 years.

It is considered that the development of such a large power project can result in cheaper power through economies of scale. Tata Power's winning bid for Mundra is approximately US 55 cents/kWh. Total project cost is US\$4.2 billion of which 75% is debt and 25% is equity. One of the major challenges for this project is to secure sources of financing for such ultra mega power project. The financing comprises of equity US\$1.05 billion, external commercial borrowing (ECB) of up to US\$1.8 billion and loans up to US\$1.37 billion. The International Finance Corporation (IFC) has provided US\$450 million and the Asian Development Bank (ADB) has committed to finance US\$450 million to the project. Table 6.3 shows the financing data of the project.

Table 6.3 Basic financing data of Mundra power project, India

Equity:	US\$ 1 billion
Debt:	
IFC	US\$450 million
ADB	US\$450 million
Korean ECAs	US\$800 million
Local Banks	US\$1.5 billion

Source: Mundra Project, Business Standard (2008)

External commercial borrowings include lending from the Export-Import Bank of Korea, International Finance Corporation, Korea Export Insurance Corporation, Asian Development Bank, BNP Paribas and Rupee lenders include SBI (lead bank for rupee lenders), India Infrastructure Finance, Housing and Urban Development Corporation, Oriental Bank of Commerce, Vijaya Bank, State Bank of Bikaner and Jaipur, State Bank of Hyderabad, State Bank of Travancore and State Bank of Indore. SBI is the financial advisor and mandated lead arranger for rupee loan. Coastal Gujarat Power Limited (CGPL) is set as special purpose vehicle (SPV) for this project which is responsible for not only raising financing for the project but also tying up the off-takes, getting clearance from various government agencies, obtaining coal blocks and other major legal issues. The first unit of 800 MW will be commissioned in July 2011 and the project will be fully operational by 2012. The successful financing of the Mundra IPP in the shadow of the Enron's Dabhol debacle, is a major achievement in India.

The 4000 MW Mundra ultra mega power project (UMPP) is the first of the UMPP which heralds the entry of super critical boiler technology in India which is significantly environmental friendly than other conventional ones using sub-critical boiler technology. The project consists of five units, each of 800 MW, which will generate saleable power of 3,800 MW (net) to be supplied to five states of India. Figure 6.2 shows the project structure of coastal Gujarat power project, India. The Ministry of Power, India took the role of co-ordination with concerned ministries/agencies and state governments for ensuring coal linkage, land acquisition, support from state government and its agencies on various issues, PPA and proper payment security mechanism with state government/state utilities. Moreover, letter of credit and escrow on the receivables are set as payment security mechanism.

Note: SPA – Share Purchase Agreement, PSA – Port Service Agreement, FTA – Fuel Transfer Agreement, FSA – Fuel Supply Agreement, PPA – Power Purchase Agreement, TRA – Trust and Retention Account, CLA – Common Loan Agreement

Figure 6.2 Project Structure of Coastal Gujarat Power Limited, India

It is interesting to note that Reserve Bank of India has permitted offshore foreign loans, which are termed external commercial borrowing, to the extent of US\$1.8 billion to meet the overseas capital costs incurred for the purchase of equipments and technology. This is a significant feature of the Reserve Bank of India for this UMPP project (Shroff, C. 2008).

3. BLCP Power Project, Thailand

BLCP is the 1434MW coal fired thermal power project in Map Ta Phut industrial economic estate of Thailand. The project consists of two units (2x717MW) which are located approximately 200 km southeast of Bangkok. It is the largest private sector power project in Thailand since the Asian financial crisis and was the only coal-fired independent power producer at that time. The consortium led by Banpu Public Company limited (Banpu) and Powergen Holding BV was selected as an IPP to build the BLCP Power (i.e. the project company) on a build-own-operate (BOO) basis. In December 1996, Electricity Generating Authority of Thailand (EGAT) announced BLCP as the winner of bidding for IPP projects in Map Ta Phut and contract was signed in November 1997. But due to Asian financial crisis, EGAT requested BLCP to defer the planned date of electricity production and extended to 4 years. BLPC complied with the request by EGAT. BLCP was selected because of its lowest tariff which is well below EGAT's cost to produce electricity. A PPA was signed between BLCP and EGAT-the off-taker for a period of 25 years and coal supply agreement with a subsidiary of Rio Tinto Limited of BLCP for a period of 25 years as well. The total project cost of this project was US\$ 1,340 million of which debt is 75% and equity is 25%. The debt came from the participation of a large number of international and local commercial banks - eleven offshore private lenders and nine onshore private lenders had contributed in debt financing of US\$ 1063 million. Asian Development Bank (ADB) and Japan Bank of International Corporation (JBIC) had also participated in the financing of the project. ADB provided US\$40 million ordinary capital resources, US\$100 million of complementary financing scheme (i.e. B-Loan) in favor of commercial lenders and a political risk guarantee in favor of commercial lenders to BLCP Power Limited. A loan of US\$408 million was contributed by JBIC to finance

the BLCP project. This loan was co-financed with private banks (agent bank: the Bank of Tokyo-Mitsubishi). Moreover, Nippon Export Import Insurance (NEXI) had provided insurance for the porting financed by commercial banks. Figure 6.3 shows the contractual structure of BLCP project.

The project sells power exclusively to EGAT on a ‘Take or pay’ basis. The tariff consists of (1) an availability payment and (2) an energy payment based on energy actually dispatched to EGAT. Construction of the project took place in July 2003 and the project was construction over 42 months and was operational 2.5 months earlier than scheduled.

Figure 6.3 Contractual Structure of BLCP Project, Thailand

The coal supply agreement was signed with Australian Coal Holdings (ACH), a wholly owned subsidiary of Rio Tinto Limited. The agreement provides supply of bituminous coal with specified quality and quantity. All the coal supplied by ACH is from Australia and Indonesia. A 30 year land lease agreement was signed between Industrial Estate Authority of Thailand (IEAT) and BLCP.

BLCP is considered a highly successful power project which is of the least cost IPPs in Thailand and plays an important role in fuel diversification and security of Thailand's power sector. ADB played a crucial role in achieving financial closure of this project in the aftermath of Asian financial crisis. This is a benchmark project as the participation of international and local commercial banks during the time when foreign exchange loans and the capacity available for private political risk insurance for the project was very limited in the region. The project was constructed through fixed price, turnkey engineering procurement and construction (EPC) contract by the consortium of Mitsubishi Corporation. The project came into commercial operation on 13 August 2006 for unit 1 and 14 November 2007 for unit 2.

6.2.2 Analysis of Contractual Foundation Factors of Cases

Output Contract:

It is found that the off-take agreement of these three projects is based on 'Take or Pay' basis. All the projects output are solely purchased by the state-owned-agency with a long term PPA. In coastal Gujarat power project, seven off-takers have signed power purchase agreements with CGPL which are Gujarat Urja Vikas Nigam Limited, Maharashtra State Electricity Distribution Company Limited, Punjab State Electricity Board, Haryana Power Generation Corporation Limited and three distribution companies from Rajasthan, Ajmer Vidyut Vitaran Nigam Limited, Jaipur Vidyut Vitaran Nigam Limited and Jodpur Vidyut Vitaran Nigam Limited for 25 years. Similarly, in Haripur power project, BPDB – the off-taker signed the PPA with AESH

for 22 years from commercial operation date. PPA for Mundra project has limited third party sale rights. The PPA provides for sale to a 'non-default off-taker' in case of any default by any other off-taker (as there are seven off-takers in this project) and thereafter sale to the market. In case of BLCP power project in Thailand, EGAT is the sole purchaser of the electricity for a period of 25 years following the commercial operation of the project.

Input Contract:

It is also seen that all the projects were able to arrange long term energy supply agreement from the supplier. In case of Haripur power project, the ministry of Energy has provided AESH with assurance in the form of a letter of amendment to the implementation agreement which provides for gas supply to Haripur project to be given priority over the IPPs in the unexpected event of a supply shortfall. In addition it, the government's guarantee of the gas supply to the project was also backstopped by the IDA PRG. On the other hand, in coastal Gujarat power project, a long term coal supply contract at reasonable prices was also sort out to mitigate fuel supply risk from imported coal and volatility of coal prices. CGPL has secured coal through long-term supply agreements with exporters of coal in Indonesia, South Africa, Mozambique, and/or Australia taking advantage of Tata Power Company's global procurement network. In BLCP project, a long term coal supply agreement for a period of 25 years was signed between BLCP and Australian Coal Holdings Pty Ltd (ACH). ACH also ensured that it has abundant coal resources capable of supplying BLCP for such long period. Thus the reserve warranty was ensured in these two projects.

Credit quality of the off-taker:

In case of Haripur power project in Bangladesh, a significant risk was associated with BPDB due its inability to meet payment obligations under PPA to ASEH. BPDB was not financially solvent to make its payment obligation for long term PPA. Thus, the government of Bangladesh had provided payment guarantee to ASEH in order to uphold

the creditworthiness of BPDB. In addition to it, IDA PRG could only be called if the government fails to make the payment to ASEH within 25 days of demand notice in the event of non-payment by BPDB. Similarly in coastal Gujarat power project in India, Ministry of Power played a crucial role in facilitating PPA and payment security mechanism with state agencies for CGPL in order to make the off-takers creditworthy for the project. The financial profile of CGPL's off-takers is diverse. But, none have defaulted or delayed payment for power purchased, except for disputed amounts. Table 6.4 shows the characteristics of the CGPL's off-takers.

Table 6.4 Characteristics of the project's off-takers of CGPL

Items	Gujarat	Maharashtra	Punjab	Haryana	Rajasthan
Off-take from CGPL	47.5%	20%	12.5%	10%	10%
Cash flow with subsidy	Positive	Negative	Positive	Negative	Negative
Collection efficiency	Very High 100%	High 93%	High 98%	Low 85%	High 97%
ATC losses	Medium 30%	Medium 36%	Low 26%	High 41%	High 46%

Note: ATC = Average Technical and Commercial

Sources: Coastal Gujarat Power Limited; Project Finance Corporation. 2007. *Report on the Performance of the State Power Utilities for Years 2003-04 to 2005-06*. New Delhi.

During the time of financing of BLCP project, the financial condition of the off-taker (i.e. EGAT) was even worse comparing the other two projects. Thai government's backstop payment guarantee on behalf of EGAT was not enough to gain the confidence of commercial lenders for this project. Political risk insurance or guarantees from multilateral institution was thus inevitable due to EGAT's vulnerable position and the unfavorable power supply demand situation especially during the time of Asian financial crisis. EGAT's credit standing is closely tied to government support and the Electricity Generating Authority of Thailand Act obliges the government to make appropriations to EGAT if funds to cover revenue deficiencies cannot be made from other sources.

Credit quality of the supplier:

The credit profile of the supplier of Haripur project was poor. The supplier's obligation was thus guaranteed by the government of Bangladesh. Ministry of Energy, Bangladesh had provided assurance to AESH in the form of a letter of amendment - a priority to supply gas to Haripur power project over other IPP projects. Where as, the suppliers of Mundra and BLCP power projects were exclusively from the sponsors group. The credit quality of these suppliers is therefore enhanced by some measures taken by the sponsors. For example, Tata Power – the sponsors of Mundra project had procured its own coal supply which led Tata Power to acquire 30% stake in Bumi Resources of Indonesia. In BLCP project, the coal supplier, Australian Coal Holdings Pty Ltd. (ACH), a wholly owned subsidiary of Rio Tinto Limited (i.e. RTZ-CRA), a 10% equity holder of the project. Coal for this project is primarily sourced from Rio Tinto mines located in Queensland and New South Wales of Hunter Valley areas of Australia as well as Rio Tinto's mining operations in Indonesia.

Credit quality of the sponsor and EPC contractors:

It is seen that all the three sponsors of the projects are internationally renowned and highly reputed and creditworthy companies. Tata Power Company Limited (TPC) is India's largest private power utility. TPC is a part of the Tata Group comprising 96 companies in seven business sectors. The company is established in 1919, licensed to generate, transmit and distribute power in India. Moreover, the company has successfully completed erection, testing, commissioning and trial operations of major overseas power projects in a number of countries, including UAE, Malaysia, Saudi Arabia, Kuwait and Algeria. Banpu, one of the sponsors of BLCP has been a pioneer in the successful development of IPPs and SPPs in Thailand. The Company is established in 1983 and now intends to use the experience and expertise to develop a business line of coal-fired power that is both complementary to and synergistic with its coal mining business. Currently, Banpu has an investment in two power generation companies in

Thailand namely BLCP Power limited in Rayong Province and Ratchaburi Electricity Holding Public Company Limited (RATCH), a gas-fired power plant in Ratchaburi Province. On the other hand, AES Corporation is one of the leading power companies in the world. Besides, AES Corporation has an extensive track record globally in the development, construction and operation of similar power plants.

The EPC contractors for these projects are also internationally recognized and creditworthy. For Haripur and BLCP projects, EPC contractors are Hyundai Engineering and Heavy Industries Ltd, and Mitsubishi Industries respectively. Likewise, Doosan the EPC contractor of Mundra project is a global company engaged in the infrastructure support business particularly in industrial facilities, machinery, heavy equipment and construction. Doosan is ranked the second in the world for low speed marine diesel engines. Many of the Doosan products such as hydraulic turbines and hydroelectric plants are recognized as ‘World Best Product’ by Korean government.

Country’s history of international borrowing records:

During the time of Haripur project financing, Bangladesh was considered moderately indebted with a relatively comfortable debt service ratio of 10%. The foreign exchange reserve was quite healthy and projected to raise approximately US\$3.5 billion by 2010 which was considered sufficient to cover the debt or import of two months throughout the period. In case of India, currency risk, currency inconvertibility risk and sovereign default risk is low in 2010. Foreign exchange reserve is moderate compare to its external debt (i.e. 22.9 and 18.4). On the other hand, Thailand’s per capita income has more than quadrupled to US\$3900 (over the past 30 years), putting it among the ranks of ‘middle income’ countries and making Thailand the second richest developing Asian country after Malaysia. Moreover, currency risk and sovereign default risk is low except currency inconvertibility risk which is moderate. Thus the overall risk for the investors was moderate (Export Finance and Insurance Corporation EFIC, December 2010). Thus it shows that the borrowing records of the three countries were favorable for investment during the period of these project financing.

6.2.3 Analysis of Enabling Environmental Factors of Cases

Competitive bidding:

All the projects are awarded through competitive bidding under transparent policy framework. In case of Haripur power project in Bangladesh, the government had acknowledged the macroeconomic risks of unconstrained IPP program by taking a decision to adopt a ceiling on future IPPs until such time as the finance of the sector is strengthened. There was no politicization of government commitments and no serious disruption happened in any of these three projects for implementing and operating plans on contractors, suppliers and holders of concessions granted by government agencies.

Strong political commitment from government:

There was a strong political support from the government for Haripur power project as the government itself requested IFC and IDA for debt financing and partial risk guarantee for this project. Moreover, due to acute power shortage during 1999, the government of Bangladesh had set highest priority on seven IPPs including Haripur with its all round commitment for implementation, power purchase and fuel supply agreements. On the other side, the government of India has set a policy of 'Power for All' by 2012. With this objective, Ministry of Power, Central Electricity Authority, and PFC have worked on the development of the ultra mega power project and Mundra power is the first one of such kind of initiative. It is interesting to note that the commercial operation date of BLCP fitted with the country's 2007 Power Development Plan (PDP) to ensure stability and to keep reserve margin within the country's targeted policy level.

Government issuance of policy guidelines:

Government of Bangladesh took initiative of inviting private sector to establish independent power producers (IPPs) under a 'Private Sector Power Generation Policy'

adopted in 1996. Haripur power project is one of the seven IPPs that is developed under this policy. In this project, the government assures AESH of all fiscal incentives and other benefits provided in the Private Sector Power Generation Policy of Bangladesh.). Similarly, according to the Electricity Act 2003, government of India has initiated five ultra mega power projects (UMPPs) to meet its huge demand on electricity in east zone of India. Likewise, BLCP is incorporated in accordance with the national policy of Thailand for greater access and participation of private sector in the electricity generation business under the scheme of IPP Program. The national policy supports and adopts by the country's cabinet resolution made in 1994.

Well developed legal system and significant precedents:

Thailand has fairly favorite climate for PPP. The legal system is flexible and quite adaptable to many of the modalities of private sector participation in public procurement, supply as well as PPP contract. Many PPP projects have been started since late 1990 and IPP program has been launched in December 1994. Out of 31,116 MW of electricity, 8010 MW has been produced by IPP projects in 2009. In case of Bangladesh, though PPP is still in nascent stage, but the country has started private sector participations in public projects through IPP since 1996. So far 16 IPP projects are in operations in the country and Haripur is third in rank of commercial operation. In Bangladesh, out of 10,586 MKWh of electricity, 6108 MKWh electricity is generated by IPPs in 2005-2006. On the other hand, India's delivery of infrastructure through PPP has acquired substantial pace since 2000. India began its IPP program with amendments of electricity law in 1991. The first IPP project has started its power delivery in 1996. Since then many IPP projects have started successful operation in India particularly in Gujarat and Maharashtra. Mundra power is one of the four ultra mega power projects commitment by the Indian government with its mission 'Power to All' by 2012.

Dispute resolution:

The contract agreement of Haripur power project states that any dispute will be resolved in accordance with ICSID or ICC rules which mean that the government of Bangladesh allows dispute resolution in international arbitration. The governments of Thailand and

India have also waived the sovereign immunity on the contract agreements of BLCP and Mundra power projects and consented to judicial proceedings in international court or decision making in connection with arbitration.

Government preparatory work of land acquisition:

The government of India has undertaken some groundwork before the Mundra project was handed over to the selected developers. Tasks include water linkage, environment and forest clearance, substantial progress in land acquisition, rehabilitation and resettlement-related works. With the help of Ministry of Power and Power Finance Corporation, the project obtained clearances relating to land acquisition and certain key clearances such as ports, transmission lines etc. CGPL has acquired the land and paid replacement rates that are well above recorded transactions. In BLCP project, the plant has acquired the land in Map Ta Phut, which is located in industrial estate under the land lease agreement with IEAT.

Off-take and fuel supply agreement in one package:

For Haripur power project, the implementation agreement signed between AESH and the government of Bangladesh contains power purchase, gas supply and land lease agreements. In BLCP project, the coal supply and power purchase agreements were not de-linked. The price of coal is fully passed on to EGAT in the tariff through the energy charge component.

6.2.4 Analysis of Guarantee Factors of Cases

Central Bank's guarantee on foreign currency availability, convertibility and transferability:

Bangladesh government has established a management and monitoring system in the central bank in order to monitor foreign exchange exposure resulting from IPPs. It would facilitate regulation of foreign exchange commitments across all sectors including IPPs. In Haripur power project, the government of Bangladesh through

Bangladesh Bank (i.e. the central bank) assures free convertibility and transferability of foreign exchange to meet AESH's foreign currency remittances. Similarly in Mundra and BLCP projects, central banks of India and Thailand have guaranteed currency convertibility and transferability to project lenders and financial institutions.

Minimum off-take guarantee:

Payments by each off-taker in Mundra power project is supported by an unconditional, irrevocable, and revolving letter of credit and a default escrow account. If an off-taker defaults, CGPL has the option to sell the power to other off-takers first, and second to third parties. There is a minimum guarantee of off-take (i.e. 65%) in Mundra power project. Similarly a minimum guarantee of off-take for Haripur power project and BLCP power project is 85%. In all these three projects, there is minimum guarantee for capacity payment for the month and energy payment for actual energy dispatched.

Letter of credit from the off-taker and government's guarantee:

In Haripur power project, the payment is guaranteed by letter of credit provided by BPDB (the off-taker) of two months capacity payment and also by the government of Bangladesh guarantee. On the other hand, in Mundra and BLCP projects, the off-takers of Mundra project and EGAT have provided three months capacity payment guarantee by their respective letter of credits.

6.2.5 Analysis of Credit Enhancement Factors of Cases

Contingent equity support by sponsors:

In Haripur power project, the sponsors had committed US\$7.5 million of standby equity support as contingency finance for cost overruns. Moreover, the sponsors have provided a performance guarantee of US\$ 20 million during construction and US\$ 2 million during operation. Similarly in BLCP and Mundra projects, the sponsors had provided

contingent equity support to the lenders US\$ 110 million and US\$ 35 million respectively for completion of the projects.

Involvement of MDBs:

IFC and ADB's participation in Mundra power project help commercial borrowings from offshore and onshore private commercial lenders such as Export-Import Bank of Korea, Korea Export Insurance Corporation, BNP Paribas and Indian commercial banks. IFC's presence in this project had contributed indirectly towards mitigation of political and regulatory risk. ADB has provided loan (i.e. US\$450 million) to this project without government guarantee of which up to US\$200 million is syndicated to KEXIM through risk participation agreement. The project is being built upon ADB assistance to the power sector reform program in the state of Gujarat. Similarly, the IDA PRG was crucial in mobilizing private sector financing from the international debt market for Haripur power project. IDA's partial risk guarantee on commercial debt of US\$ 60.9 million has encouraged the commercial lenders (e.g. CitiBank N.A. ANZ Grindlays Credit Agricole Indosuez, Hypovereins Bank and Kleinwort Dresdner Bank) to participate in loan financing. The IDA PRG has provided coverage to commercial lenders for loan default by AESH on scheduled debt service payments resulting from the government's failure to meet payment obligation of government guarantee support on PPA, GSA and LLA. In case of BLCP project, the foreign exchange loans were not available during the time of financing (i.e. 2003-2004) because of credit constraint faced by international and commercial banks due to Asian financial crisis. Moreover, private political risk insurance providers had limited capacity at that period. Therefore, the role of ADB was crucial for BLCP project financing as it provided direct loan and a PRG to catalyze commercial financing in enabling the project to achieve its financial closure. Moreover, ADB took the lead in mobilizing a PRG for other providers.

Involvement of ECAs:

Mundra power project is the first project that has been financed by KEXIM on a project finance basis in India. KEXIM entered into risk participation structure with ADB to mitigate some risks from ADB. It is also important to note as the project used Korean equipments therefore KEXIM's participation also helped the supplier and contractors to get direct payments through the participation of KEXIM which eventually reduced the construction costs of the project as well. Participation of ECAs were absent in Haripur and BLCP power projects. In BLCP project, Nippon Export and Import Insurance (NEXI) had provided insurance for the portion financed by commercial banks.

Escrow account between SPV and Lenders:

In Mundra power project, payment by each off-taker is supported by an unconditional, irrevocable, and revolving letter of credit and a default escrow account. Escrow accounts are also set for Mundra and BLCP projects to get receivables from the off-takers of the project as an instrument for payment security.

Establishment of special intermediately:

Indian Infrastructure Finance Company Limited (IIFCL) a 100% government-owned entity of India provided US\$450 million financing on Mundra power project. Its participation not only encouraged other domestic commercial institutions to participate in the project but also provided long-term debt. Though this is not present in Haripur project but in some other IPP projects, Infrastructure Development Company Limited (IDCOL) has actively participated. For example, in Meghanaghat power project of Bangladesh, IDCOL has provided US\$ 80 million.

Debt service reserve fund:

In case of Haripur project, a six-month debt service reserve account was set-up for repayment to commercial lenders. Moreover, the government of Bangladesh had

covenanted to IDA that it would maintain an annual external debt service threshold if between 18-20 percent on a projected basis.

Table 6.5 shows the salient features of three IPP projects.

6.3 Discussion of Findings

Output and input contracts are crucial agreements to decide on the magnitude of financing by the lenders as well as from SPV's point of view. These also become vital issues in some instances of failed PPP projects. For example, in a recent study, it was found that Indian giant Tata Group had finally given up its US\$ 3 billion investment plan on fertilizer, power and steel projects in Bangladesh. This is due to the fact that the Bangladesh government was unable to give assurance for a long term gas supply. Khan and Parra (2003, pp. 113-114) stated that a project that has an off-take agreement is always more attractive than one that does not. The market risks particularly in Asia are eliminated through the long term off-take and supply agreement. In these three IPP projects, it is found that the governments as well as the lenders have ensured long term off-take agreement ('Take or Pay') and supply agreement in their PPA and GSA. The culture of merchant facilities (i.e. spot purchase) has not been adopted at large in PPP projects in this region. Moreover, it is also experienced that credit rating agencies have downgraded merchant power business in Asia due to power price volatility. This observation is reinforced and reflected in the outcome of the questionnaire survey by the experts from Asia.

All these three projects have creditworthy EPC contractors and operators. Since the financial conditions of the off-takers of these projects were poor, the governments have provided payment guarantee on behalf of these agencies in order to enhance their credits and to avoid down-grading of the projects. The government had provided performance guarantee to the supplier (Titas Gas) in order to assure long term supply agreement and its availability to the lenders. On the other sides, the sponsors of India (Tata Power) and Thailand (BLCP) have ensured their long term coal supply and availability through the sponsors' global procurement networks.

Table 6.5 Salient features of three IPP projects

Factors of Special Purpose Vehicle for Power PPP Projects	Haripur Power Bangladesh	Mundra Power India	BLCP Power Thailand
Take or Pay off-take agreement	X	X	X
If off-taker does not dispatch the plant, it makes a capacity payment, but not energy payment	X	X	X
Guarantee from the off-taker to indemnify SPV for all costs/losses incurred converting payments from local currency to foreign currency	-	X	-
Provision of third party sales in case of default of off-taker	-	X	-
Long term 'Supply or Pay' agreement	X	X	X
Secure certain amount of energy through long term supply agreement	X	X	X
Credit quality of the off-taker	X	X	X
Credit quality of the supplier	X	X	X
Rated O&M contract with performance damage	X	X	X
Country's history on international borrowing records	X	X	X
Credit quality of the sponsor particularly an EPC contractor	X	X	X
Established government's template for infrastructure financing	X	X	X
Competitive bidding award	X	X	X
Strong political commitment (Clear Objective, Dispute Resolution)	X	X	X
Government issuance of policy guideline	X	X	X
Well developed legal system and significant precedent exists	X	X	X
Government allows dispute resolution in international arbitration	X	X	X
No significant instance of expropriation, currency inconvertibility or contract abrogation by the government	X	X	X
Government to carry out all preparatory work including land acquisition and utility removal at its cost	X	X	X
Concession Agreement, off-take and fuel supply agreement are in one agreement i.e "all in one package"	X	X	X
Government's guarantee on debt	X	-	-
Limited counter guarantee in monetary value by the government on behalf of the off-taker	X	-	-
Support letter from the host government which causes off-taker to discharge its payment obligation	X	-	-
Price regulation guarantee on market by the host government	X	X	X
Government's guarantee on supplier's performance (if supplier is State Owned Enterprise)	X	-	-
Government's counter guarantee on payment (if off-taker is SOE)	X	X	X
Force majeure event by government is 'deemed dispatched' and obliges to make capacity payment to SPV	X	-	X
Unconditional and irrevocable guarantee by the host government	-	X	-
Central bank's guarantee on Currency Availability, Convertibility and Transferability	X	X	X
Export Credit Agencies credit guarantee	-	X	-
Credit facilities by the commercial banks	X	X	X
Off-taker's guarantee for payment (Letter of credit from the off-taker)	X	X	-

Factors of Special Purpose Vehicle for Power PPP Projects	Haripur Power Bangladesh	Mundra Power India	BLCP Power Thailand
Contingent Equity support by the sponsors	x	x	x
Standby credit guarantee by the sponsors	x	x	x
Shareholder's retention agreement	x	x	x
Claw back guarantee by the project sponsors and passive equity investors	x	-	-
Letter of Credit by the host government	x	x	-
Presence of Equity from Government/ Government Agency	-	It is there, but not being used	-
Involvement of Multilateral Agencies	x	x	x
Involvement of Export Credit Agencies		x	
Involvement of insurance companies (Business interruption and casualty insurance policies in place)	x	x	x
Commercial Paper from Banks	x	x	x
Establishment of specialized intermediary (such as Infrastructure Development Finance Company etc) with equity participation from government, domestic financial institutions.	It is absent in this project but exists in another project	x	x
Financing with political risk insurance from Multi-lateral agencies or Export Credit agencies or insurance companies	x	-	x
Creation of Debt Service Reserve Fund	x	x	x
Standby letter of credit backing Contractor's performance to fulfill its obligation	x	-	-
Indexation formula that adjusts the local currency tariffs for inflation and changes in tax	x	x	x
Establish a lender managed escrow account for deposit revenues	x	x	x

Note: x = present, - = absent

It is also essential to identify the legal factors that commonly lead to successful setup of SPV for PPP projects in a country, and to incorporate these factors as criteria for predicting success in future PPP projects of a similar nature. Legal and institutional framework must be in place before setting up SPV for PPP projects. Historically, the lack of legislative and regulatory frameworks has hampered project financing in developing countries in Asia. In view of this, governments must decide by which active steps private sector investment and development can be achieved and identify the negative impact of existing institutional environment, political commitment and legal status. It is reflected in the survey that, 41.9% and 45.2% of respondents gave highest weightage (i.e. 4= very important and 5= extremely important) to this factor. Lack of legal status for project financing and absence of government templates for PPP can lead to lengthy negotiation which in turn would hinder investors from setting up SPV for a project. These are also reflected in the three selected cases. In these three IPP projects, the governments have ensured a set policy for private sector participation, guidelines and legal system. Proper structuring of SPV for these projects is thus achieved through these legal factors which eventually helped to mitigate political, legal and regulatory risks.

Involvement of MDBs and ECAs with political risk guarantees are also essential for project financing in Asia. It is seen that these organizations not only help in financing but also provide crucial roles in risk mitigation, thus gaining confidence of the lenders for investment in the projects. For example, IFC played a key role in financial structuring of all lenders in Mundra project, India. Its presence indirectly contributed towards mitigation of political and regulatory risks. In Haripur power project of Bangladesh, IDA has provided partial risk guarantee which covered debt service default to the lenders caused by breach of contractual obligations of the government of Bangladesh. Similarly in BLCP project of Thailand, ADB has provided direct loan and a partial risk guarantee to catalyze commercial financing as well as in enabling the project to achieve financial closure. In questionnaire survey, this factor “financing with political risk coverage from MDBs/ECAs” also got highest rating with a mean of 3.80. It is seen that 51.6% of the respondents have provided higher value (i.e. 4= very high) to this factor.

There are various ways to enhance the credit of a project. Credit enhancement can be done by sponsors, government, multilateral banks, bilateral banks, and insurance companies. Credit enhancement has a role in political risk coverage and mitigation of cost-overrun risk. It is found that, in all these three projects, sponsors have provided contingent equity support for cost overruns, completion and performance guarantee of the projects. This is also reflected in the questionnaire survey that 48% respondents have ranked this factor as 'very important' and the overall mean is 3.87.

6.4 Chapter Summary

Descriptive analysis on these seventy-five factors provides an in-depth understanding on respondents' views on those critical financial and legal factors for establishing SPV of IPP projects in Asia.

Case investigations on three IPP projects are also done. From the analysis of questionnaire survey and case investigations, it is clear that SPV needs to be crafted properly for its sustainability in the emerging power markets of Asia. Project sponsors and its legal and financial advisors like to structure SPV in such a way that it would be protected against readily foreseeable policy and regulatory risks, market risk, counterparty risks and finally investment risk. A questionnaire survey has been done to study the opinions of practitioners who have hands-on experiences in power PPP projects in Asia. Analysis of the survey results of the questionnaire survey of PPP practitioners particularly from Asia on setting up SPV and its practices confirms that consideration of these criteria (i.e. contractual foundation, enabling environment, guarantees and credit enhancement) are appropriate. However, in tailoring these criteria for a specific power project, adjustment should be made to reflect each party's role and capability in the project, because each factor has different weightage in SPV's setup which may affect the success of the power PPP project. It is believed that the findings will help the policy developers, financial and legal consultants towards developing SPV for IPP projects in Asia.

CHAPTER 7

FACTORS INFLUENCING FINANCE OF IPP PROJECTS IN ASIA – A LEGAL FRAMEWORK

7.1 Background

In this chapter, a qualitative research is done to identify various issues that a government needs to deal with for setting up of IPP projects in Asia [which is the second objective of this research](#). In this line, case studies on four IPP projects from India, Pakistan, Indonesia and China are evaluated and examined to analyze government's role and involvement in these projects. The issues examined are related to sovereign support policy, involvement of financial institutions and export credit agencies, purchase agreements, and credit enhancement mechanism. The analysis reveals that a government must carefully choose appropriate strategy for setting up of IPP projects depending on its contractual and financing agreements. Finally a decision support model is developed with an expectation that it would help government to develop a legal framework for financing IPP projects. [This research is based on case studies published in journals, books, and on the Internet.](#)

7.2 Rationale of choosing the sector and the projects

[Power is one of the biggest constraints for increasing growth in Asia. Sub-continent and South Asian countries are particularly facing a huge demand for electricity to meet the nations' requirement. Countries like Bangladesh, India, and Pakistan have set power as the highest priority sector to achieve their development goal and desired GDP. Today, along with the developing world, major IPP programs are unfolding in the emerging economies of Asia as their economies grow and the often weak state of the public sector renders it largely incapable of delivering the energy needs associated with growth. Greenfield \(i.e. new\) investment is considered as the major source of IPP expansion that accounts for 56% of the total investment in IPPs \(PACRA, 2009\). The IPP projects selected are Meghnaghat and Haripur of Bangladesh, Dabhol and Coastal Gujarat power projects of India, HubCo of Pakistan, Laibin B of China, Paiton 1 of Indonesia, and BLCP of Thailand. Economic Intelligence Unit \(EIU\) in its 2011 infrascop report has classified Asia-Pacific countries into four stages according to PPP-readiness. These are – \(1\) Nascent, \(2\) Emerging, \(3\) Developed and \(4\) Mature where Bangladesh, China, Indonesia, Thailand, Pakistan fall into the emerging stage and India into developed stage \(EIU, 2011\).](#)

In this Chapter, four IPP projects - (1) Dabhol power project of India, (2) Laibin B power project of China, (3) HubCo power project of Pakistan, and (4) Paiton 1 power project of Indonesia are examined. All the project contracts were signed during the period of IPP boom (1992-1996). All the projects had huge impact on the economic growth of the country, at the same time government's involvement was high as it was the first PPP project in the country.

7.3 Role of a Government

The role of power sector becomes vital for the economic development of a country (Gupta and Sravat, 1998). Especially, in Asia, government considers this issue very critically in economic viewpoint but failed to make credible promise due to political instability and financial constraints. Government can affect private infrastructure investment as a financier, supplier, customer, competitor, or regulator (Ramamurti, 2003). Government's involvement can occur in federal, state or even local level which influences the investment policy for infrastructure. Any element in a country's policy framework that jeopardizes financial structure becomes a stumbling block for investor consortia, making project either more expensive or simply impossible because of increased risk. In many developing countries, therefore, successful implementation of financial structure requires careful review of business environment for investments and, if necessary, reform of policy framework underlying it. New financial structures often need to be designed, laws need to be amended and/or new legislation created and adopted, and regulatory oversight functions must be established and strengthened. According to Gonzales (2003), a careful structuring of terms and conditions of the financing deals could pave a way to the formulation of a workable model. A consistent regulatory policy is therefore required even with multiple changes of government parties. In public private partnership (PPP) project, though most of the stakeholders are from private side and may be one or two bodies from public side such as Central Government, State Government and/or government owned agency, but they have profound role and can influence financial structuring. The role of the government depends largely on the position of the government in the project and the need for relevant support in order to attract necessary private investment in project

development (Delmon, 2009). The role and involvement of government in financial structure of PPP project can be best understood from the Figure 7.1

Figure 7.1 Government's Involvement in IPP Project

The following sections describe the overview of four IPP projects, analysis and results, decision support model and conclusion.

7.4 Overview of Projects

1. Dabhol Power Project, India

The first privatized Independent Power Producer (IPP) project in India. The Government of India and Ministry of power had invited EDC (Enron Development Corporation) to set up this project. Dabhol Power Company (DPC), a special purpose vehicle (SPV) worked as a nodal agency for bringing together private investors and concerned government agencies for the project. It was a 2015 MW **build-operate-transfer (BOT)** project which would be connected to Maharashtra state electricity board (MSEB) grid through 440 KV transmissions (Gupta and Sravat, 1998; Sudong, 2001). The energy used for this plant was initially naphtha and then liquefied natural gas (LNG). The power generated by the project contributes 2.6% of total power produced by India and the tariff rate was 16 cents/KWH.

2. Laibin B Power Project, China

Laibin B was the second phase [build-operate-transfer \(BOT\)](#) project of Laibin Power Plant, which involved investment, financing, design, construction, procurement, operation and maintenance and transfer of a 2X350MW coal-fired power plant. The Project Company (SPV) was consisted of Electricite de France (EDF) and GEC Alsthom backed by COFACE, France's export credit agency. Guangxi State Government ensured Fuel supply and Power purchase guarantee (Wang and Tiong, 2000). [The plant would be transferred to the Chinese Government after 18 years. The tariff rate of the plant was 4.82 cents/KWH.](#)

3. Paiton1 Power Plant, Indonesia

This was the first independent power project financed in Indonesia. PT Paiton Energy Company (Paiton1) was organized to finance, construct and own Indonesia's first large private power project at a cost of roughly US \$ 2.5 Billion. It was a 30 yrs contract with PLN. [The tariff rate of this plant was 6.61 cents/KWH. This coal fired plant contributed 5% of total power generated in Indonesia.](#) The economic downturn and political changes in Indonesia after 1998 caused severe problems to the project. The devaluation of local currency also adversely affected the sponsor's ability to service the foreign debt. The contract was then renegotiated (Schaufelberger and wipadapisut, 2003; Sudong, 2001).

4. HubCo Power Plant, Pakistan

Hub Power Company (HubCo), a public limited company incorporated in Pakistan was established to produce 1292 MW thermal power in the province of Baluchistan at a total cost of US \$ 1.833 billion. [It was a build-own-operate \(BOO\) project.](#) The lenders considered the equity as the protection for their loans and commitments towards the project. World Bank and a consortium of foreign banks and agencies were committed to finance the project. National Development Finance Corporation (NDFC) was appointed to the lead bank to arrange long term loans and also the administrator of private sector energy development fund on behalf of the Government of Pakistan (GOP). The power generated would be sold to WAPDA [for 30 yrs at a](#)

cost of 4.79 cents/KWH (Siddique, 2000; Sudong, 2001). Figure 7.2 shows the project phases.

Figure 7.2 Project Phases

Table 7.1 shows the general information of each project.

Table 7.1 Project information

Project	Country	Type of Contract	Concession Period (yrs)	Total Project Cost (US\$ Million)	Project Capacity	Fuel Used	Approximate Tariff rate*	Power Distribution to the Country**	Government Control***	Type of Project Financing
1. Laibin B	China	BOT	18	616	700 MW	Coal	4.82 cents/KWH	0.33%	State	Limited recourse
2. Paiton 1	Indonesia	BOO	30	2700	1230	Coal	6.61 cents/KWH	5%	Central	Non-recourse
3. Dabhol	India	BOT	20	2900	2015	Naphtha then LNG	16 cents/KWH	2.6%	State	Non-recourse
4. HubCo	Pakistan	BOO	30	1833	1200	Furnace Oil	4.79 cents/KWH	9.4%	Central	Limited Recourse

*Approximate Tariff rate: It is total average life cycle tariff which is the simple arithmetic average of base tariffs as per the Power Purchase Agreement of the Project (Source: <http://www.pakistaneconomist.com/issue2000/issue4/f&m4.htm>). For Laibin B it is 0.4 RMB, for Dabhol it is 8 rupees (Source: <http://www.gasandoil.com/goc/company/cns23252.htm>)

**Power Distribution to the Country: It is the percentage of electricity to be generated by the project to the total electricity produced in the country on that particular period. In 1997, the total electricity generation in China is 210,000 MW, in Indonesia 24.7 GW, in India 77000 MW, in Pakistan 12800 MW.

***Government Control: Government Authority who grants the concession agreement and concession period. Such as, for Laibin B, it is the People's Government of Guangxi Zhuang Autonomous Region (Guangxi Government) and for HubCo project it is Maharashtra State Government. Rest two projects Paiton 1 and HubCo are controlled by PLN National Electric Authority, Indonesia and Government of Pakistan respectively.

7.5 Analysis and Results

Analyses are done on sovereign credit rating, involvement of MDBs and ECAs, purchase agreements, guarantees and credit support agreements of four IPP projects in Asia. Following section describes the results of the selected cases.

7.5.1 Sovereign Credit Rating

Debt financing is difficult to arrange in developing countries and often requires sovereign guarantee (USAID, 1995). Better sovereign credit rating (SCR) helps finding variety of options for debt financing. Generally the sovereign credit rating of developing country is low and falls into non-investment grade. Investors are reluctant due to payment defaults on project in some particular developing countries. Therefore, it requires government to take some major financial initiatives like foreign exchange availability, favorable tax treatment, stamp and duties exemption, and legal initiatives as well to attract the lending institutions participating into capital investment in a project. The Legal initiatives are sovereign immunity waiver, assurance against confiscation expropriation nationalization deprivation (CEND risk), and support against political intervention. All these attempts help a government to gain trust to the lending institutions; overcome payment default and make creditworthy purchaser of utility.

It is found that the countries selected for this study had almost similar credit rating at that time (as shown in Table 7.2). However, Pakistan's rating falls the lowest among other countries. According to Okorotchenko (2007), Pakistan and Indonesia had sovereign rating of B⁺ and BBB respectively. This means that their rating were in non-investment grade (Kotecha, 2005). Due to this non-investment grade, Pakistan and Indonesia require sound and strong legal strategies, policies, reliable sponsors, sensible and transparent power purchase agreement in order to sell the project to the investors. Pakistan and Indonesia had achieved to attract international financing through government guarantee and credit agreement. In order to make the project attractive and finance-able, Pakistan government had enacted many agreements and guarantees for the project. Pakistan government urged World Bank to support and be the guarantor for this project. Moreover, State government's strong guarantee for off-

take and supply, and performance of supplier's guarantee have attracted many financial institutions to participate financing in this project.

7.5.2 Involvement of MDB and ECA

Attracting foreign funds for infrastructure project development is one of the critical issues for developing country (Kumaraswamy and Zhang, 2001). Domestic commercial banks are reluctant to contribute heavily to the capitalization of large projects. Moreover, they are not accustomed or even comfortable with the concept of entering into an inter-creditor agreement with foreign banks where loan governance decisions, decisions related to enforcement of security (Khan and Parra, 2003). The domestic capital market is not strong and unstable too. Therefore, the reality is, most of the funding generates from international financial institutions, private offshore banks and export credit agencies. Government has to seek forward to these institutions where it has strong tie and good relationship to mobilize finance with ease. The involvement of various lenders in a project has distinct objective and the project company has obligations to them. The project company has to fulfill the conditions which in turns influence financial structures of a project. For example, in HubCo Power project, the World Bank involvement gave financial guarantee that protects lenders against breach by the government of any contractual undertaking. The counter guarantee from the government helped the sponsors gaining more debt from other financial institutions. Under the umbrella of multilateral development banks (MDB), commercial lenders feel comfortable and are more likely to commit longer maturities. On the other side, though export credit agencies are the largest source of public finance for private sector projects, the main purpose of these agencies is to protect their companies against commercial and political risks of not being paid while operating abroad. In Dabhol project, political risk was covered by Overseas Private Investment Corporation (OPIC), NEXI provided political risk coverage of \$338 million in Laibin B project and Paiton1 project. In HubCo project, these risks were covered by COFACE, MITI and SACE.

The presence of MDB and Export Credit Agencies (ECA) not only help financing but also assures guarantees against political, commercial and completion risks. These agencies need to be selected carefully according to the risks mitigation strategy set by

Table 7.2 Influencing attributes in the case studies

Name of the Project	SCR [§] Grade by S&P (Jan 1, 1997)	Political Risk Coverage by ECA, MDB	Type of Bidding	Purchase Agreement		Implementation Agreement (IA)			Debt Security	Payment Security
				Off-take	Supply	FX Guarantee	Fiscal Incentive	Payment Guarantee		
1. Dabhol, India	BB ⁺ , non-investment Grade	OPIC	Direct Negotiation	Hell or High Water	Phase I: Naphtha, local market Phase II: LNG from Middle East	Fuel supply covers FX risk	10 yrs Tax Holiday	GOI guarantees to 1/3 of due amount	-	LC, State and Central Guarantee (monthly basis). Escrow Account
2. Laibin B, China	BBB, investment grade	COFACE extensive coverage	Competitive	Take or Pay	Guangxi Provincial Government supply coal from two mines	State Administrati on for Foreign Exchange	-	Guarantee on convertibility of RMB and no change of laws	COFACE coverage up to \$290 million	-
3. Paition 1, Indonesia	BBB ⁺ , non-investment Grade	JEXIM and USEXIM	Direct Negotiation	Take or Pay	PT Adaro is the coal supplier, newly set up company	-	-	No counter guarantee by govt. on behalf of PLN (off-taker)	USEXIM extended coverage to debt	Offshore payment facility, basis of payment was assurance of political continuity
4. HubCo, Pakistan	B ⁺ , non-investment grade	PRG and PCG by the World Bank, CDC, COFACE	Competitive	Take or Pay	Pakistan State Oil Co. supplies furnace oil, 30 yrs	FX Guarantee by SBP, Counter guarantor is Pakistan Govt.	Life long Tax exemption	GOP guarantees payment on behalf of WAPDA (off-taker)	World Bank ECO guaranteed loan, JEXIM guaranteed loan, commercial banks partial guarantee on debt service coverage in default	SBP guarantees FX and transfer through offshore and domestic escrow account

[§] Source: Asia Pacific Sovereign Report Card 2008 Outlook

Note: PRG= Partial Risk Guarantee; PCG= Partial Credit Guarantee; GOP= Government of Pakistan; GOI= Government of India; SBP= State Bank of Pakistan; RMB=Renminbi, OPIC= Overseas Private Investment Corporation CDC= Commonwealth Development Corporation, COFACE= Compagnie Francaise d'Assurance pour la Commerce Extérieur

a project company. Prudent selection of these international institutions not only acts as an umbrella to other lending organizations which are willing to participate into the project but also ensures adequate risks coverage.

7.5.3 Purchase Agreements

In these case studies, two projects were awarded through direct negotiation. It is found that these two projects had suffered on transparency issue. Direct negotiation was not at all a good choice for developing country like India or Indonesia where unstable political environment exists. Enron sought and obtained contract without competitive bidding. Paiton1 power project contract was awarded without public tendering. Both these projects initially had higher tariff rate. After a long onerous renegotiation the final tariff rate had been settled in Dabhol and Paiton1 project. Off-take and supply contract are the most vital agreements in project financing. The magnitude of investment mostly relies upon the conditions of these two contracts.

‘Hell or High Water’ agreement is a stringent ‘Take or Pay’ off-take contract. Though it contributes higher indirect credit enhancement, it needs to be projected carefully keeping in mind that the project would be capable enough to produce the aforesaid amount. In Dabhol power project, the project company locked Maharashtra State Electrical Board (the off-taker) in a way that Maharashtra State Electricity Board (MSEB) had to pay even if it does not require or plant cannot produce. Therefore, the MSEB had to pay US \$1.2-\$1.3 million yearly for Dabhol’s electricity. In ‘Hell or High Water’ agreement, the project company has to ensure the full capacity of the facility to the off-taker otherwise this type of agreement becomes a burden to the off-taker and suffers shareholders too. Moreover, the penalty can be high for not producing the agreed capacity to the off-taker. Similarly, the supply agreement is also essential for a project company to ensure continual supply of raw materials so that the project can generate production. It is also an important issue for fixing tariff rate. Supplier must be reliable with proven records of experience and capability. In Paiton1 project, the supplier was awarded to supply coal for the plant, despite the company had no previous experience in the coal business. It was prudent for HubCo project to arrange for the Pakistan government to supply furnace-oil at a fixed price over the

concession period. By doing so, it had removed the risk of supply which could affect operations and possible rise of price which might affect its profit.

7.5.4 Guarantees and Credit Support Agreements

Credit enhancement is a kind of guarantee that a project requires at various stages. Credit enhancement is done by sponsors, investors, government, multilateral banks, bilateral banks and insurance companies. Credit enhancement mechanism in Dabhol project were payment guarantee from state government, 'Take or Pay' off-take agreement and political risk coverage by OPIC. In HubCo project, Pakistan government's performance guarantee on Supply of oil and State bank's guarantee for foreign exchange, US\$ 436 million subordinated debt by Private Sector Energy Development Fund (PSEDF) were acted as credit enhancement. In Laibin B, Chinese government gave three strong supports - State Planning Commission (on provincial performance guarantee), the Ministry of Electrical Power (on tariff stability) and the State Administration for Foreign Exchange (on currency transfer and convertibility). In addition to it, COFACE offered political risk on pre and post project completion. These two packages were enough for Chinese government for full debt package without any need for multilateral bank involvement. In Paiton1 Project, credit enhancement were done through Central bank's guarantee as third party, sponsor's contingency equity provision, political risk guarantee by Export Import Bank of Japan (now JBIC, formally JEXIM) and Export Import Bank of United States (USEXIM). Sponsor's contingency equity and claw back guarantee were found only in this project, but on the other side, there was no counter guarantee from the Indonesian government due to payment default by the state owned enterprise for off-take agreement.

As lenders rely fully on the projected revenue of the project rather than project's assets and credits of the sponsors, therefore a set of securities are essential to ensure creditworthiness of a project. These securities are made to mitigate unpredicted risks in most effective way so that the lenders would be convinced for debt financing in the project. The project company needs performance guarantee from the government if government agency is supplier, and payment guarantee for off-take. Normally state owned enterprises are the supplier and off-taker. The project company (SPV) requires

foreign exchange guarantee from the central bank for currency availability, convertibility and transferability which also needs to be backed by the government. Government can support revenues to sponsors by foregoing or deferring taxes. It is seen from the cases, that government involvement is prerequisite for enhancing project credit in developing countries. Government's explicit guarantee reduce or eliminate the risks involved in IPP projects, such as, financial risk is reduced through government loan guarantees, and demand risk is reduced by minimum off-take guarantee.

In order to allocate/share the risks of an IPP project among a large pool of participants, SPV needs to establish/set various contracts with those participants. It operates at the centre of an extensive network of contractual relationships that attempts to allocate a variety of IPP project risks to those parties best suited to appraise and control them. For example, long term input agreement with the supplier to mitigate supply risk, off-take agreement with the buyer to mitigate market and demand risk, central bank guarantee and counter guarantee from the host government on foreign currency to mitigate currency risk to offshore banks and foreign investors, and so on. Table 7.3 shows a list of legal attributes that are required to mitigate the risks involved in IPP projects. This table is built based on the information of scholarly works of various researchers such as Sorge (2004), Wang et al.(1999, 2000), Tam and Leung (1999), Akintoye et al. (1998), Merna and Smith (1996), Salzmann and Mohamed (1999), Ghersi and Sabal (2006), Khan and Parra (2003), and Schaufelberger and Wipadapisut (2003). A part of it has been described in Chapter 2 section 2.4 "Project risks and Financing Strategies", and section 2.5 "Government Support and Guarantees". In Table 7.3 SCR risk is the impact to a country due to the rating by international credit rating agencies like S&P or Moody's. The risks that a country bears for such event are – higher interest rate payment to International financial Institutions, less attractiveness to investors and sometimes investors are restricted to invest in debt rated below a prescribed level.

7.6 Conclusion and Decision Support Model

The research is conducted through comprehensive examination of four IPP projects in

Table 7.3 Legal attributes and risks

Legal Attributes	Prominent Risks in IPP												
	Demand Risk	Market Risk	Supply Risk	Financial Risk	Debt Risk	Payment Risk	Political Risk	Completion Risk	Abandonment Risk	Currency Risk/ Foreign exchange	SCR Risk ^o	Performance Risk/Volume risk	Interest rate risk/ Price risk
Off-take Agreement	•	•		•		•						•	•
Feedstock Supply Agreement		•	•	•		•						•	•
Subordinated Debt				•	•								•
Government Loan Guarantee				•	•					•	•	•	
Government Payment Guarantee				•	•	•	•	•					•
Government Performance Guarantee				•			•						
Government Guarantee for FX										•			
IA (CEND)							•	•	•				
Multilateral Development Banks Participation					•	•	•		•				
Export Credit Agencies Involvement						•	•	•					
Backstop Payment										•	•		
Counter Guarantee by Govt. for Central Bank				•		•				•	•		
Provision for Financial Transaction - Offshore Escrow Account						•				•			
Competitive Bidding							•						

• = Risk Response (Mitigation)

India, China, Indonesia and Pakistan. The laws of the four countries provided various forms of government support; such as tax exemption, subsidies, equity participation, revenue guarantee and some risk absorbing strategies. The results are intuitive. The study leads to government's consideration on following legal factors that influence strategies for financing in IPP projects.

First, government has to ensure competitive bidding to meet transparency, accountability and creditworthiness of IPP project to the nation, particularly to the opposition party.

Second, government should participate in capital investment of IPP projects. Government needs to institute investment tool such as subordinated debt under the Multi-lateral Development Banks (e.g. the World Bank) in power projects similar to Private Sector Energy Development Fund (PSEDF) or Private Sector Infrastructure Fund (PSIF) in Pakistan and Bangladesh respectively. This debt mechanism not only relieves the investors but also attract other offshore and domestic lending institutions to finance.

Third, government must ensure performance guarantee in 'Put or Pay' supply contract if state owned enterprise (SOE) be the supplier, and creditworthy purchase guarantee 'Take or Pay' as off-taker for the project.

Fourth, government needs to encourage ECAs, MDBs and insurance companies to participate in financing and/or providing political and commercial risk coverage for the project.

Fifth, government needs careful selection of legal attributes for mitigating risks involved in IPP projects (Table 7.3) which help to form financial structuring. This will enable government to set legal strategies (Table 7.4) depending on conditions prevail in IPP projects.

Finally, based on analysis, a decision model in Table 7.4 is developed. The researcher has constructed this decision support model based on the research works of Gupta and Sravat (1998), Khan and Parra (2003), Kumaraswamy et al (2001), Wang et al (2000), Gonzales and Paul (2003), Siddiqui (2000), Schaufelberger and Wipadapisut (2003), and Ramamurti (2003). Depending on financing terms and conditions,

government needs to choose appropriate strategies for setting IPP projects in the country. For example, loose condition may exist when financing jurisdiction is questionable due to opaque off-take agreement. Therefore, the government should choose ‘Hell or High Water’ off-take agreement, escrow mechanism and trustee - as a legal strategy for its purchase agreement. Similarly, if a country possesses lower SCR (Table 7.4, column2), government needs to ensure – (Table 7.4, column3) strong off-take agreement, supply guarantee and performance, central bank guarantee for foreign exchange availability, convertibility and transferability as a strategy for attracting debt financing (Table 7.4, column1). These will help the government to attract investors, lending institutions and other private parties for better funding and project creditworthiness. Failure to identify these legal attributes and to incorporate them into strategies will impede project bankability as well as successful financial closeout.

Table 7.4 Recommended legal strategies for different conditions of IPP project financing and structuring

IPP Projects Financing and Structuring Terms	Conditions	Legal Strategies
Debt Financing Agreements	Country with High Sovereign Credit Rating* (Investment grade)	<ul style="list-style-type: none"> Set up Implementation Agreement (IA) such as Tax-efficiency, Exemption of Custom duties, Sovereign immunity, CEND Provide Legal opinions to support project documentation and collateral
	Country with low Sovereign Credit Rating (Non- investment grade)	In addition to above; <ul style="list-style-type: none"> Subordinated Debt from Government Ensure strong off-take agreement Ensure supply guarantee Establish guarantee for supply performance Central Bank guarantee for foreign exchange availability, convertibility and transferability
Financial Institutions, ECAs, offshore private banks and commercial banks	High debt, payment & political risk	<ul style="list-style-type: none"> Ensure careful selection of lending organizations that provide commercial, political and cost-overruns risk coverage
	Low debt, payment & political risk	<ul style="list-style-type: none"> Provide Counter guarantee by the government Subordinate debt contribution agreement by the government
Purchase Agreement: Off-take	High Demand & Market risk	<ul style="list-style-type: none"> Establish ‘Hell or High Water’ Contract Establish escrow mechanism Set up Trustee
	Low Demand & Market risk	<ul style="list-style-type: none"> Establish ‘Take or Pay’ contract Establish escrow account mechanism
Purchase Agreement:	High supply risk &	<ul style="list-style-type: none"> Ensure solid supply agreement by arranging ‘Put or Pay’ contract

Table 7.4 Continued

IPP Projects Financing and Structuring Terms	Conditions	Legal Strategies
Supply	Market risk	<ul style="list-style-type: none"> • Seek guarantee for supply performance (damage payable due to substandard supply)
	Low supply risk & Market risk	<ul style="list-style-type: none"> • Ensure ‘Put or Pay’ contract • Engage supplier of proven track record
Credit Enhancement	High creditworthy Project	<ul style="list-style-type: none"> • Incorporate insurance programs to cover both political and commercial risks • Seek MIGA, International Financial Corp. guarantee
	Low creditworthy project	In addition to above <ul style="list-style-type: none"> • Establish payment guarantee from the host government on behalf of central bank • Establish ‘Take or pay’ off-take agreement • Seek Political risk coverage from Export Credit Agencies • Backstop payment guarantee • Competitive Procurement

*Sovereign Credit Rating (SCR): The rating of a country by rating agency. This implies the risk level of investing environment of that particular country.

Thus, the model will help the government to set legal strategies (Table 7.4) and financial structuring of a project. In other words, this legal framework will persuade investors, lending institutions and private entities to finance in IPP projects.

7.7 Chapter Summary

In the previous Chapter (i.e. Chapter 6), the analysis is done on finding critical financial and legal factors for establishing SPV of IPP projects in Asia – [the first objective of the research](#). To attain the second objective, here, the researcher has [analyzed](#) the issues that a government needs to deal with for setting up of IPP projects in Asia. Four IPP projects are thus studied to analyze the governments’ role and involvement in these projects. Finally, a recommendation is made on legal strategies for different conditions of IPP projects financing and structuring (i.e. the decision support model). [The decision support model is strictly scrutinized and agreed upon by the professionals in this area and thus published in International Journal of Project Management, 2009, 27\(1\), 51-78](#). However, further validation of the proposed model is left to future research when there are more IPP case studies can be collected.

CHAPTER 8

ANALYSIS OF SPV AND STAKEHOLDERS OF IPP PROJECTS – CASE STUDIES

8.1 Background

The concept of project finance, SPV and network theory has been discussed in Chapter 2 (Literature Review). It briefly describes about project participants (i.e. stakeholders), project risks, and government support mechanism. In Chapter 4, the researcher investigates the details of stakeholders and their contracts with SPV, and core activities of SPV in the light of fifteen cases around the World. Finally, in this Chapter, the researcher examines the stakeholders' analysis by using network theory. The aim of this chapter is to explore the [organizational structure](#) of the network generated by IPP agreements. In IPP projects, the relationships between the participants are established through a variety of contractual agreements between financiers, government, contractors, operators and customers. Raising funds, linking various participants legally and financially, ensuring supply, and producing and marketing products depend on well-established financial and legal structure of agreements. Though numerous research studies have been conducted to establish and justify the structure of IPP projects based on contractual agreements between participating stakeholders and on existing legal framework of a host country, there are still some questions left unanswered. Examples are: What are the factors that influence the structuring of PPP? Who are the key stakeholders? And what are the roles of participating partners in a PPP project? However, not much work has been done. Application of network theory can help fill these gaps and identify and distinguish potential stakeholders in PPP affiliation and can effectively contribute to an in-depth analysis of the relationships among participating partners – [the third objective of this research](#). The analysis can identify important features like core-peripheral stakeholder(s), influential intermediary participants and their interdependence, and influences of a PPP structure on its substantive outcome. With the introduction of the network theory, a more thorough analysis of PPP structures can be achieved which may provide valuable information to project sponsors as well as legal and financial advisors.

8.2 Rationale of using network theory

Baines and Hale (2004) show that this theory can be applied to develop services because it can explain how things are linked to each other in order to grow. Similarly, network diagram is used by medical researchers to trace the spread of contagious diseases. Marketing researchers use network related data and conduct analysis to increase the effectiveness of their marketing strategies. Thus, the theory offers a successful conceptual framework to deal with the structure of many complex systems. Hence, the rationale for choosing network theory is its ability to substantiate the arguments made in this chapter. The theory provides a powerful tool for the representation and analysis of complex IPP structures and their interacting stakeholders. The significance of using the network theory on a IPP structure helps –

1. to identify most important stakeholder in a PPP structure
2. to recognize systematically which stakeholders are participating in a specific agreement and how many agreements a stakeholder is involved
3. to Classify how many stakeholders are involved in an agreement and the prominent stakeholders in those agreements; and
4. to analyze the structural constraints and opportunity that a stakeholder faces as well as to understand the role of a stakeholder plays in PPP structure

8.3 Selection of Cases

A comparative study on IPP infrastructure projects is carried out to get additional insight concerning legal and financial structure. Data used for this purpose are concession agreements of power generation projects in Pakistan, China, Bangladesh, and Indonesia. These are HubCo project in Pakistan, Laibin B and Meizuhou Wan Power project in China, Meghnaghat power project in Bangladesh, and Paiton 1 Power Project in Indonesia. Concession agreements of these five cases are then compared in terms of financial and legal structures and the involvement of stakeholders in the project. Since the aim is to find a case that represents all the interests in terms of PPP, the authors therefore set the criteria as follows:

- (a) Involvement of various contractors/suppliers/operators from the local and abroad;
- (b) Involvement of multi-lateral and bi-lateral agencies;

- (c) Involvement of export credit agencies in terms of debt and/or political risk guarantees; and
- (d) The project gets as many guarantees as possible from the government, government agencies and its central bank (i.e. off-take, supply, performance and foreign exchange guarantees).

All these criteria are emerged when comparing the five cases. Table 8.1 shows the projects and the presence of criteria as mentioned here.

Table 8.1 Selected cases and their features

Sl. No	Name of the Project	Presences of Criteria (features of the project)
1	HubCo Power Project, Pakistan	(a), (b), (c), (d)
2	Laibin B Power Project, China	(a), (c), (d)
3	Meghnaghat Power Project, Bangladesh	(a), (b), (d)
4	Paiton 1 Power Project, Indonesia	(a), (b), (c)
5	Meizhou Wan Power Project, China	(a), (b), (c)

Considering all these criteria and project features, it is found that the HubCo project of Pakistan is most complete one among the five cases (as shown in Table 8.1). The authors believe that all the PPP project structures can be analyzed using the network theory, but for the sake of better understanding, the HubCo project is most representative as it contains almost all possible factors in terms of stakeholders and their agreements. Therefore, the researcher first applies the network theory on HubCo project and afterwards consider Meghnaghat power project as another case to compare and conclude.

8.3.1 HubCo Power Project, Pakistan: Case 1 for network analysis

8.3.1.1 Background

The HubCo project of Pakistan is a good case to examine the structure of PPP due to the comprehensive set of contractual agreements that contain necessary security to ensure the viability of the project. This case has been described by many authors such as Delmon (2009), Chowdhury and Charoenngam (2009), Tiong and Anderson (2003), Tinsley (2000), Luxton (1998) in several journals, books, the world bank notes as well

as in public-private infrastructure advisory facility (PPIAF). This case will help to better understand the PPP agreements and its structure. At the outset, international financial institutions and banks had modest credit limits for Pakistan and domestic banks had limited lending capacity.

HubCo is a 4x323 MW power plant project and also the first Build-Own-Operate (BOO) plant project in Pakistan with 25:75 equity-debt ratio (Tiong and Anderson, 2003). World Bank and a consortium of foreign banks and agencies were committed to finance the project. Debt was provided in two forms: a subordinated debt from Private Sector Energy Development Fund (PSEDF) organized by World Bank and other debts from Japan, Italian and French export credit agencies (Luxton, 1998). A 30 year power purchase agreement was signed by Water and Power Development Authority (WAPDA, a state owned entity) with a provision of certain performance-based bonus and penalties for the project. National power UK, an equity holder was engaged to witness the construction and commissioning and also liable to ensure high plant performance during operation. The Government of Pakistan had provided HubCo a sovereign guarantee of the financial obligations of some of the state entities involved such as WAPDA and Pakistan State Oil Co. and a grant of 30-year concession. Moreover, HubCo (here the special purpose vehicle, SPV) entered into an exchange risk insurance scheme with the State Bank of Pakistan (SBP) to cover the currency-related risk. The structure of the project is shown in Figure 8.1.

World Bank provided partial risk guarantee in (1) conversion of local currency to foreign currency if SPV is unable to do so, (2) change in law that affects the economy of the project, (3) government's failure to its obligation under project agreement; (4) expropriation of project assets by government and (5) project's failure to generate sufficient revenue due to war and civil unrest on this projects (Delmon, 2009). To better understand the HubCo project, the network theory is employed to analyze the project in the following section

8.3.1.2 Bipartite Graph of HubCo Project, Pakistan

Now consider a bipartite (two mode) graph which represents the PPP agreements of the HubCo project. Group1 is the related parties of the PPP agreements and Group2 is the contracts/agreements. An edge exists only between an agreement and an actor (i.e.

a stakeholder of PPP), but there is no edge between two actors in the same set. Figure 8.2 shows the bipartite graph of HubCo project.

Figure 8.1 PPP Structure of HubCo Power Project, Pakistan

Source: Tinsley (2000)

Figure 8.2 Bipartite Graph of HubCo Project

Legend:

Stakeholder#1 = Pakistan Government
 Stakeholder#2 = WAPDA (Off-taker)
 Stakeholder#3 = Pakistan State Oil Co.

Stakeholder#4 = Contractors
 Stakeholder#5 = National Power UK
 Stakeholder#6 = HubCo (SPV)

Stakeholder#7 = Pakistan State Bank
 Stakeholder#8 = Equity Holders
 Stakeholder#9 = MDBs
 Stakeholder#10 = ECAs

Now, this graph can be analyzed algebraically by introducing adjacency and incidence matrices. In the matrix notation,

$B_{ij} = 1$, if node i from the first group links to the node j of second group

$= 0$, otherwise

In this matrix, each row represents the stakeholders of group1 and the columns represent the underlying contract/agreements with that stakeholder. For example, row 1 represents Pakistan government and its agreements in HubCo project. Similarly, row 2 represents WAPDA and its agreements in the HubCo project. Thus, adjacency matrix B is a binary matrix. It is neither a square nor a symmetric in general.

i and k are linked if both of them are linked to j (as shown in Figure 8.2).

$A_{ik} = \sum_j B_{ij} B_{ji}$; thus collapsing a two-mode network into a one-mode network

$A = BB^T$; Transpose of a matrix swaps B_{xy} and B_{yx} , if B is a m -by- n matrix B^T is n -by- m matrix.

$$\text{Therefore, } B^T = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 1 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 \end{pmatrix} \quad (2)$$

General formula for matrix multiplication is $Z_{ij} = \sum_k X_{ik} Y_{kj}$.

Therefore, $A = \begin{pmatrix} 5 & 1 & 1 & 0 & 0 & 5 & 2 & 2 & 1 & 0 \\ 1 & 2 & 1 & 0 & 1 & 2 & 0 & 0 & 0 & 0 \\ 1 & 1 & 2 & 0 & 1 & 2 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 1 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 5 & 2 & 2 & 1 & 1 & 8 & 2 & 4 & 2 & 1 \\ 2 & 0 & 0 & 0 & 0 & 2 & 2 & 1 & 0 & 0 \\ 2 & 0 & 0 & 1 & 0 & 4 & 1 & 5 & 2 & 2 \\ 1 & 0 & 0 & 1 & 0 & 2 & 0 & 2 & 2 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 & 0 & 1 & 1 & 2 \end{pmatrix}$ [A is the product of (1) and (2)]

The diagonal entities of A give the number of agreements that each party is being involved. For example, HubCo (SPV) is being involved in eight agreements; similarly Pakistan State Oil Co. is involved in two agreements. Off-diagonal elements of A give the number of agreements that both parties are involved. For example four agreements are occurred between equity holders and HubCo. Similarly, there are two agreements between the government of Pakistan and Pakistan State Bank (i.e. foreign exchange guarantee and guarantee on performance).

8.3.1.3 Network Diagram of HubCo power project by NetDraw

Software for Social Network Analysis (Computer package UCINET 6.0) is used to draw the network diagram of HubCo case. The package incorporates models which are suggested by Borgatti et al. (2002) for detecting core/periphery structures in network data. The components of matrix A are now being inserted into the data spreadsheets matrix of UCINET 6.0 and then visualize the network diagram with NetDraw. Figure 8.3 shows the network diagram generated by NetDraw (UCINET 6.0).

Figure 8.3 PPP Structure of HubCo Project by NetDraw

The drawing by NetDraw helps to better understand how a particular node is embedded its neighborhood and to the larger graph (i.e. is node 'isolate' a 'pendant'). It gives a sense of the structural constraints and opportunity that an actor faces and also able to understand the role that an actor plays in a structure.

8.3.1.4 Degree Centrality Index of HubCo Project

In order to explain the location of each stakeholder in terms of how close they are to the center of action in PPP structure, it requires the analysis of degree centrality, closeness centrality and betweenness centrality indexes. Table 8.2 shows the degree centrality indexes of HubCo project stakeholders.

Table 8.2 Degree centrality index of HubCo project stakeholders

Stakeholders	ID	1	2
		Degree	NrmDegree
HubCo SPV	6	20.0	44.4
Pakistan Government	1	12.0	26.7
Equity Holders	8	12.0	26.7
MDBs	9	7.0	15.6
ECAs	10	5.0	11.1
WAPDA	2	5.0	11.1
Pakistan State Bank	7	5.0	11.1
Pakistan State Oil Co.	3	5.0	11.1
Contractors	4	4.0	8.9
National Power UK	5	3.0	6.7
Descriptive Statistics		1	2
		Degree	NrmDegree
Mean		7.8	17.3
Std Dev		5.0	11.2
Sum		78.0	173.3
Variance		25.4	125.2
SSQ		862.0	4256.8
MCSSQ		253.6	1252.3
Euc Norm		29.4	65.2
Minimum		3.0	6.7
Maximum		20.0	44.4

HubCo, the SPV (i.e. stakeholder #6) is regarded as the most influential stakeholder due to its highest degree. The Government of Pakistan (i.e. stakeholder #1) is also a prominent and influential (as shown in Table 8.2) party with a degree centrality index 12 in this PPP structure. The results of the last column of first panel show the normalized degree centrality of HubCo stakeholders (called NrmDegree in UCINET). The second panel of results tells what does the distribution of the actor's degree centrality scores look like. On the average, stakeholders have a degree of 7.8 (i.e. the mean), which is quite high, given that there are only nine other stakeholders. The variability that is the coefficient of variation (standard deviation divided by mean, times 100) is 64.10 indicates that the population in the dataset is [moderately](#) homogenous.

8.3.1.5 Closeness Centrality Index of HubCo Project

Closeness centrality approaches emphasize the distance of an actor to all others in the network by focusing on the distance from each actor to all others. Closeness provides a number of alternative ways of calculating the farness of each actor from all others. Farness is the sum of the distance from each actor to all others in the network. Table 8.3 shows the closeness centrality measures of HubCo project.

National Power UK, the operator (i.e. stakeholder #5) and Pakistan State Bank (i.e. stakeholder #7) have the largest sum of geodesic distances from other stakeholders (i.e. farness is 15). The farness is re-expressed as closeness (i.e. reciprocal of farness) and the greatest closeness is observed in the graph (here, the closeness of HubCo, the SPV). Summary statistics are shown in the last panel of the figure. The distribution of in-closeness and out-closeness variability is same (i.e. the minimum and maximum). This is also reflected in the graph in-centralization (72%) and out-centralization (72%).

Another way of measuring closeness is by eigenvector of geodesic distances. The eigenvector approach is an effort to find out the most central actors in terms of 'global' or 'overall' structure of the network. It is a measure of the importance of a node in a network. It assigns relative scores to all the nodes in a network based on the principle that connections to high-scoring nodes contribute more to the score of the node in question than equal connections to

low-scoring nodes. It pays attention to patterns that are more ‘local’. The location of each actor with respect to each dimension is called an ‘eigenvalue’ and the collection of such values is called an ‘eigenvector’. Table 8.4 shows the eigenvector centrality of HubCo project stakeholders.

Table 8.3 Closeness centrality index of HubCo project stakeholders

Closeness Centrality Measures					
		1	2	3	4
Stakeholders	ID	inFarness	outFarness	inCloseness	outCloseness
HubCo SPV	6	9.0	9.0	100.0	100.0
Pakistan Government	1	12.0	12.0	75.0	75.0
Equity Holders	8	12.0	12.0	75.0	75.0
MDBs	9	13.0	13.0	69.2	69.2
ECAs	10	14.0	14.0	64.3	64.3
WAPDA	2	14.0	14.0	64.3	64.3
Contractors	4	14.0	14.0	64.3	64.3
Pakistan State Oil Co.	3	14.0	14.0	64.3	64.3
Pakistan State Bank	7	15.0	15.0	60.0	60.0
National Power UK	5	15.0	15.0	60.0	60.0
Descriptive Statistics					
		1	2	3	4
		inFarness	outFarness	inCloseness	outCloseness
Mean		13.2	13.2	69.6	69.6
Std Dev		1.7	1.7	11.3	11.3
Sum		132.0	132.0	696.4	696.4
Variance		3.0	3.0	128.0	128.0
SSQ		1772.0	1772.0	49773.5	49773.5
MCSSQ		29.6	29.6	1279.9	1279.9
Euc Norm		42.1	42.1	223.1	223.1
Minimum		9.0	9.0	60.0	60.0
Maximum		15.0	15.0	100.0	100.0
Network in-Centralization = 72%					
Network out-Centralization = 72%					

Note: The last two rows (i.e. Network in-Centralization and out-Centralization) of the table are in percent figure.

The first set of statistics of Table 8.4 – the eigenvalues tell how much of the overall pattern of distances among actors can be seen as reflecting the global pattern (the first eigenvalue) and more local, or additional patterns. Here, the percentage 54% means that half of all of the distances among actors are reflective of the main dimension or pattern. The first eigenvalue is larger than the second. Here the ratio 2.9 means that the dominant pattern is 2.9 times more important than the secondary pattern. In the second set of statistics, the highest score indicates that an actor is more central to the main pattern of distances among all of the actors whereas, lower values indicate that actors are more peripheral. The second column indicates the normalized eigenvector (called nEigenvec in UCINET software) of the HubCo stakeholders. The results are very similar to those for earlier analysis of closeness centrality. This indicates that Pakistan government, HubCo SPV and equity holders (i.e. stakeholder #1, #6 and #8) are being most central and the contractors (i.e. stakeholder #4) and National Power UK, the operator (i.e stakeholder #5) are being most peripheral. But, the most peripheral stakeholder in HubCo PPP structure is National Power UK, which is the operator, as its eigenvector value (i.e. 0.06) is the lowest among all stakeholders.

Table 8.4 Closeness centrality index of HubCo project stakeholders (by Eigenvalue)

Eigenvalues				
Factor	Value	Percent	Cum %	Ratio
1:	16.2	54	54	2.9
2:	5.6	19	73	1.6
3:	3.5	12	85	2.5
4:	1.4	5	90	1.4
5:	1.0	3	93	1.0
6:	1.0	3	96	1.2
7:	0.8	3	99	1.9
8:	0.4	1	100	6.4
9:	0.1	0	100	
	<u>30.0</u>	<u>100.0</u>		
Bonacich Eigenvector Centralities				
Stakeholders	ID	1		2
		Eigenvec		nEigenvec
Pakistan Government	1	0.46		64.95
WAPDA	2	0.14		20.36

Table 8.4 Continued			
Pakistan State Oil Co.	3	0.14	20.36
Contractors	4	0.09	13.33
National Power UK	5	0.06	9.08
HubCo SPV	6	0.69	96.97
Pakistan State Bank	7	0.19	26.99
Equity Holders	8	0.41	58.38
MDBs	9	0.20	28.74
ECAs	10	0.13	18.06

8.3.1.6 Betweenness Centrality Index of HubCo Project

Freeman (1979) created some measures of centrality of individual actor based on its betweenness as well as overall graph centralization. The more actors depend on a particular actor to make connections with other actors, the more powerful that particular actor is. The results of HubCo project are shown in Table 8.5. nBetweenness means the normalized betweenness centrality indices of the HubCo stakeholders.

Table 8.5 Betweenness centrality index of HubCo project stakeholders

Stakeholders	ID	1	2
		Betweenness	nBetweenness
HubCo SPV	6	28.6	39.8
Pakistan Government	1	6.7	9.3
Equity Holders	8	4.0	5.6
MDBs	9	1.3	1.9
WAPDA	2	0.7	0.9
Pakistan State Oil Co.	3	0.7	0.9
National Power UK	5	0	0
Pakistan State Bank	7	0	0
Contractors	4	0	0
ECAs	10	0	0
Descriptive Statistics			
		1	2
		Betweenness	nBetweenness
Mean		4.2	5.8
Std Dev		8.4	11.7
Sum		42	58.3

Table 8.5 Continued		
Variance	70.8	136.7
SSQ	884.9	1706.9
MCSSQ	708.5	1366.7
Euc Norm	29.7	41.3
Minimum	0	0
Maximum	28.6	39.8
Network Centralization Index = 38%		

Note: Only the last row of the table (i.e. Network Centralization Index) is in percent figure.

There is a lot of variation in stakeholder betweenness, ranging from 0 to 28.6. There is also quite a bit of variation (std. dev. = 8.4 and mean betweenness = 4.2). Despite this, overall network centralization index is low (38%), means one third of all connections can be made in this network without the aid of any intermediary. **There are not a lot of betweenness stakeholders. Hence, in the sense of structural constraint, there are not a lot of powerful stakeholders.** HubCo SPV, Pakistan government and MDBs (i.e. stakeholder #6, #1 and #8) appear to be relatively more powerful than others by this measure due to high betweenness value (i.e. 28.6, 6.7 and 4 respectively). There is a structural basis for these stakeholders to perceive that they are different from others in the population. Another way of measuring betweenness is to find out what relations are most central than finding which actors. The results for these measures are shown in the Table 8.6.

Table 8.6 Betweenness centrality index of HubCo project stakeholders (Edge Betweenness)

Edge Betweenness										
	1	2	3	4	5	6	7	8	9	10
1	0	2.83	2.83	0	0	2	2.3	2.67	3	0
2	2.83	0	1	0	1.3	4.5	0	0	0	0
3	2.83	1	0	0	1.3	4.5	0	0	0	0
4	0	0	0	0	0	4.8	0	1.8	1.3	1
5	0	1.3	1.3	0	0	6.3	0	0	0	0
6	2	4.5	4.5	4.8	6.3	0	4.3	3	3.3	4.8
7	2.3	0	0	0	0	4.3	0	2.3	0	0
8	2.67	0	0	1.8	0	3	2.3	0	1.3	1.8
9	3	0	0	1.3	0	3.3	0	1.3	0	1.3
10	0	0	0	1	0	4.8	0	1.8	1.3	0

Note: 1= Pakistan Government, 2= WAPDA, 3= Pakistan State Oil Co., 4= Contractors, 5= National Power UK, 6= HubCo SPV, 7= Pakistan State Bank, 8= Equity Holders, 9= MDBs, 10= ECAs

A number of potential relations between parts of actors are not parts of any geodesic paths such as the relation from stakeholder 1 to stakeholder 4, 5 and 10. Betweenness is zero if there is no tie or if a tie that is present is not part of any geodesic paths. There are some central relations in the graph. For example, the ties from HubCo SPV (i.e. stakeholder #6) to contractors (i.e. stakeholder #4), to National Power UK (i.e. stakeholder #5) and to ECAs (i.e. stakeholder #10) have values of 4.8, 6.3 and 4.8 respectively. These high values arise because without the tie to HubCo SPV, contractors, National Power UK and ECAs would be largely isolated. If this stakeholder (i.e. HubCo, the SPV) is removed from the graph, stakeholder #4, #5 and #10 would not be there anymore. Therefore they are one step up in the hierarchy. Hierarchy reduction by betweenness for the HubCo project is shown in Table 8.7.

Table 8.7 Betweenness centrality index of HubCo project stakeholders (Hierarchical Reduction)

Partition Based on Successive Reduction of HubCo Project via Betweenness										
	1	2	3	4	5	6	7	8	9	10
1	3	2	2	1	1	3	1	2	2	1

Successive Reduction of HubCo Project via Betweenness											
		5	7	4	10	3	2	9	8	1	6
3	3	.	.	.	.	.	.	.	.	1	1
2	2	.	.	.	.	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1

Note: 1= Pakistan Government, 2= WAPDA, 3= Pakistan State Oil Co., 4= Contractors, 5= National Power UK, 6= HubCo SPV, 7= Pakistan State Bank, 8= Equity Holders, 9= MDBs, 10 = ECAs

In these dataset, it is seen that a three-level hierarchy exist. The first portion of the output shows a partition of the node's level in the hierarchy. Stakeholder #5, #7, #4 and #10 are at the lowest level (1) of the hierarchy. The second portion of the output has re-arranged the nodes to show which actors are included at the lowest level of betweenness; which drop out at level 2 (i.e. are most subordinate e.g. actors 5, 7, 4, 10) and successive levels. The data has a hierarchical depth of three. According to this measurement, Pakistan Government (i.e.

stakeholder #1) and HubCo, the SPV (i.e. stakeholder #6) are at the highest level of hierarchy (i.e. at level 3).

8.3.1.7 Discussion of findings of HubCo Project, Pakistan

From the analysis of indices, it is quite clear that four parties - HubCo (the SPV), Government of Pakistan, Equity holders and MDBs are the influential stakeholders in the PPP structure of this project. All the other stakeholders are surrounded by them. HubCo (the SPV) has the highest degree and betweenness centralization indices (as shown in Table 8.2 and 8.5) and maintains numerous contracts with other stakeholders in PPP structure. This implies that HubCo (the SPV) is a cohesive core actor in the PPP structure of this project. This actor is more influential, has greater access to information and can communicate to others more efficiently. Moreover, it has the highest closeness index (as shown in Table 8.3 and 8.4). Therefore, the opinion leader of this network is HubCo, the SPV. On the other hand, node degree centrality of Pakistan government and of the equity holders are the same but the second most influential and cohesive actor is Pakistan government due to its higher betweenness index (as shown in Table 8.5). This indicates that the Pakistan government has more control over the flow of communication (i.e. the contracts) and can connect more actors indirectly through its direct links. Also, MDBs is considered an important actor as it is relatively close to all the other actors. According to the hierarchy of power, it is in the fourth position just after equity holders (as shown in Table 8.2). In contrast, contractors and National Power, UK (i.e. the operator) have the least degree and betweenness indices. Both of them are peripheral actors, maintaining few contracts in the network and, hence are located spatially at the margins of the network. However, National Power, UK is the most peripheral actor in the PPP structure as it has the least degree centrality and eigenvector (as shown in Table 8.2 and 8.4). Degree and closeness indices of WAPDA and ECAs are same (as shown in Table 8.2 and 8.3) and the betweenness index of ECAs is lower than WAPDA (as shown in Table 8.5). Among these two stakeholders, WAPDA is powerful due to its higher value in betweenness, eigenvector and hierarchy reduction by betweenness index. WAPDA is in advantageous position in the PPP Structure as it is not only connected with two influential and dominant parties (i.e. Pakistan government and SPV) but also able to connect more parties indirectly than that of ECAs.

8.3.2 Meghnaghat Power Project, Bangladesh: Case 2 for network analysis

8.3.2.1 Background

Meghnaghat Power Limited (MPL) is one of the first major independent private sector power projects in Bangladesh. The 450 MW combined cycle gas fired power plant was an independent power producer which was developed under a build-own-operate (BOO) agreement with the government of Bangladesh. Total cost of the project was US\$295 million of which equity is US\$75 million and debt is US\$220 million. The concession was awarded to the AES Corporation of the United States, following a competitive bidding process developed with Asian Development Bank (ADB) advisory support and assistance. ADB provided a direct loan of US\$50 million and a loan of US\$20 million under ADB's complementary financing scheme (i.e. B-Loan). Moreover, it had approved a partial risk guarantee which was renamed as political risk guarantee (PRG) of US\$70 million for the project. Infrastructure Development Company Limited (IDCOL) a non-bank financial institution of Bangladesh had contributed two loan facilities – senior tranche of US\$20 million and subordinated tranche of US\$60 million for this project (IDCOL Newsletter, 2001). A consortium of Banks led by ANZ had also contributed US\$90 million in this project.

The government of Bangladesh ensured to indemnify and reimburse ADB for all amounts paid by ADB under the guarantee agreement (ADB extended annual review report, 2008). The project company MPL signed an implementation agreement (IA) with the government, and a power purchase agreement (PPA) and a land lease agreement (LLA) with Bangladesh Power Development Board (BPDB) – the off-taker. Under the agreement, all generated electricity is to be delivered to BPDB for 22 years on a 'Take-or-Pay' basis. The government of Bangladesh gave counter guarantee of payment obligation of BPDB under the PPA. The government also gave performance guarantee of the fuel supplier Titas Gas Transmission and Distribution Company Limited under the gas supply agreement (GSA) and the lessor under the LLA (ADB Performance Evaluation Report. 2009).

The construction was completed in 22 months, 2 months ahead of schedule and commercial operation began on 26 November 2002. According the ADB, MPL is the only project that did not experience any delay. MPL has been described as “the least cost IPP in Asia” whose tariff was 5.2 cents/KWh (Dey and Khan, 2006). This is because that the government of

Bangladesh provided a substantial subsidy on gas price for its power generation. Till 2009, the generation capacity of 450 MW of this project is 9% of that of the country. Table 8.8 shows the basic data of the project.

Table 8.8 Basic data of Meghnaghat power plant

Project Data	As per ADB Loan Documents (\$ million)	Actual (\$ million)
Total Project Cost	300	295
Total Equity	80	75
Total Debt	220	220
ADB Participation:		
- Direct Loan	50	50
- Complementary Financing Scheme	20	20
- Political Risk Guarantee	70	70
Key Dates	Expected	Actual
Loan Agreement	11 April 2001	11 April 2001
Loan Closing	11 April 2004	11 April 2004
Commercial Operations Date	31 January 2003	26 November 2002

Source: ADB, Loans and Political Risk Guarantee Bangladesh Meghnaghat Power Project, Extended Annual Review Report, 2008

Most of the agreements are based on English law and the land lease agreement is under the Bangladesh law (Public Private Partnerships in infrastructure development, UNESCAP, 2008). Security to the lenders was provided on the plant, site, right, and title to the project agreements. The contractual structure of the project is shown in Figure 8.4.

8.3.2.2 Bipartite Graph of Meghnaghat power project, Bangladesh

Now a bipartite graph has been drawn considering the key stakeholders and their agreements in Meghnaghat power project which is shown in Figure 8.5. Group 1 is the related parties of the PPP agreements and Group 2 is the contracts/agreements. An edge exists only between an agreement and stakeholder but there is no edge between two stakeholders in the same set.

Figure 8.4 Contractual Structure of Meghnaghat Power Project, Bangladesh

Figure 8.5 Bipartite Graph of Meghnaghat Power Project, Bangladesh

Now collapsing this bipartite graph into matrix -

$$D = \begin{pmatrix} 1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \dots\dots\dots (iii)$$

And the transpose matrix of B is –

$$D^T = \begin{pmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 1 & 1 \end{pmatrix} \dots\dots\dots (iv)$$

Matrix multiplication is done in order to get one mode network from two mode network.
Therefore, $C = D \times D^T$

$$C = \begin{pmatrix} 6 & 2 & 2 & 0 & 6 & 0 & 1 & 2 & 1 & 0 \\ 2 & 2 & 1 & 0 & 2 & 0 & 0 & 1 & 0 & 0 \\ 2 & 1 & 2 & 0 & 2 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 6 & 2 & 2 & 1 & 9 & 1 & 1 & 3 & 2 & 1 \\ 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 2 & 1 & 1 & 0 & 3 & 0 & 0 & 3 & 2 & 1 \\ 1 & 0 & 0 & 0 & 2 & 0 & 0 & 2 & 2 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 1 & 1 \end{pmatrix} \dots\dots C \text{ is a product of (iii) and (iv)}$$

The diagonal entries of A give the number of agreements that each stakeholder is being involved. For example, Meghnaghat Power Plant (the SPV) is being involved in nine agreements with various stakeholders in the project whereas the government of Bangladesh is having six agreements with project stakeholders. On the other hand, off-diagonal elements of A give the number of agreements that both parties are being involved. For example, there are three agreements between ADB and government of Bangladesh (GOB). Similarly, GOB and Titas Gas Transmission Ltd have two agreements between them.

8.3.2.3 Network Diagram of Meghnaghat Power Project by NetDraw

The network diagram of Meghnaghat power project is thus visualized by inputting the components of matrix C into the dataset of UCINET 6.0. Figure 8.6 shows the diagram of the project generated by NetDraw.

Three widely used centrality measures – (1) *degree centrality*, (2) *closeness centrality* and (3) *betweenness centrality* are now being analyzed to find out important stakeholders, their power and obstacles, intermediaries as well as weak stakeholders in this PPP structure.

8.3.2.4 Degree Centrality Index of Meghnaghat Project

Higher out-degree represents a stakeholder to be influential whereas in-degree represents prominent. In Table 8.9, all the stakeholders possess same out-degree and in-degree. This is because undirected and un-weighted network has been considered for the simplicity of understanding. Table 8.9 shows the degree centrality of Meghnaghat power project.

Figure 8.6 PPP Structure of Meghnaghat Power Project by NetDraw

Table 8.9 Degree centrality index of Meghnaghat project stakeholders

Degree Centrality		1	2	3	4
Stakeholder ID	Name	OutDegree	InDegree	NrmOutDeg	NorInDeg
1	GOB	14	14	26	26
2	BPDB -Off-taker	6	6	11	11
3	Titas-Supplier	6	6	11	11
4	Hyundai-Contractor	1	1	1.8	1.8
5	MPL-the SPV	19	19	35	35
6	Ansaldo	1	1	1.8	1.8
7	AES-Equity Holders	2	2	3.7	3.7
8	ADB	10	10	18.5	18.5
9	IDCOL	6	6	11	11
10	ANZ and other Banks	3	3	5.5	5.5
Descriptive Statistics		1	2	3	4
		OutDegree	InDegree	NrmOutDeg	NorInDeg
1	Mean	6.8	6.8	12.6	12.6
2	Std Dev	5.6	5.6	10	10
3	Sum	68	68	126	126
4	Variance	31	31	109	109
5	SSQ	780	780	2674	2674
6	MCSSQ	317	317	1089	1089
7	Euc Norm	28	28	51	51
8	Minimum	1	1	1.8	1.8
9	Maximum	19	19	35	35
10	N of obs	10	10	10	10

Since MPL (the SPV) and government of Bangladesh (GOB) have the highest degrees (i.e. 19 and 14 respectively), thus be regarded as the most influential as well as prominent stakeholders in this PPP structure. The third influential and prominent stakeholder is ADB. It is also found that these stakeholders such as GOB, MPL (the SPV) and ADB are more central in the structure which suggests that this network as a whole may have a group of central actors rather than a single star. [*Star structure description*: in star network, a stakeholder has more opportunities and alternatives than those of other stakeholders. All the stakeholders are connected to other stakeholders through one central stakeholder]. Other powerful stakeholders in this structure are BPDB, Titas and IDCOL as all possess degree centrality of 6. Further analysis is required (e.g. closeness and betweenness centrality) to find out who is most influential and prominent among them as all of them have the same degree centrality. On an average, stakeholders have a degree of 6.8 (i.e. mean), which is quite high, given that there are only ten stakeholders in the project.

8.3.2.5 Closeness Centrality Index of Meghnaghat Project

Now, closeness centrality is being measured to get further analysis on power of the stakeholders of Meghnaghat power project. It measures how close a stakeholder is to all other stakeholders in the network. Table 8.10 shows the closeness centrality of Meghnaghat power project.

Table 8.10 Closeness centrality index of Meghnaghat project stakeholders

Closeness Centrality		1	2
Stakeholder ID	Name	Farness	nCloseness
1	GOB	12	75
2	BPDB -Off-taker	14	64
3	Titas-Supplier	14	64
4	Hyundai-Contractor	17	53
5	MPL-the SPV	9	100
6	Ansaldo	17	53
7	AES-Equity Holders	16	56
8	ADB	12	75
9	IDCOL	14	64
10	ANZ and other Banks	15	60
Descriptive Statistics		1	2
		Farness	nCloseness
1	Mean	14	66.5
2	Std Dev	2.3	13.4
3	Sum	140	665
4	Variance	5.6	179
5	SSQ	2016	46017
6	MCSSQ	56	1796
7	Euc Norm	45	214
8	Minimum	9	53
9	Maximum	17	100
10	N of obs	10	10

Stakeholder #4 and #6 (i.e. Hyundai contractor and Ansaldo) have the largest sum of geodesic distances [*Geodesic distance definition*: It is the number of relations/agreements in the shortest possible walk from one stakeholder to another] from other stakeholders (i.e. inFarness of 17, Ansaldo). The farness figures can be re-expressed as closeness (the reciprocal of farness) and normed relative the greatest closeness observed in the Table 8.10 (here, the inCloseness of stakeholder #5 i.e. MPL).

Another way to check the closeness centrality is to measure the eigenvalue of each stakeholder. The location of each stakeholder with respect to each dimension is called an “eigenvalue” and the collection of such values is called the “eigenvector”. The eigenvalue approach helps to find the most central stakeholders (i.e. those with the smallest farness from others) in terms of the global or overall structure of the network. Table 8.11 shows the closeness centrality of MPL stakeholders by eigenvalue measurement.

Table 8.11 Closeness centrality index of Meghnaghat project stakeholders (by eigenvalue measurement)

Eigenvalues					
	Factor	Value	Percent	Cum%	Ratio
	1:	16.8	60	60	4.3
	2:	3.8	13.9	73.9	1.5
	3:	2.5	9	82.9	1.5
	4:	1.6	5.8	88.7	1.6
	5:	1	3.6	92.3	1
	6:	1	3.6	95.9	1.5
	7:	0.6	2.3	98.2	1.4
	8:	0.5	1.6	99.8	6.8
	9:	0.06	0.2	100	
		<u>28</u>	<u>100</u>		
Bonacich Eigenvector Centralities			1	2	
Stakeholders	ID	Eigenvec		nEigenvec	
GOB	1	-0.54		-76.5	
BPDB	2	-0.2		-28	
Titas	3	-0.2		-28	
Hyundai	4	-0.04		-6	
MPL (SPV)	5	-0.7		-99	
Ansaldo	6	-0.04		-6	
AES	7	-0.07		-11	
ADB	8	-0.3		-41	
IDCOL	9	-0.17		-24	
ANZ and Other banks	10	-0.07		-10	
Descriptive Statistics			1	2	
		Eigenvec		nEigenvec	
1	Mean	-0.235		-33	
2	Std Dev	0.211		29.85	
3	Sum	-2.355		-332	
4	Variance	0.045		891	
5	SSQ	1		20000	
6	MCSSQ	0.446		8911	
7	Euc Norm	1		141	
8	Minimum	-0.7		-99	

Table 8.11 Continued				
	9	Maximum	-0.04	-6
	10	N of obs	10	10
	11	N Missing	0	0
Network centralization index = 45%				

The results are similar to those found in earlier analysis of closeness centrality. GOB, MPL (the SPV) and ADB are most central, and Hyundai contractors and Ansaldo are most peripheral. Overall variation in distances (here is 60%) is accounted by the first factor (i.e. main dimension). This means that about 3/5 of all the distances among stakeholders are reflective of the main dimension or patter. The first eigenvalue is larger than second (here, the ratio of first eigenvalue to second is about 4.33). This reflects that the dominant pattern is 4.33 times important than the secondary pattern.

8.3.2.6 Betweenness Centrality Index of Meghnaghat Project

Node betweenness centrality helps to identify a stakeholder who lies on the communication path between stakeholders and thus can control the communication flow. This power arises due to dependency of other stakeholders onto it. Table 8.12 shows the betweenness centrality of Meghnaghat power project.

Table 8.12 Betweenness centrality index of Meghnaghat project stakeholders

Betweenness Centrality		1	2
Stakeholder ID	Name	Betweenness	nBetweenness
1	GOB	2.6	7.4
2	BPDB -Off-taker	0	0
3	Titas-Supplier	0	0
4	Hyundai-Contractor	0	0
5	MPL-the SPV	20	55.5
6	Ansaldo	0	0
7	AES-Equity Holders	0	0
8	ADB	2	5.5
9	IDCOL	0.3	0.92
10	ANZ and other Banks	0	0

DESCRIPTIVE STATISTICS FOR EACH MEASURE

		1	2
		Betweenness	nBetweenness
1	Mean	2.5	7
2	Std Dev	5.9	16
3	Sum	25	69

Table 8.12 Continued				
4	Variance	34.8	269	
5	SSQ	411	3173	
6	MCSSQ	348	2690	
7	Euc Norm	20	56	
8	Minimum	0	0	
9	Maximum	20	55	
10	N of obs	10	10	
Network Centralization Index = 54%				

From Table 8.12, it is found that there are lot of variation in stakeholder betweenness (from 0 to 20), and there is also an overall variation (i.e. Std. dev = 5.9 relative to a mean betweenness of 2.5) in the network. The overall network centralization index is relatively high (i.e. 54%). Thus it explains that only one fifth of all connections can be made in this network without the aid of any intermediary, hence there can be a lot of betweenness in this structure, and therefore a lot of power exists in the network. In this network, stakeholder# 1, 5, and #8 (i.e. GOB, MPL and ADB) appear to be relatively powerful than others by this measure. This gives a strong basis for these stakeholders to perceive that they are different from others. Another way to find the betweenness is to check which relations are more central rather than finding the stakeholders. This can be found from edge betweenness of Table 8.13.

Table 8.13 Edge betweenness of Meghnaghat project stakeholders

Stakeholder ID	1	2	3	4	5	6	7	8	9	10
1	0	1.8	1.8	0	3.3	0	3	1.8	2.5	0
2	1.8	0	1	0	4.3	0	0	1.8	0	0
3	1.8	1	0	0	4.3	0	0	1.8	0	0
4	0	0	0	0	4.3	0	0	1.8	0	0
5	3.3	4.3	4.3	9	0	9	6	3.5	4.1	5.3
6	0	0	0	0	9	0	0	0	0	0
7	3	0	0	0	6	0	0	0	0	0
8	1.8	1.8	1.8	0	3.5	0	0	0	1.6	2.3
9	2.5	0	0	0	4.1	0	0	1.6	0	1.3
10	0	0	0	0	5.3	0	0	2.3	1.3	0

Note: Stakeholder#1= GOB, stakeholder#2 = BPDB, stakeholder#3 = Titas, stakeholder#4 = Hyundai (the contractors), stakeholder#5 = MPL (the SPV), stakeholder#6 = Ansaldo, stakeholder#7 = AES (Equity Holders), stakeholder#8 = ADB, stakeholder#9 = IDCOL, stakeholder#10 = ANZ and other Banks.

A number of the relations (i.e. agreements) between pairs of stakeholders are not parts of any geodesic paths (e.g. the agreement from stakeholder#1 to #6 or from stakeholder#3 to 4). Betweenness is zero if there is no agreement, or if an agreement that is present is not part of any geodesic paths. It is found that there are some quite central relations in the Table. For example, the agreements from stakeholder#4 to #5, stakeholder#6 to #5, and stakeholder#10 to #5. These high values arise because without the agreement with stakeholder #5, stakeholders #4, # 6 and # 10 would be largely isolated. Table 8.9 also supports the claim made in Table 8.13 (i.e. GOB, MPL and ADB are the most central stakeholders in the PPP structure and play intermediary role in its structuring as well). If these stakeholders are removed from the structure, some of the remaining stakeholders would not be between any more. This can be described by hierarchical reduction. Table 8.14 shows the hierarchical reduction structure of Meghnaghat Power Project.

Table 8.14 Hierarchical reduction structure of Meghnaghat Power Project, Bangladesh

Partition Based on Successive Reduction of Meghnaghat Power Project via Betweenness										
	1	2	3	4	5	6	7	8	9	10
1	2	1	1	1	2	1	1	2	2	1

Successive Reduction of Meghnaghat Power Project via Betweenness										
	6	2	3	4	10	7	1	8	9	5
2	2	•	•	•	•	•	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1

Note: Stakeholder#1= GOB, stakeholder#2 = BPDB, stakeholder#3 = Titas, stakeholder#4 = Hyundai (the contractors), stakeholder#5 = MPL (the SPV), stakeholder#6 = Ansaldo, stakeholder#7 = AES (Equity Holders), stakeholder#8 = ADB, stakeholder#9 = IDCOL, stakeholder#10 = ANZ and other Banks.

In this Table 8.14, it turns out that a two-level hierarchy can be identified. The first portion of the output shows a partition. The first node is at the lowest level (1) of the hierarchy, while the second node is at the second level (2). The second portion of the output has re-arranged the nodes to show which actors are included at this level (e.g. stakeholders#1, 5, 8 and 9) and which are dropped out at level 2 (i.e. are subordinate, e.g. stakeholders#2, 3, 4, 6, 7 and 10).

8.3.2.7 Discussion of Findings of Meghnaghat Project, Bangladesh

From the analysis of indices, it is clear that GOB, MPL and ADB are the most powerful and influential stakeholders in PPP structure of this project. All other stakeholders are surrounded by them. Similar to HubCo (the SPV), here MPL (the SPV) possesses the most degree centrality, betweenness centrality and closeness centrality (as shown in Table 8.9, 8.10, and 8.11). This stakeholder is at the central of the PPP structure though other two stakeholders (i.e. GOB and ADB) are quite central too. MPL (the SPV) has the greatest access to information and communicate to all other stakeholders more easily than other influential stakeholders. This stakeholder is the opinion leader in PPP structure similar to HubCo (the SPV) in previous analysis. On the other side, Hyundai contractors and Ansaldo are most peripheral due to their lowest degree centrality, closeness and betweenness centrality. These two stakeholders are very remote and highly dependent on only one influential intermediary which is none but MPL (the SPV). The third influential stakeholder in this structure is ADB. It is very difficult to identify the forth influential stakeholder in Meghnaghat power project. BPDB, Titas and IDCOL possess the same degree centrality (i.e. 6 as shown in Table 8.9) and closeness centrality (i.e. 64 as shown in Table 8.10). But BPDB and Titas have the higher eigenvalue (i.e. closeness centrality which is 0.2 as shown in Table 8.11) than that of IDCOL (having the value 0.17). On the other side, IDCOL possesses higher betweenness centrality index (i.e. 0.3) than those of BPDB and Titas (i.e. 0) as shown in Table 8.12. Hierarchical analysis helps to resolve this problem which shows that IDCOL possesses a second level of hierarchy than those of BPDB and Titas (i.e. both are dropped in the second level of hierarchy) as shown in Table 8.14. Therefore, the forth influential stakeholder is IDCOL. Last but not least, overall betweenness centrality of the structure suggests that GOB, MPL (the SPV) and ADB play very important roles as intermediaries for other stakeholders in Meghnaghat power project. 80% of the agreements are mediated through these three stakeholders.

8.4 Comparison between HubCo and Meghnaghat Power Project

Application of network theory has revealed some interesting features of IPP structure of HubCo and Meghnaghat power projects. Table 8.15 shows the [organizational structure](#) of both projects.

Table 8.15 [Organizational Structure](#) of HubCo and Meghnaghat power project by Network Theory

Organizational Structure	HubCo Power Project, Pakistan	Meghnaghat Power Project, Bangladesh
Powerful and influential stakeholder	HubCo (the SPV) is the most powerful and influential stakeholder in this IPP structure. In both cases, SPV is the most powerful and influential stakeholder in IPP structure. Therefore, these two are the opinion leaders	MPL (the SPV) is the most powerful and influential stakeholder in this IPP structure.
Second most powerful stakeholder	Government of Pakistan is the second most powerful and influential stakeholder In both cases, the government is the second most powerful and influential stakeholders.	Government of Bangladesh is the second most powerful and influential stakeholder
Powerful intermediaries	In this case, GOP, HubCo (the SPV), MDBs and Equity holders are the powerful intermediaries	In this case, GOB, MPL (the SPV) and ABD are the powerful intermediaries
Structural pattern	None of the cases possess star structure as both of them have more than one powerful intermediary	
Hierarchical pattern	Three level of hierarchical pattern exists	Two level of hierarchical pattern exists
Overall betweenness centralization	Almost 70% of the agreements are mediate through four major intermediaries. Though Meghnaghat has fewer intermediaries compared to HubCo project, but only one-fifth of the agreements can be made without the aid of these intermediaries.	80% of the agreements are mediate through three major intermediaries.
Weak and remote stakeholders	Contractors and National power UK are the weak stakeholders It is found that in HubCo power project, though these two stakeholders are quite remote and peripheral to its structure, yet they are connected to other powerful intermediaries. But in Meghnaghat power project, the two weak stakeholders are solely dependent on one intermediary which is MPL (the SPV).	Contractors and Ansaldo (Maintenance Contractor) are the weak stakeholders
Characteristics of the structure	Stakeholders in the dataset are homogenous (i.e. 64%)	Stakeholders in the dataset are highly homogenous (i.e. 82%)

8.5 Chapter Summary

This is how the network theory speaks the language of nodes and links, and provides a foundation for graphical and mathematical representation without rejecting verbal languages, as done by case studies. Another stakeholder analysis method is stakeholder analysis matrix. It requires systematic gathering and analyzing qualitative information (Schmeer, 1999). Workshop, focus group discussion and interviews are the three common approaches of this method. The method is quite subjective and requires prudent judgment on identifying influential stakeholders and their impact assessment on a project. Customer Relationship Management (CRM) is another stakeholder analysis method which requires substantial datasets and it uses data mining technique to assess opportunity for business growth. On the other hand, network theory focuses on the importance of relationships among stakeholders. Through mapping the relationship, this method is able to identify position, power and influences of each stakeholder. Here, the application of network theory on the structure of IPP projects addresses some important aspects, such as the distribution of power of related parties in IPP agreements and the sources. Core/periphery structure and a dense, cohesive core and a sparse, unconnected periphery are also sought in the analysis. It is found that the power of any individual actor (i.e., party) is not an individual attribute but arises from the relationships with other actors in the network. Finally, the use of the network theory on the IPP structure reveals some hallmark perspectives: relationship between actors rather than attributes of actors, interdependence of actors, and structure affects substantive outcome.

CHAPTER 9

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

9.1 Conclusions of Research

In Chapter 1, the objectives of this research are stated. These are (1) To set up SPV, identify critical and financial factors of IPP projects in Asia; (2) To develop a decision support model for different conditions of IPP project financing and structuring which can be helpful to the government to select appropriate strategies for stepping into these projects; and (3) To find out the key stakeholders, their power and opportunities, the intermediaries and weak stakeholders as well as the obstacles in structuring IPP projects in Asia.

In order to achieve the first objective, seventy-five factors are identified from literature and case investigations. After preliminary validation and collection of questionnaire, factor analysis is then used to determine the critical legal and financial factors for establishing SPV of IPP projects in Asia. This reveals fifteen factor groupings which are (1) Output contract, (2) Input contract, (3) Parties creditworthiness, (4) Regulatory framework, (5) Host country business environment, (6) Concession agreement, (7) Guarantees on off-taker, supplier and SPV, (8) Guarantees on tariff, (9) Government's financial guarantees, (10) Credit guarantees by financial institutions, (11) Credit enhancement by shareholders, (12) Credit enhancement by government, (13) Credit enhancement by MDBs, ECAs and other parties, (14) Capital structure mechanism, and (15) Credit enhancement by commercial banks. These fifteen groupings therefore represent the basic elements of critical legal and financial factors for establishing SPV of IPP projects in Asia.

The first three factor groupings fall under contractual foundation factors. Fourth to sixth factor groupings fall under enabling environmental factors. Seventh to tenth factor groupings fall under guarantee factors, and eleventh to fifteenth factor grouping falls under credit enhancement factors. Figure 9.1 shows the factor analysis groupings and principal component factors (PCF) of each grouping.

Figure 9.1 Factor Analysis and Principal Component Factors

Thus, the findings of factor analysis suggest that the structuring of SPV for IPP projects in Asia largely depends on these fifteen factor groupings that are dependent on (1) contractual foundation factors, (2) enabling environmental factors, (3) guarantee factors, and (4) credit enhancement factors. [Details are explained in Chapter 5.](#)

Moreover, descriptive analysis of these seventy-five factors also revealed the respondents' perception of these factors for establishing SPV of IPP projects in Asia. Above all, three case investigations (i.e. Haripur power project of Bangladesh, Coastal Gujarat power project of India, and BLCP power project of Thailand) are also done to examine the presence and influences of these factors for setting up SPV on these three IPP projects. Factor analysis, descriptive analysis and case study analysis for setting up SPV and its practices confirms that consideration of these criteria (i.e. contractual foundation, enabling environment, guarantees and credit enhancement) are appropriate. However, in tailoring these criteria for a specific power project, adjustment should be made to reflect each party's role and capability in the project, because each attribute has different weightage in SPV's setup which may affect the legal and financial sustainability of the power PPP project in Asia. Details are explained in Chapter 6.

To attain the second objective, a qualitative research is done to identify various issues that a government needs to deal with for setting up of IPP projects in Asia. Four IPP projects from India, Pakistan, China and Indonesia are selected to examine the government's role and level playing ground on these projects. The analysis reveals that a government must carefully choose appropriate strategy for setting up of IPP projects depending on its contractual and financing agreements. The study leads to government's consideration on following legal factors that influence strategies for financing in IPP projects. First, government has to ensure competitive bidding to meet transparency, accountability and creditworthiness of IPP project to the nation, particularly to the opposition party. Second, government should participate in capital investment of IPP projects. Government needs to institute investment tool such as subordinated debt under the Multi-lateral Development Banks (e.g. the World Bank) in power projects similar to Private Sector Energy

Development Fund (PSEDF) or Private Sector Infrastructure Fund (PSIF) in Pakistan and Bangladesh respectively. This debt mechanism not only relieves the investors but also attract other offshore and domestic lending institutions to finance. Third, government must ensure performance guarantee in ‘Put or Pay’ supply contract if state owned enterprise (SOE) be the supplier, and creditworthy purchase guarantee ‘Take or Pay’ as off-taker for the project. Fourth, government needs to encourage ECAs, MDBs and insurance companies to participate in financing and/or providing political and commercial risk coverage for the project. Fifth, government needs careful selection of legal attributes for mitigating risks involved in IPP projects which help to form financial structuring. This will enable government to set legal strategies depending on conditions prevailing in IPP projects. Finally, based on analysis, a decision model in table 7.4 is developed. Depending on financing terms and conditions, government needs to choose appropriate strategies for setting IPP projects in the country. For example, loose condition may exist when financing jurisdiction is questionable due to opaque off-take agreement. Therefore, the government should choose ‘Hell or High Water’ off-take agreement, escrow mechanism and trustee - as a legal strategy for its purchase agreement. Similarly, if a country possesses lower SCR, government needs to ensure – strong off-take agreement, supply guarantee and performance, central bank guarantee for foreign exchange availability, convertibility and transferability as a strategy for attracting debt financing. These will help the government to attract investors, lending institutions and other private parties for better funding and project creditworthiness. Failure to identify these legal attributes and to incorporate them into strategies will impede project’s bankability as well as successful financial closeout. It is expected that the decision support model (Table 7.4 in Chapter 7) will help the government to set legal strategies and financial structuring of a project. In other words, this legal framework will persuade investors, lending institutions and private entities to finance in IPP projects. Details are explained in Chapter 7.

To attain the third objective, the researcher used network theory. The theory provides a powerful tool for the representation and analysis of complex IPP structures and their interacting stakeholders. The significance of using the network

theory on a IPP structure helps - (1) to identify most important stakeholder in a PPP structure; (2) to recognize systematically which stakeholders are participating in a specific agreement and how many agreements a stakeholder is involved; (3) to classify how many stakeholders are involved in an agreement and the prominent stakeholders in those agreements; and (4) to analyze the structural constraints and opportunity that a stakeholder faces as well as to understand the role of a stakeholder plays in PPP structure. The network theory speaks the language of nodes and links, and provides a foundation for graphical and mathematical representation without rejecting verbal languages, as done by case studies. The network theory focuses on the importance of relationships among stakeholders. Through mapping the relationship, this method is capable to identify position, power and influences of each stakeholder. Thus, the theory is applied to [two IPP projects in Asia \(HubCo power project in Pakistan and Meghnaghat power project in Bangladesh\)](#). Here, the application of network theory on the structure of IPP projects (e.g. HubCo power, Pakistan) addresses some important aspects, such as the distribution of power of related parties in IPP agreements and the sources. Core/periphery structure and a dense, cohesive core and a sparse, unconnected periphery are also sought in the analysis. It is found that the power of any individual actor (i.e., party) is not an individual attribute but arises from the relationships with other actors in the network. Details are explained in Chapter 8. Finally, the use of the network theory on the IPP structure reveals some hallmark perspectives: relationship between actors rather than attributes of actors, interdependence of actors, and structure affecting substantive outcome.

9.2 Contributions

1. The factors/key factors found in this study including the in-depth understanding about the influence on legal and financial issues can be used as the basis for selecting criteria for structuring SPV of IPP projects. These findings should influence policy development towards IPP and the manner in which private partners should go about structuring SPV of the project.

2. The factors influencing finance on IPP projects can lead the government to consider certain legal strategies (i.e. Decision Support Model) for stepping into the funding of IPP projects.
3. The application of network theory on the structure of IPP projects can provide valuable information to project sponsors as well as legal and financial advisers to identify core-peripheral stakeholder(s), influential intermediary participants and their interdependence, and influences on IPP structure on its substantive outcome.

9.3 Limitations of Research

The study is limited to the structuring of SPV for IPP projects in Asia. The cases used in this study are privately financed power projects and all are located in Asia. Though the researcher has tried his best but he believes that it is impractical to incorporate all the legal and financial factors that influence the setup of SPV for IPP projects in Asia.

Secondary data have been used for analyzing the structure of HubCo project using network theory. To draw the bipartite graph of HubCo power project, the author only used the scholarly work of Tinsley (2000), and Tiong and Anderson (2003) published in journal and book. It would have been more commendable if interviews/questionnaire survey with the practitioners involved in HubCo project could be done in order to verify the agreements among the stakeholders of that project.

Another limitation of this research is the use of simple, undirected and un-weighted network diagram of HubCo project. This is done for the sake of easy understanding of the matrix. A weighted network requires weighing of various agreements in terms of criticality/importance from the interviewers, which the author believes quite difficult to achieve because of the complexity of the process.

9.4 Recommendations for Future Research

The additional study can be conducted both in horizontal and vertical directions.

Horizontal direction: The study on SPV for other kinds of projects such as school, hospital, prison, toll roads etc. (i.e. social and economic projects).

Develop a prototype SPV that can be adaptable to any kind of infrastructure projects (i.e. financial, economic and social).

Vertical direction: For the quantitative analysis (i.e. descriptive analysis), all the respondents are from Asia. It is found that the respondents had greater propensity to choose middle response categories due to Asian cultures and Confucian teachings regarding “the middle way” (Si and Cullen, 1998). The influence of Confucianism and “the middle way” on Asian cultures (Hofstede, 1991; Hofstede and Bond, 1988) might have biased the respondents to select the central point that were found in survey instruments. To overcome such tendency, future research can be done on this study by avoiding explicit midpoint in odd number response categories.

A study on SPV for IPP projects in non-investment grade countries and investment grade countries in Asia.

The study can be carried out to a specific country so as to obtain individual unique characteristics of SPV for IPP projects of that country.

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APPENDIX - A

Overview of Various Special Purpose Vehicle Structure of Fifteen Cases

A.1 BTS, Thailand

In this structure, government of Thailand is the entity responsible for granting a concession and ultimate owner after the concession period (30 years). The risks associated with construction, operation and maintenance, finance and revenue packages were documented in the concession agreement. Off-take contract was vital for attracting the capital required for this infrastructure. The lenders also carefully examined the off-take agreement as to ensure the projected cash flow. Here, off-take agreement normally applicable for contract-led projects but not for market-led projects.

BTS Structure

In this figure, the off-take agreement is of market-led. The revenue is collected from the toll that the users pay for it. Another kind of off-take agreement is contract-let which is normally found in the power, gas and oil projects. There, the off-taker is the state or state agency.

Italian-Thai Development was responsible for all construction and civil engineering work, Siemens assumed responsibility for the coordination of the overall project, the system planning, delivery of the rolling stock and technical infrastructure, as well as training of the operating personnel. In addition to that, Siemens will provide maintenance of the electrical and mechanical systems for five years.

A.2 Ras Laffan, Qatar

Ras Laffan is a Liquid Natural Gas project based in Qatar and owned by Qatar General Petroleum Corp (70%) and Mobil Oil (30%). The project issued bonds rated investment in the US market in 1996. The off-take of natural gas was to be sold to Kogas (Korea Gas Corporation) on long-term basis purchase agreement. It was a 25 years take-or-pay sale and purchase agreement with Ras Laffan. All parties entered into a trust agreement. The trustee was a New York trustee Credit Suisse who was liable to collect revenue and pay lenders (interest and principal payments) after O&M expenses had been paid. The following figure illustrates the structure:

Ras Laffan

Since the country has various troubles related to regional conflict in the Arabian Gulf area as well as the legal system is weak, therefore selection of offshore trustee played an important role for gaining trust to all participants in the project.

Ras Laffan is a \$3.8 billion LNG project in Qatar, a joint venture between the majority owner, the state of Qatar, and a minority partner, Mobil Corp. The project relies on offshore natural gas owned by the state of Qatar, and has one customer, the Korean state-owned utility, Kogas. Ras Laffan needs to raise \$1.2 billion through project finance non-recourse bonds; that is, the project finance bonds would rely solely on the project's cash flow for debt servicing and amortization.

A.3 Karnaphuli Fertilizer Company, Bangladesh

US\$ 423 million sought by Bangladesh Government to finance the engineering, procurement, construction, operation and maintenance of a fertilizer plant. The SPV was Karnaphuli Fertilizer Company Limited. Bangladesh Government guaranteed the Bank syndicate for supply of gas for production of urea and ammonia, Transammonia and Marubeni were the off-takers. Payments were received into an escrow account who disbursed the interests and principals to lenders (Bank syndicate).

Karnaphuli Fertilizer Company, Bangladesh

In this structure, a Swiss and Japanese company was the off-taker of the production for an agreement of at least 7 years. The payment would be deposited on an offshore escrow account, approved by Bangladesh government. Besides the state owned gas company BGSL promised to supply gas as supplier for the production for 20 years. Financiers obtained insurance from a number of export credit agencies which would be triggered if govt. interfered in the escrow account agreement or expropriate the plant.

A.4 Dabhol Power Project, India

This is one of the hottest IPP issues in the recent history. It was the first privatized IPP project in India. The Government of India and Ministry of power had invited EDC (Enron Development Corporation) to set up this project. The SPV here worked as a nodal agency for bringing together private investors and concerned government agencies for the project. It was a 215 MW project which would be connected to Maharashtra State Electricity Board (MSEB) grid through 440KV transmission line. The figure illustrates the flow diagram of agreements, stakeholders, and financial framework of the project.

Dabhol Power Project, India

(Adapted from Private Power Projects in developing countries: J P Gupta and A K Sravat)

GOI= Government of India, GOM= Government of Maharashtra, DPC= Dabhol Power Company, ECA= Export Credit Agency, OPIC= Overseas Private Investment Corporation.

A.5 Laibin B Power Plant Project, China

Laibin B is the second phase project of Laibin Power Plant, which involved investment, financing, design, construction, procurement, operation and maintenance and transfer of a 2X350MW coal-fired power plant. The Project Company (SPV) was consisted of Electricite de France (EDF) and GEC Alsthom backed by Coface, France's export credit agency. Guangxi State Government ensured Fuel supply and Power purchase agreement guarantee. In addition to that, central government gave a commitment of foreign exchange. It was a full foreign ownership project in China. The figure below gives an illustration of contractual structure of Laibin B power plant project:

Laibin B Power Project, China

A.6 Euro tunnel Project

This is the most discussed and high capital investment project in the world. The project aimed to link the UK and France rail networks together by the construction of a twin tunnel system crossing the channel and financed by purely private capital. The Channel Tunnel Group- France Manche SA (CTG-FM) consortium was the project company for financing, constructing and operating the project. It was a 55 years concession period after that the entire project would become the property of the governments.

Euro Tunnel Project

The project was protected from all government interference with tariffs and from competing until the end of 2020. Construction was to be carried out by a consortium of construction firms known as Transmanche Link. The obligations of Transmanche Link would be secured by a performance bond. Equity was accumulated in three stages. In Equity I, CTG-FM arranged £ 50 million from group of contractors, most of whom were equity shareholders of CTG-FM. The project arranged loan of £ 5 billion that contained a series of protective measures. In particular all assets would be transferred to banks in the event of default and Eurotunnel could not undertake other business without bank permission and could not borrow money elsewhere.

This project is a classic example of construction contract where the project vehicle and therefore the lenders assumed certain construction risks and arranged a standby facility for cost overruns.

A.7 Hamersley Iron Ore Project

Hamersley Iron Pty. Limited was formed to finance the development of extensive iron ore deposits located in the Hamersley Range in Western Australia. A special purpose finance subsidiary Hamersley Iron Pty. Limited entered into contracts to sell iron ore to seven Japanese steel companies. The Sponsors were Conzinc Riotinto of Australia (CRA) and Kaiser Steel Corporation (Kaiser). The state government gave a guarantee to the SPV and it attained funding from bank loan agreement (nine US banks and three Canadian banks). The figure portrays below the legal and financial framework:

Hamersley Project

The sponsors CRA and Kaiser agreed to contribute funds to SPV to the extent required to enable Hamersley for paying all additional costs require completing the project and the penalties due to noncompliance on time.

A.8 Paiton 1 Energy Project

This is the first independent power project to be financed in Indonesia. PT Paiton Energy Company (Paiton) was organized to finance, construct and own Indonesia's first large private power project at a cost of roughly \$ 2.5 Billion. It was a 30 yrs contract with PLN.

Paiton 1 Power Project

PLN and Paiton entered into a PPA contract for 30 years but the government of Indonesia refused to guarantee PLN's payment obligations. Though electricity purchase is the only source of generating revenue and govt. of Indonesia did not guarantee the payment obligations, the financing was delayed. Moreover, to be more credit worthy to the export credit agencies and banks, Paiton 1 provided a completion undertaking too.

A.9 HUBCO Project, Pakistan

Hub Power Company (HUBCO), a public limited company incorporated in Pakistan was established to produce 1292 MW thermal power in the province of Baluchistan at a total cost of US \$ 1.833 billion. The lenders considered the equity as the protection for their loans and commitments towards the project. World Bank and a consortium of foreign banks and agencies were committed to finance the project. National Development Finance Corporation (NDFC) was appointed to the lead bank to arrange for raising the long term loans and also the administrator of private sector energy development fund on behalf of the Government of Pakistan (GOP). The power generated would be sold to WAPDA with agreed tariff of Rs. 1.32 per kWh which was revised as 6.1 cents per kWh.

Hub River Power Project, Pakistan

A.10 Hibernia Oil Field Project, Canada

Hibernia Oil Field Partners “Hibernia” was formed to develop a major oil field off the coast of Newfoundland. Mobil with its 33% share serves as managing general partner and project operator. Canadian Government provided C\$ 2.7 billion in grants and loan guarantees. Moreover it agreed to pay 25% of construction cost up to a maximum of C\$ 1.04 billion and guarantee up to C\$ 1.66 billion of non-recourse project loans.

Hibernia Oil Project

The financial support and guarantee provided by the Canadian government and Provincial government was crucial for the project to launch. The project was too large and too risky for any of the partners to undertake prudently on its own.

A.11 Ashkelon Desalination Project, Israel

This is a 250 million US \$ project for desalination seawater, involves financing, design, construction, operation, maintenance and transfer to government after 24 years 11 months. The project company VID entered into concession agreement with government agency 'Water and Desalination Authority (WDA)'. The production of the facility will be sold to WDA on a "take or pay" basis. VID Desalination Company Ltd. ("VID"), the special purpose company established by Vivendi Water, IDE Technologies Ltd and Dankner Ellern Infrastructures Ltd.

Ashkelon Desalination Project

The Ashkelon deal has set a precedent on the Israeli financial markets as the first Israeli deal to be financed by way of bank debt and institutional private placement. The financing was arranged by Bank Leumi Le-Israel B.M. who also provided the bank debt. The institutional bond issue which represents 60% of the total financing was managed by Gmul Sahar Underwriters Ltd. and Leumi & Co. Underwriters Ltd. The institutional financing process is particularly noteworthy since it involved more than 60 institutional investors.

Due to huge demand of water, the government requested to double the capacity of the facility from 50 to 100 Mm³. Therefore, a huge impact occurred to arrange finance for this project. Two options were available – Syndicating the facility to banks and or to pension funds. The first option was unsuccessful due to capital adequacy ratio of the banks in Israel. The only possible alternative was therefore the "Pension Funds" route. The participation of the institutional investors necessitated a rating of AA- minimum from Maalot, the local rating agency.

A.12 Skikda Desalination Project, Algeria

PPP project was set in Algeria in 2004 with an expectation to produce desalinated water 100,000 m³/day. The construction period was assumed to be 24 months; approximated project cost USD 110.6 million. The debt to equity ratio is 70% debt and 30% equity. The contractor was domestic. The Algerian government has played a significant role for the project. The host country energy company contributed 40% equity along with other equity sponsors, moreover, 25 years off-take agreement was signed with the host government and SPV. In addition to that host government gave performance guarantee of USD 25 million maximum up to 4 years, including construction period.

Skikda Desalination Project, Algeria

A13. Tuas Desalination Project, Singapore

In January 2003, the Public Utilities Board (PUB) of Singapore awarded a contract for Build, Own and Operates (BOO) desalination plant to SingSpring (a special purpose company), a consortium comprising Hyflux Ltd (70%) and Ondeo (30%). The agreement is for 20 years with guaranteed production capacity of up to 136,380 m³/day. It is the first PPP project by Singapore in the water industry. The project serves 10% of country's potable water demand. Tuas desalination plant is one of the most energy efficient Sea Water Reverse Osmosis (SWRO) plants in the world, producing treated water at total energy consumption for the plant of only 4.2kWhr/m³. This has resulted in an expected first-year selling price of US 49 cents/m³ - the lowest of any comparable project in the world.

Tuas Desalination Project, Singapore

A14. AES Lal Pir, Pakistan

AES Lal Pir Limited (the project company) is a special purpose vehicle established for the development of the Lal Pir power project in Pakistan. It is a build-own-operate (BOO) project to develop a 362 MW oil-fired power plant located adjacent to Muzaffargarh canal in the province of Punjab, Pakistan. AES Corporation (USA) is the major shareholder. Pakistan State oil (PSO) is the fuel supplier and Water and Power Development Authority (WAPDA) – the off-taker is responsible to purchase power for a 30 year period from commercial operation date of the project. The government of Pakistan (GOP) has guaranteed the payment obligations of PSO and WAPDA and the availability of foreign currency for debt service.

Source: Lang, L.H.P (1998)

15. AES Pak Gen, Pakistan

AES Pak Gen Limited (the project company) is a special purpose vehicle established for the development of the Pak Gen project located in Muzaffarghat canal in the province of Punjab, Pakistan. This project is located near to AES Lal pir power project. The project is a build-own-operate (BOO) one, which is set to produce 365 MW of electricity. The total cost of the project is US\$ 348.9 million. AES Corporation (USA) is the major shareholder of the project company through its wholly-owned subsidiary AES Pakistan Holdings Inc.

Fuel is supplied by Pakistan State Oil (PSO) and Pakistan Water and Power Development Authority (WAPDA) is the off-take purchaser – both for a 30 year period from the commercial operation date of the project. In Pak Gen project, unlike the Lal Pir project, the Ministry of International Trade and Industry of Japan (MITI) provides guarantees for commercial loans.

Source: Lang, L.H.P (1998)

APPENDIX - B
Factor Analysis Data

Factor Analysis: Contractual Foundation Factors

Table B1. Communalities of Contractual Foundation Factors

Communalities		
	Initial	Extraction
Offtake_Take_or_pay	1.000	.679
Offtake_Hell_or_high	1.000	.877
Offtake_spv_delivery_obligation	1.000	.733
Offtake_offtaker_capacity_payment	1.000	.509
Offtake_offtaker_guarantee_indemnify	1.000	.651
Offtake_Merchant_facility	1.000	.853
Provision_thirdparty_sale	1.000	.637
Supply_supply_or_pay	1.000	.690
Supply_supply_and_pay	1.000	.649
Supply_Spot	1.000	.722
Supply_secure_long_term_energy	1.000	.578
Counterparty_creditquality_offtaker	1.000	.773
Counterparty_creditquality_supplier	1.000	.713
Counterparty_creditquality_operator	1.000	.875
Counterparty_creditquality_country	1.000	.770
Counterparty_creditquality_EPC	1.000	.605

Extraction Method: Principal Component

Table B2. Total Variance of Contractual Foundation Factors

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.011	32.200	32.200	3.011	32.200	32.200	2.640	29.725	29.725
2	2.696	23.800	56.000	2.696	23.800	56.000	2.222	22.642	52.367
3	1.815	15.700	71.700	1.815	15.700	71.700	2.005	19.333	71.700
4	.987	5.110	76.810						
5	.882	3.472	80.282						
6	.809	3.027	83.309						
7	.762	2.573	85.882						
8	.649	2.011	87.893						
9	.582	1.985	89.878						
10	.410	1.819	91.697						
11	.348	1.619	93.316						
12	.298	1.587	94.903						
13	.239	1.400	96.303						
14	.198	1.397	97.700						
15	.198	1.281	98.981						
16	.198	1.019	100.000						

Extraction Method: Principal Component Analysis

Factor Analysis: Enabling Environmental Factors

Table B3. Communalities of Enabling Environmental Factors

Communalities		
	Initial	Extraction
Enabling_Country_stability	1.000	.623
Enabling_government_template	1.000	.722
Enabling_Transparent_law	1.000	.744
Enabling_Competitive_bidding	1.000	.818
Enabling_political_commitment	1.000	.751
Enabling_Institutional_environment	1.000	.741
Enabling_policy_guideline	1.000	.708
Enabling_legal_system	1.000	.788
Enabling_legal_statutes_PF	1.000	.678
Enabling_Trade_liberalization	1.000	.781
IA_Dispute_resolution	1.000	.766
IA_Expropriation_CI	1.000	.765
IA_Government_land_acquisition	1.000	.736
IA_Concession	1.000	.760
IA_Delinking	1.000	.758

Extraction Method: Principal Component

Table B4. Total Variance of Enabling Environmental Factors

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.432	38.214	38.214	5.432	38.214	38.214	3.396	33.642	33.642
2	1.591	18.785	56.999	1.591	18.785	56.999	2.542	21.943	55.585
3	1.485	10.578	67.577	1.485	10.578	67.577	1.937	11.992	67.577
4	.976	8.210	75.787						
5	.897	6.041	81.828						
6	.800	5.024	86.852						
7	.669	3.689	90.689						
8	.506	2.342	92.883						
9	.469	2.108	94.991						
10	.407	1.665	96.656						
11	.311	1.107	97.763						
12	.234	.985	98.748						
13	.197	.557	99.305						
14	.139	.357	99.662						
15	.128	.338	100.000						

Extraction Method: Principal Component Analysis

Factor Analysis: Guarantee Factors

Table B5. Communalities of Guarantee Factors

Communalities		
	Initial	Extraction
GB_Govt_govt_debt_guarantee	1.000	.780
GB_Govt_limited_counter_guarantee	1.000	.720
GB_Govt_Support_letter	1.000	.827
GB_Govt_price_regulation	1.000	.613
GB_Govt_supplier_performance	1.000	.774
GB_Govt_payment	1.000	.844
GB_Govt_Agreement_SPV_Tax_increase	1.000	.728
GB_Govt_Force_majure	1.000	.836
GB_Govt_Stabilization_clause	1.000	.671
GB_Govt_renegotiate_tariff	1.000	.569
GB_Govt_unconditional	1.000	.784
Central_Bank	1.000	.821
Others_MDBs_credit	1.000	.753
Others_ECAs_credit	1.000	.768
Commercialbank_credit	1.000	.836
Letter_credit_Bank_offtaker_tideup	1.000	.789
Offtaker_guarantee_payment_LC	1.000	.784

Extraction Method: Principal Component

Table B6. Total Variance of Guarantee Factors

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.276	34.015	34.015	6.276	34.015	34.015	3.640	23.786	23.786
2	1.772	14.421	48.436	1.772	14.421	48.436	2.030	16.599	35.385
3	1.356	10.243	58.679	1.356	10.243	58.679	1.972	14.674	50.059
4	1.285	8.036	66.715	1.285	8.036	66.715	1.966	11.656	66.715
5	.975	7.157	73.872						
6	.838	6.294	80.166						
7	.754	5.075	85.241						
8	.674	4.125	89.366						
9	.614	3.142	92.508						
10	.505	2.075	94.583						
11	.429	1.296	95.879						
12	.342	.985	96.864						
13	.270	.812	97.676						
14	.235	.748	98.424						
15	.127	.652	99.076						
16	.097	.527	99.603						
17	.053	.398	100.000						

Extraction Method: Principal Component Analysis

Factor Analysis: Credit Enhancement Factors

Table B7. Communalities of Credit Enhancement Factors

Communalities		
	Initial	Extraction
CE_Shareholder_contingency	1.000	.769
CE_Shareholder_Standby_credit	1.000	.810
CE_Shareholder_retention	1.000	.830
CE_Shareholder_AbilitytoExit_SPV	1.000	.821
CE_Shareholder_SPV_reserve_acc	1.000	.724
CE_Shareholder_Claw_Back	1.000	.690
CE_Govt_Letter_of_Credit	1.000	.772
CE_Govt_DSRA	1.000	.855
CE_Govt_Grants	1.000	.758
CE_Govt_Subordinated_Debt	1.000	.681
CE_Govt_Equity	1.000	.858
CE_Thirdparty_MDBs	1.000	.748
CE_Thirdparty_ECAs	1.000	.755
CE_Thirdparty_Security_Trustee	1.000	.756
CE_Thirdparty_Insurance	1.000	.811
CE_Thirdparty_MDBs_Subordinated_Debt	1.000	.668
CE_Thirdparty_Commercial_Paper	1.000	.687
CE_Thirdparty_IDFC	1.000	.762
CE_Thirdparty_Political_risk_MDBs_ECAs	1.000	.656
CE_CapitalMechanism_Creation_DSRF	1.000	.735
CE_CapitalMechanism_Turstgrants_SPV	1.000	.731
CE_CapitalMechanism_Standby_letter_contractor	1.000	.683
CE_CapitalMechanism_backended_payment	1.000	.486
CE_CapitalMechanism_Subordination	1.000	.770
CE_CapitalMechanism_Indexation	1.000	.520
CE_CapitalMechanism_Escrow_SPV	1.000	.736
CE_CapitalMechanism_Escrow_lender	1.000	.790

Extraction Method: Principal Component

Factor Analysis: Credit Enhancement Factors

Table B8. Total Variance of Credit Enhancement Factors

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.462	28.985	28.985	6.462	28.985	28.985	3.260	22.976	22.976
2	3.451	18.337	47.322	3.451	18.337	47.322	3.014	15.298	38.274
3	2.335	8.178	55.500	2.335	8.178	55.500	2.826	10.853	49.127
4	1.888	5.967	61.467	1.888	5.967	61.467	2.627	8.975	58.102
5	1.720	5.372	66.839	1.720	5.372	66.839	2.426	8.737	66.839
6	.991	5.011	71.850						
7	.961	4.837	76.687						
8	.816	3.774	80.461						
9	.720	3.101	83.562						
10	.612	2.766	86.328						
11	.490	2.209	88.537						
12	.465	1.855	90.392						
13	.373	1.741	92.133						
14	.363	1.504	93.637						
15	.331	.997	94.634						
16	.248	.864	95.498						
17	.204	.793	96.291						
18	.137	.656	96.947						
19	.126	.575	97.522						
20	.113	.466	97.988						
21	.096	.419	98.407						
22	.078	.361	98.768						
23	.064	.301	99.069						
24	.058	.288	99.357						
25	.049	.253	99.610						
26	.031	.201	99.811						
27	.012	.189	100.000						

Extraction Method: Principal Component Analysis

Appendix-C

Table C1. Validation of Preliminary Factors by Experts

Preliminary Factors	No. of experts		Results
	Having influence	No influence	
1. Factors related to Contractual Foundation			
1.Take or Pay off-take agreement	7	0	validated
2. Hell or High water off-take agreement	5	2	validated
3. SPV is obliged to make certain capacity payments to compensate the off-taker if it fails to meet its delivery obligation	5	2	validated
4. If off-taker does not dispatch the plant, it makes a capacity payment but not energy payment	7	0	validated
5. Guarantee from off-taker to indemnify SPV for all costs/losses incurred converting payments from local to foreign currency	4	3	validated
6. Merchant facility	4	3	validated
7. Provision of third party sales in case of default of off-taker	4	3	validated
8. Long term ‘supply or pay’ agreement	7	0	validated
9. Long term ‘supply and pay’ agreement	6	1	validated
10. Spot purchase	5	2	validated
11. Secure certain amount of energy through long term supply agreement	4	3	validated
12. Credit quality of the off-taker	7	0	validated
13. Credit quality of the supplier	7	0	validated
14. Rated O&M contract with performance damage	7	0	validated
15. Country’s history of international borrowing records	6	1	validated
16. Credit quality of the sponsors particularly the EPC contractor	7	0	validated
2. Factors related to Enabling Environment			
1. Comprehensive and transparent law	7	0	validated
2. Competitive bidding award	7	0	validated
3. Strong political commitment	7	0	validated
4. Institutional environment	6	1	validated
5. Government compensation for bidding costs (to reduce front end cost)	0	7	not validated
6. Government allows dispute resolution in international arbitration	6	1	validated
7. No significant instance of expropriation, currency inconvertibility or contract abrogation by the government	6	1	validated
8. Government to carry out all preparatory work including land acquisition and utility removal at its cost	6	1	validated
9. Long track record of country’s legal stability	5	2	validated
10. Established government’s template for infrastructure financing	5	2	validated

Table C1 Continued

11. Government issuance of policy guideline	6	1	validated
12. Well developed legal system and significant precedent exists	7	0	validated
13. Legal statutes for project financing	5	2	validated
14. Trade liberalization, privatization or deregulation of key sectors (e.g. electricity, utility etc.)	4	3	validated
15. Concession agreement, off-take and fuel supply agreement are in one agreement i.e. 'one package'	7	0	validated
16. De-linking PPA and fuel supply agreement	4	3	validated
3. Factors related to Guarantees			
1. Government's guarantee on supplier's performance	5	2	validated
2. Government's counter guarantee on payment	5	2	validated
3. Force majeure event by government is deemed dispatched and oblige to make capacity payment to SPV	7	0	validated
4. Use of stabilization clause or stabilization guarantee between government and SPV	5	2	validated
5. Letter of credit from off-taker (i.e. guarantee for payment)	4	3	validated
6. Price regulation guarantee on market by the host government	4	3	validated
7. Agreement that protects SPV from increases in country's tax or a change in country law	5	2	validated
8. Limited country guarantee in monetary value by the government on behalf of off-taker	5	2	validated
9. Central bank's guarantee on currency availability, convertibility and transferability	7	0	validated
10. Government commitment to renegotiate tariff in the event of currency devaluation	4	3	validated
11. Government's guarantee on debt	5	2	validated
12. Standby financing by the government	1	6	not validated
13. Unconditional and irrevocable guarantee by the government	4	3	validated
14. Support letter from the host government which causes off-taker to discharge its payment obligation	4	3	validated
15. Multi-lateral Development Bank's credit guarantee	6	1	validated
16. Export Credit Agency's credit guarantee	7	0	validated
17. Commercial Bank's credit facility	7	0	validated
18. Commercial freedom	1	6	not validated
19. Letter of credit from bank to tide over temporary liquidity mismatches on behalf of off-taker	4	3	validated
4. Factors related to Credit Enhancement			
1. Contingent equity support by the sponsors	7	0	validated
2. Standby letter of credit by the sponsors	7	0	validated
3. Shareholder's retention agreement	6	1	validated
4. Ability to exit to sales of shares from SPV	5	2	validated
5. Shareholder's agreement that SPV reserves maintenance account	7	0	validated
6. Claw back guarantee by the project sponsors and passive equity investors	5	2	validated
7. Letter of credit by the host government	5	2	validated

Table C1 Continued

8. Establishment of government funded debt service reserve account if off-taker is unable to make necessary payment obligation	4	3	validated
9. Presence of government grants	4	3	validated
10. Presence of government equity	5	2	validated
11. Presence of subordinated debt by government	5	2	validated
12. Involvement of MDBs	7	0	validated
13. Involvement of ECAs	7	0	validated
14. Involvement of security trustee	7	0	validated
15. Involvement of insurance companies	7	0	validated
16. Presence of subordinated debt from MDBs	6	1	validated
17. Financing with political risk insurance from MDBs, ECAs or insurance companies	7	0	validated
18. Establishment of specialized intermediary with equity participation from government, domestic financial institutions	6	1	validated
19. Minimum damage guarantee by the host government	1	6	Not validated
20. Creation of DSRF	4	3	validated
21. A trust that grant SPV a priority interest in portion of off-taker's cash collection in case of off-taker's default	4	3	validated
22. Indexation formula that adjusts the local currency tariffs from inflation and changes in tax	7	0	validated
23. Establish an escrow agreement between SPV and off-taker to capture revenues	4	3	validated
24. Establish a lender managed escrow account for deposit revenues	7	0	validated
25. Commercial papers from banks	5	2	validated
26. Standby letter of credit backing contractor's performance to fulfill its obligation	7	0	validated
27. Senior lender's acceptance of back-ended payment profile (i.e. flexible repayment schedule)	5	2	validated
28. A subordination agreement among government, SPV and lenders for short term cash flow pressure	4	3	validated

Appendix-D

Survey on Special Purpose Vehicle (SPV) of Independent Power Producer (IPP) Projects in Asia

Dear Sir/ Madam,

This survey is being carried out by a PhD candidate under the supervision of Associate Professor Dr. (Name of the Professor) from the School (Name of the School) of (Name of the University) University. The main objective of this research is to investigate the current practice of setting up a Special Purpose Vehicle and the impact of legal and financial issues on it. The findings from the survey will give us a comprehensive picture of the financial and legal considerations for the setting up of the Special Purpose Vehicle (SPV) for IPP projects in Asia.

Experience and tacit knowledge in this area are vital for this research and we therefore seek your valuable feedback and opinion. Your participation in this survey will provide us with meaningful insights into the process of SPV utilization and will help us ensure that the results generated from this research are realistic and well-grounded in actual project experience.

As part of this Survey we have created a questionnaire. There are 5 parts to be completed. A glossary is also added for clarification of some terms that are used in the questionnaire.

The questionnaire will take about 10 minutes to complete. Kindly complete the questionnaire and return it by emailing it to the address given below by **31 March 2010**. If you wish to comment on any of the questions or qualify your answers, please feel free to use the space provided at the bottom of each part. Your comments will be greatly appreciated.

All feedback and information gathered from this survey will be held in strict confidence and will only be used for research purposes.

Thank you very much for your participation and contribution.

Yours sincerely,

Name of the Researcher
PhD Candidate
Name of the School, Name of the University
Email: abc@abc.com

Start of Questionnaire

Part I-Personal Information

Country: _____

Title: _____

Last Name: _____ First Name: _____

Type of Organization:

☐ Financial Institutions ☐ Project Company ☐ Government Agency

☐ Research Institute ☐ Donor Agency ☐ Others:
Pls. specify:

Position in the organization: _____

Back ground:

☐ Lawyer ☐ Consultant ☐ Contractor

☐ Academician ☐ Researcher ☐ Others:
Pls. specify:

Responsibilities: _____

Duration of
Working Experience: _____

Email Address: _____

Part II – Financial Issues

What are the following financial issues do you consider for setting up SPV of IPP projects in Asia? (Extremely important = 5, very important = 4, important = 3, somewhat important = 2, not important = 1). Please tick (√) or cross (x).

Financial Attributes Supporting Setup of Special Purpose Vehicle	Negligible —————> Extreme				
	1	2	3	4	5
Take or Pay off-take agreement					
Hell or High Water off-take agreement					
SPV is obliged to make certain payments to compensate the off-taker, if it fails to meet its delivery obligation					
If off-taker does not dispatch the plant, it makes a capacity payment, but not energy payment					
Guarantee from the off-taker to indemnify SPV for all costs/losses incurred converting payments from local currency to foreign currency					
Credit quality of the off-taker					
Long time 'Supply or Pay' agreement					
Long time 'Supply and Pay' agreement					
Spot Purchase					
Supply Agreement is divided into Swing (Variable) and firm (Supply or pay) Supply					
Secure certain amount of energy through long term supply agreement					
Credit quality of the supplier					
Presence of host government grants					
Presence of Domestic Debt					
Presence of Subordinated Debt (by Multilateral Agency)					
Presence of Subordinated Debt (by Host Government)					
Presence of Equity from Government/ Government Agency					
Establishment of specialized intermediary (such as Infrastructure Development Finance Company etc) with equity participation from government, domestic financial institutions.					
Financing with political risk insurance from Multi-lateral agencies or Export Credit agencies or insurance companies					
Senior lender's acceptance of back-ended payment profile (i.e. flexible repayment schedule)					
Establish an escrow agreement between SPV and off-taker to capture revenues from off-taker customer to support off-taker's payment obligation					
Establish a lender managed escrow account for deposit revenues					
Government's guarantee on debt					
Limited counter guarantee in monetary value by the government on behalf of the off-taker					
Price regulation guarantee on market by the host government					
Central bank's guarantee on Currency Availability, Convertibility and Transferability					
Multi-lateral Development Banks' credit guarantee					

Financial Attributes Supporting Setup of Special Purpose Vehicle	Negligible —————> Extreme				
	1	2	3	4	5
Export Credit Agencies credit guarantee					
Credit facilities by the commercial banks					
Country's history on international borrowing records					
Indexation formula that adjusts the local currency tariffs for inflation and changes in tax					
Project is economical to the off-taker					
Rated O&M contract with performance damage					
A defensible tariff (i.e. tariff is priced par or at a lower cost than a project's competitors)					
De-linking off-take and supply Agreement (such as PPA and fuel supply agreement)					
Others, please specify					

Part III – Legal Issues

What are the following legal issues do you consider important for setting up SPV of IPP Projects in Asia? (Extremely important = 5, very important = 4, important = 3, somewhat important = 2, not important = 1). Please tick (√) or cross (x).

Legal Attributes Supporting Setup of Special Purpose Vehicle	Negligible —————> Extreme				
	1	2	3	4	5
Long track record of country's legal stability					
Established government's template for infrastructure financing					
Comprehensive and transparent concession law					
Competitive bidding award					
Strong political commitment (Clear Objective, Dispute Resolution)					
Institutional environment (such as skill and dedicated Government staff to oversee design and implementation of PPP)					
Government issuance of policy guideline					
Well developed legal system and significant precedent exists					
Legal statutes for project finance					
Trade liberalization, Privatization or deregulation of key sectors (such as electricity, utilities etc.)					
Government allows dispute resolution in international arbitration					
No significant instance of expropriation, currency inconvertibility or contract abrogation by the government					
Government's commitment to renegotiate tariff in the event of currency devaluation					

Legal Attributes Supporting Setup of Special Purpose Vehicle	Negligible —————> Extreme				
	1	2	3	4	5
Unconditional and irrevocable guarantee by the host government					
Government to carry out all preparatory work including land acquisition and utility removal at its cost					
Government's guarantee on supplier's performance (if supplier is State Owned Enterprise)					
Government's counter guarantee on payment (if off-taker is SOE)					
Letter of credit from the off-taker					
Force majeure event by government is 'deemed dispatched' and oblige to make capacity payment to SPV					
Use of stabilization clause or stabilization guarantees in the contract between the host government and SPV					
Others, please specify					

Part IV - Credit Enhancement issues

What following issues do you consider important for enhancing credit for setting up SPV of IPP Projects in Asia? (Extremely important = 5, very important = 4, important = 3, somewhat important = 2, not important = 1). Please tick (✓) or cross (x).

Credit Enhancement issues for Special Purpose Vehicle	Negligible —————> Extreme				
	1	2	3	4	5
Contingent Equity support by the sponsors					
Shareholders' agreement that SPV reserves a maintenance account for O&M before making any distribution to shareholders					
Project completion guarantee by the sponsors					
Claw back guarantee by the project sponsors and passive equity investors					
Letter of Credit by the Host Government					
Support letter from the host government which causes off-taker to discharge its payment obligation					
Establishment of government funded debt reserve account if state-owned off-taker is unable to make necessary payments to the lenders					
Agreement that protects SPV from increases in country					

Credit Enhancement issues for Special Purpose Vehicle	Negligible —————> Extreme				
	1	2	3	4	5
taxes or a change in country law					
Agreements that exempt SPV from taxes during construction period, including value added taxes, documentary and stamp taxes, registration fees and customs duties					
A subordination agreement among government, SPV and lenders for short term cash flow pressure					
Involvement of Multilateral Agencies					
Involvement of Export Credit Agencies with political risk coverage					
Involvement of security trustee					
Creation of Debt Service Reserve Fund					
A trust that grants SPV a priority interest in portion of off-taker's cash collection in case the off-taker defaults in payment obligation					
Standby letter of credit backing Contractor's performance to fulfill its obligation					
Business interruption and casualty insurance policies in place					
Others, please specify					

Part V – Open Question

Your comments are also welcome on the following open question.

Do you have any further comments regarding set up of SPV for IPP projects in Asia? If so, list them down please;

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End of the Questionnaire
Thank you for your contribution

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Glossary

Claw back guarantee: A guarantee is provided by sponsors that they return the cash distribution (dividend) to SPV in the event of debt service, capital improvement and similar needs.
Hell or High Water: A non-cancelable contract whereby the off-taker must make the specified payment to the seller (here SPV) regardless of any difficulties that may encounter. It binds the purchaser until expire of the contract. There are no “outs” for the off-taker. Off-taker has to pay in all events even if output is not produced and even in cases of force majeure.
Take or Pay: Agreement between off-taker and seller (here SPV) in which the off-taker will still pay some amount even if the product or service is not provided.
Stabilization Clause: It is used in contracts with host government to manage political risk, that is, to restrain a government and increasingly a state enterprise to intervene in a contract entered into with a foreign company. The function of stabilization clause is to freeze in place each of the significant investment assumptions made by the project company over which the government has control.
Security Trustee: Third party bank is appointed by lending banks to perform certain agency functions related to the security of cash flows and its disbursement.
Spot Purchase: Under this agreement, SPV agrees to purchase supply or transportation services on the terms available in the market at the time of purchase.
Subordination agreement: This is a form of credit support by the host government to SPV to reduce risks in contracting with a state-owned off-taker. If a risk materializes, rather than advancing money to the state-owned utility, the government could instead agree to defer collection from SPV to it, or to another state-owned company participating in the project for a limited time.
Supply or Pay: A contract provided by the suppliers of energy/raw material to a project which needs as assured supply of such energy/raw material over a long period at predictable price to meet production cost targets. Under this contract, supplier must either supply the energy/ raw material or pay the SPV the difference in costs incurred in obtaining the energy/raw material from another source.
Supply and Pay: A Supply and Pay contract is an obligation to pay for the product/service only if it is delivered to SPV. There is no unconditional obligation to the supplier to pay for product/service whether or not delivered.