Build Operate Transfer (BOT) Project Financing in Asian Developing Countries

- Comparative Study on the Structure and Risks in BOT Power Projects -

Cho HyunChan[1], Kunishima Masahiko[2] and Yoshida Tsuneaki[3]

[1] Ph.D. Candidate, Dept of Civil Engineering, University of Tokyo*

[2] Professor, Dept. of Civil Engineering, University of Tokyo**

[3] Professor, Dept. of Civil Engineering, University of Tokyo***

Since late 1980s, the number of Build-Operate-Transfer (BOT) type infrastructure projects that have been executed in Asia counts approximately 150. To meet the Asia's huge demand in infrastructure development and management, the unique BOT method will be implemented increasingly in the upcoming 21st century. The aim of this paper is to investigate the basic structure and explore the characteristics of the risks involved in the BOT projects located in Asian developing countries. Risks are categorized into nine different groups. Appropriate solutions and methods to reduce and manage each risk are also discussed. Five actual power projects from Asian developing countries are selected for a comparative study.

【*Keyword*】 : *Build-Operate-Transfer (BOT), Asian developing countries, structure, risks, solutions*

1. INTRODUCTION

The precise linkage between infrastructure development and economic growth is still open to debate, however, according to the statistic data provided by the World Bank[1)] and an empirical analysis studied on Japanese, Korean and Asian developing countries' economies[2)], the amount of infrastructure investment grows in proportion to the gross domestic product (GDP).

* Department of Civil Engineering
03-3815-0460 Ext. 6143
** Department of Civil Engineering
03-3815-0460 Ext. 6142
*** Department of Civil Engineering
03-3815-0460 Ext. 6142

In Asia, the share of infrastructure investment in GDP is expected to rise from 4 percent today to more than 7 percent by the turn of the century[3)]. However, government's ability to spend on infrastructure investment has been severely constrained because of its incapability in raising sufficient capitals for the infrastructure investment and its inefficiency in management of infrastructure development and operation[4)].

To meet the needs for the infrastructure development in Asia, the BOT method has been accepted and implemented increasingly in recent years both in developed and developing countries. The number of BOT type infrastructure projects from 1985 to 1995 counts

more than 150 only in Asian region and roughly 40% of BOT investments went to power sector, 33% to transportation sector, 18% to telecommunications and 9% to water and wastewater sector[5].

The road to a successful BOT project is, however, not easy. The whole process of BOT project development is a complicated, time consuming, and expensive business. Risks are various and high, competition is keen, negotiations are long and extensive[6]. So both public and private sectors who are participating in BOT project need to understand the basic structure, analyze and manage the risks and pay special attention to these considerations.

The objective of this paper is to increase the understanding of the BOT project by analyzing the basic structure, agreements, risks, risk factors and solutions and methods to reduce each risk through a comparative study of five BOT projects. No attempt is made to rank or generalize the identified outcomes, because the sample size is too small to rank the factors in their importance or draw a single general conclusion. This paper aims to look into the detail structure and agreements applied in actual BOT projects and to provide a comprehensive checklist of risks, risk factors and solutions for each risk.

2. PROJECT SELECTION

Five BOT projects, two projects from Philippines, one project from Indonesia, Pakistan and Nepal each are chosen for the comparative study. They are Batangas Power project, Hopewell Power project, PT Paiton Power project, Fauji Kabirwala Power project and Khimthi Hydroelectric (Himal) Power project.

The selection of these five projects is judgmental and subjective. However, there are several common features which all the selected projects share together. First, all the sampled BOT projects are located in Asian developing countries. Second, all the projects are power plant projects. Third, they are all considered to be one of the first BOT projects to be financed under the BOT scheme in their own countries. Fourth, multinational interactive banks such as Asian Development Bank (ADB), International Finance Corporate (IFC), Japanese Export Import Bank (JEXIM) and US Export Import Bank (USEXIM) were actively involved in debt financing. Fifth, the selected projects are currently either under smooth construction by experienced contractors or in operation after the successful completion of construction.

Two main sources of information about the sampled BOT projects are the documentation of experiences and lessons and the contents of interviews. The documentation of experiences and lessons were presented in seminars and conferences on BOT projects delivered by experts such as S. Takeuchi, senior economist in Japan Long Term Credit Bank Research (LTCBR) institute and H. Kato, director of industrial development study division in Japan International Cooperation Agency (JICA). The interviews were conducted with specialists on BOT project financing such as H.M. Chung, senior manager of private investment group in

the World Bank on March 1997 and K.W. Lee, manger of Private Sector Group (PSG) in ADB and five investment officers of PSG in ADB, N. Kawasaki, J. Yamagata, J. Fyfe, P. Lombardo and T. Hoschka on September 1997. The basic features and descriptions of five sampled BOT projects are illustrated on table 1.

Table 1 Five Sampled BOT Projects

Projects	Hopewell	Batangas	PT Paiton	Fauji Kabirwala	Himal
Host Country	Philippines	Philippines	Indonesia	Pakistan	Nepal
Project Type	Power	Power	Power	Power	Power
Total Cost	$973	$120	$2,500	$170	$143
Cost of Construction	$729	$106	$1,772	$104	$107
Construction / Total	75 %	89 %	71 %	61%	75%
Concession Period	25 years	10 years	30 years	30 years	20 years
Equity : Debt	25:75	25:75	25:75	25:75	35:65
Project Company	Corporation	Corporation	Partnership	Ltd.	Ltd.
Capacity	700 MW	123 MW	615 × 2 MW	151 MW	60 MW
Description	Coal fired Thermal power plant	Bunker C fuel oil fired diesel power plant	Coal fired Thermal power plant	Low British Thermal unit gas Fired power plant	River hydro Power plant

MW : Megawatts

$ unit : Millions

3. PORJECT COMPANY

In most cases of BOT projects, the initial private promoters who are interested in a particular project form a joint venture or a consortium project company. It raises the capital enough for the particular infrastructure through project financing instead of direct financing.

Project financing is also called off-balance sheet financing. It is defined as a financing of a particular economic unit in which a lender is satisfied to look to the cash flows and earnings of that economic unit as the sole source of funds from which a loan will be repaid and to the assets of the economic unit as collateral for the loan[7]. It should be distinguished from direct financing. In connection with direct financing, lenders to the firm look to the firm's entire asset portfolio to generate the cash flow to service their principal loans with interests. So the direct financing influences the firm's assets balance[8]. Direct financing is often called as corporate financing[9].

In a BOT project financing, the newly established legal entity, the project company, is segregated to a substantial degree from the promoting companies. This means that legally the asset, cash flow, contract and agreement of the project company are separated from the promoting companies.

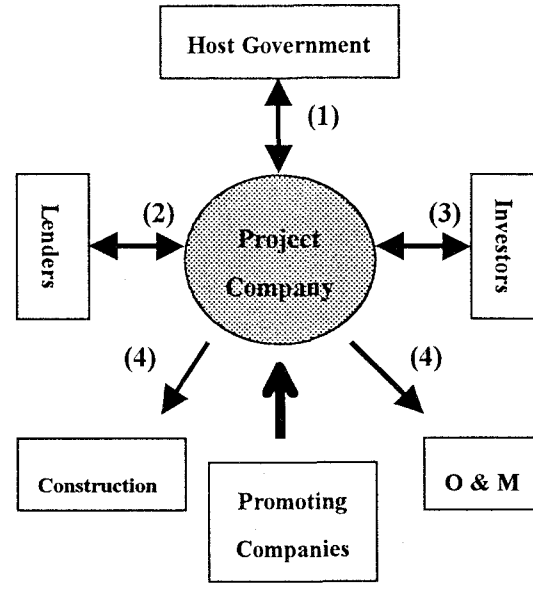
This newly established project company will perform all the functions required to develop a project, once the company is awarded the bid to proceed the development of the given project. The appropriate structure of the project company depends on a variety of business, legal, accounting, tax and regulatory factors.

There are four alternatives forms of a project company; Undivided Joint Interest, Corporation, Partnership and Limited Liability Company. Four projects from five sampled BOT projects formed either a limited liability company (Ltd.) or a corporation as a distinct legal entity. Largely, there are three advantages in forming a Ltd. or corporation. First, the shareholder investors in the project are not liable for the project company's obligation beyond their capital contributions. Second, there are no limitation on the number or type of owners. This characteristic enables the project company to expand its debt capacity. Third, all the owners may participate actively in the management of the company without risking loss of their limited liability[10]. PT Paiton project formed a partnership. In a partnership form, partners are jointly liable for all obligations and certain liabilities incurred by the project company.

4. AGREEMENTS

The basic structure of a BOT project with four important agreements involved in its negotiations and implementations are illustrated on figure 1. The four agreements are concession agreement, credit agreement, shareholder agreement and contract agreement.

Figure 1. Structure of BOT project



Note : (1) Concession Agreement (2) Credit Agreement
(3) Shareholder Agreement(4) Contract Agreement

(1) Concession Agreement

A host government should only proceed with a project only if the project has a positive net economic value meaning the expected economic benefit to be derived from the project exceeds the expected economic cost. It is assumed that the economic analysis takes into account the associated social and environmental aspects. Commonly, once the project proves its positive economic value, a concession agreement between host government and BOT project company is contracted.

One of the most important issues in a concession agreement is the length of the concession agreement. Concession period is the company's operation time of the facility needed to compensate the front end equity investment and repay the debt and interest borrowed from the lenders. The concession period for the

sampled projects ranges from 10-30 years. In some cases, government involves in equity investment and becomes a part of the owner, but it is not the case for the sampled projects.

(2) Credit Agreement

A credit agreement is a critical contract particularly for a successful BOT project financing, because the project is rarely financed independently on its own without a credit support from third party lenders, mostly the banks, who may be interested in lending a credit service. The lenders will not be willing to lend their credit services to a project company when more than just a lending risk is involved in the project. Also, the excessive debt dependency in project financing will increase the bankruptcy cost[11].

The investigation of the sampled projects reveals that the practiced debt to equity ratio is 75:25 except for Himal projects which is 65:35. In a view point from the project company, borrowed credit services from lenders turns into the debt accompanying the interest which has to be repaid within a promised date. The source of debt comes from commercial banks, local banks, life insurance companies, public and private pension funds, multinational interactive banks and in some cases, host government. In all sampled projects, multinational interactive banks such as ADB, IFC, JEXIM and USEXIM were the major lenders of the project debt financing.

ADB provided loans to four sampled projects except for PT Paiton power project, and IFC provided loans to Hopewell power project and Himal power project, and Japanese and US EXIM banks provided loans to Hopewell power project and PT Paiton power project. These multinational interactive bank's loans are favorable because the loan term is usually longer than that of normal banks and the participation of these banks endorses the credit for other potential lenders.

(3) Shareholder Agreement

Investor who has an interest in the project or views the project as an investment opportunity may be able to become a part of owner by providing equity capital. This equity capital is essential because it complements debt financing and more easily accommodates the financial needs of the project. Equity investment is compensated by dividends, but equity investor is the last in priority for its repayment. So it is called a risk capital compared to the credit capital provided by the lender[12].

Usually, the promoting companies who form a project company invest the equity capital at the beginning, and attract external investors by advertising the value and promising the success of the project. In all the sampled projects, promoting companies' equity share for the total equity of the project company exceeds 78%. In PT Paiton project, 100% of the equity is invested by the consortium of the promoting companies. Interviews with experts and specialists suggest that the higher equity investment by the promoting companies can help to attract the lenders to provide debt services.

Besides external investors, typically those parties who will directly benefit from the

construction, operation and maintenance of the project become the equity investors. They are real estate developers, construction & engineering companies, subcontractors and raw material suppliers, purchaser of the project's output. In some cases, banks participate in equity investment, too. ADB is an equity investor as well as a lender for four sampled projects that it involved in.

(4) Contracts Agreement

Generally, among the promoting companies who usually become partly shareholders of a project company, at least one construction contractor and operating company are involved and these companies participate in the engineering, construction or operational services. However, the project company may hire an independent company to design, build and operate the project under the separated contract. In Hopewell and Fauji Kabirwala projects, the project company hired independent contractors for the construction and the operation and maintenance (O&M) activities. Table 2 shows the participants in each project as promoting companies, general contractors, O&M contractors, suppliers, power purchasers and main lenders.

Table 2. Promoting Companies, Contractors, Suppliers and Purchasers

Projects	Hopewell Power	Batangas Power	PT Paiton Power	Fauji Kabirwala	Khimthi Hydroelectric
Promoting Companies	Hopewell Holdings Limited (HK)	Enron Power (USA)	Mission (USA), Mitsui (Japan), GE (USA), PT BHP (Local)	Fauji Found (PK), Sceptre Co (USA), INTRAG (USA)	Butwal Co.(Nepal), Statkraft (Norway)
Equity Share of Promoting Companies	87%	90%	100%	88%	78%
Turnkey Contractor	Mitsubishi Co. (Japan)	Enron (USA)	Mitsui, Duke, Flour, Toyo	National Energy Production (USA)	Statkraft, Himal (Nepal)
O & M Contractor	Hopewell	Enron (USA)	Mission	Westinghouse Int'l Service Co. (USA)	Statkraft
Energy Supplier	National Power Corporation	National Power Corporation	PT BHP	Oil and Gas Develop (PK)	Equipment Supply & Installation
Power Purchaser	National Power Corporation	National Power Corporation	Public Power Corporation	Pakistan Water & Power Authority	Nepal Electricity Authority
Main Lenders	ADB, JEXIM, IFC, USEXIM	ADB, JEXIM	JEXIM, USEXIM	ADB,	ADB, IFC

Local : Host Country, PK : Pakistan, HK : Hong Kong

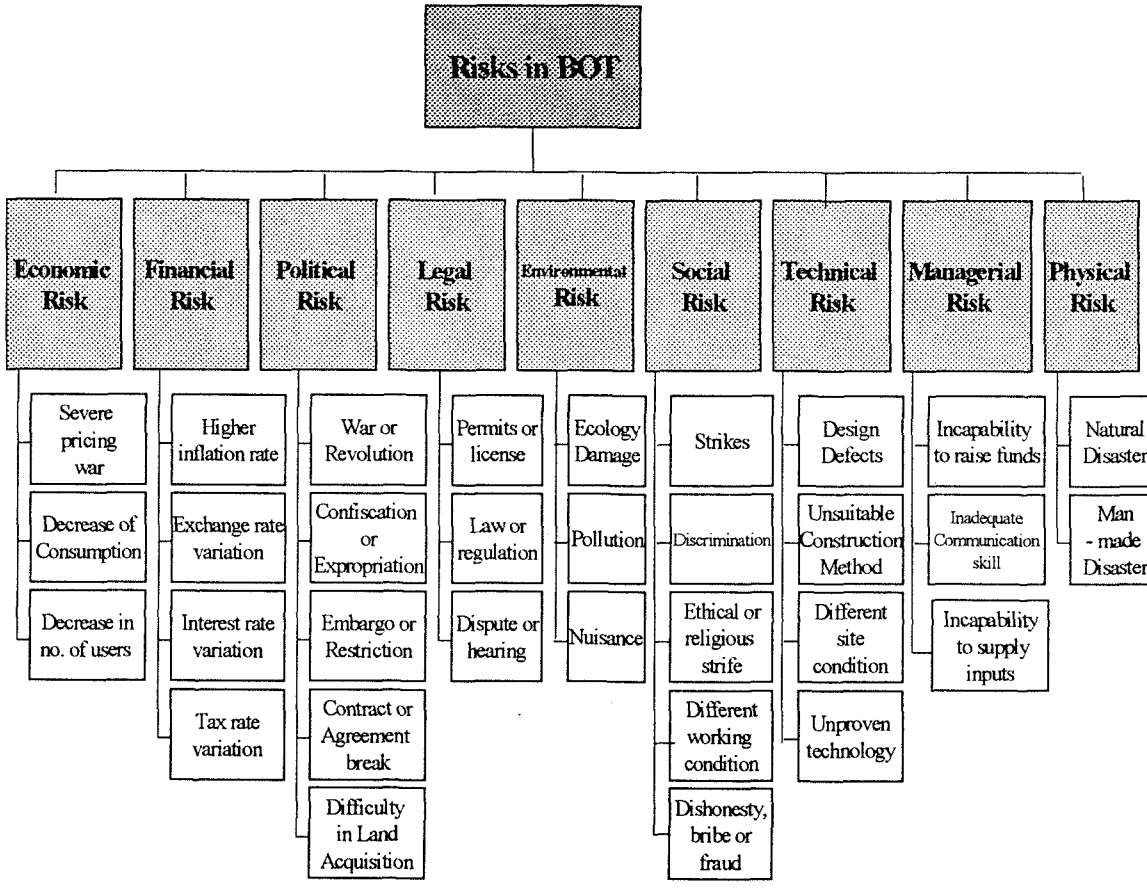
5. BOT RISKS

A risk is defined as any unintended or unexpected failure or outcome of a decision or course of action[13]. The writer defines a risk in BOT project as any unintended or unexpected changes or events which: 1) delays the schedule of the project or stops the project completely; 2) causes a cost overrun or revenue shortage of the project; 3) deteriorates the quality or reduces the quantity of the final output of the project.

Various risks are existing throughout the each phase of BOT project development from the construction until transferring to the host government with the expiration of the concession period. For a BOT project to be successfully achieved, these risks must be properly considered and reduced and sometimes avoided in its feasibility stage. After the commencement of the construction, these risks must be carefully monitored and managed.

The extensive literature background reviews[14,15,16,17] and research interviews previously explained reveal that there are nine risks categorized by the nature of the risk. The risks which were identified are illustrated on figure 2.

Figure 2.Hierarchical Structure of Risks in BOT project



(1) Economic Risk

Economic risk is defined as a risk caused by the unexpected changes of external market conditions in certain country or region where the project is located. Three factors for the economic risk have been identified. They are: 1) severe pricing war with both domestic and international competitors; 2) decrease of consumption due to the economic regression; 3) decrease in the number of users due to the migration or population reduction.

(2) Financial Risk

Financial risk is defined as a risk caused by the unexpected change of the financial conditions which can affect the cash flow adversely in direct. Four factors for the financial risk have been identified. They are: 1) higher inflation rate than forecasted one; 2) exchange rate (currency rate) variation; 3) interest rate fluctuation 4) tax rate variation.

(3) Political Risk

Political risk is defined as a risk which is caused by the unexpected change of the political system or the foreign policy of the host country. Sovereign risk is included in the political risk. Five factors for the political risk have been identified. They are: 1) war, revolution, political takeover or coup d'etat; 2) expropriation or confiscation; 3) embargo or restriction on exports/imports; 4) breaking the contract or agreement by the government authority or sovereign power; 5) difficulties in land acquisition for the project.

(4) Legal Risk

Legal risk is defined as a risk which is caused by the unexpected change of the legal system or unnecessary requirements of the legal procedure in the host country or pertinent jurisdiction. Three factors for the legal risk have been identified. They are: 1) availability of numerous permits and licenses; 2) change of law, standard or regulation; 3) requirement of the public hearing or dispute.

(5) Social Risk

Social risk is defined as a risk caused by the unexpected social, cultural behavior, habit or customs of the host country or local community. Five factors for the social risk have been identified. They are: 1) strikes of work force or union; 2) public discrimination; 3) ethical or religious strife; 4) different working condition such as language, climate or weather; 5) dishonesty, bribe or fraud.

(6) Environmental Risk

Environmental risk is defined as a risk caused by the potential or perceived negative influence on the surroundings or ecosystems. Three factors for the environmental risk have been identified. They are: 1) ecological damage; 2) pollution including air, water pollution and dirt or noise; 3) nuisance.

(7) Technical Risk

Technical risk is defined as a risk which involves the issues associated with design, engineering, construction and operation of the project. Four factors for the technical risk have

been identified. They are: 1) defects in design; 2) unsuitable construction method; 3) different site condition; 4) unproven or too difficult technology in operation.

(8) Managerial Risk

Managerial risk is defined as a risk caused by the lack of business technique or inadequate management by the promoting companies or joint venturing companies. Three factors for the managerial risk have been identified. They are: 1) incapability to raise the funds to finance the project; 2) inadequate communication or negotiation skill; 3) incapability to supply the inputs for the project such as labor, material, equipment and energy.

(9) Physical Risk

Physical risk is divided into two factors. They are: 1) natural disaster; 2) man made disaster. Natural disaster includes floods, earthquake, landslides, etc. Man made disaster includes fire, safety accidents, system breakdown by the human error.

6. SOLUTIONS

For a BOT project to be successfully achieved, risks which were identified must be properly considered, reduced, managed and monitored throughout the whole process. Most of the risks can be managed greatly through applying the appropriate managing methods or solutions. Some managing methods and solutions are suggested in this section which were applied in the sampled projects.

(1) Economic Risk

In all the sampled projects, promoting companies conducted extensive realistic market study with sensitivity analysis which has been carried out to test the project's viability under various adverse conditions. The analysis examines whether the project is economically viable under all the adverse conditions considered. The market study was reviewed again by external consultants or advisers.

Also, the project company sets an energy or raw material supply contract to ensure the supply of the energy or raw material for the normal operation of the plant. In all the sampled projects, the project company obtained a Power Purchase Contract (PPA) with the host government or public corporation, so the project company can cover debt service payment and fix operation and maintenance costs.

(2) Financial Risk

Thanks to the various new hedging instruments developed in 1980s, the financial risk was able to be reduced greatly[18]. To manage the interest rate fluctuation, all the sampled projects either set a fixed interest rate around 10% per annum or convert a floating rate into fixed rate by applying swap, so that the interest rate becomes London inter-bank offered rate (LIBOR) plus a spread of certain percent per annum.

Also, to protect the lender's credit risk, the lender calls for the establishment of an escrow account to receive all revenues of the project. This ensures the servicing of all long term debt. Usually, the revenues held in escrow account

will be disbursed in the following order of priority: 1) O&M costs 2) taxes 3) debt service 4) dividend 5) subordinated loan 6) general over head for the project company. The exchange risks can be reduced by borrowing an appropriate portion of the project debt funds in hard currency or multiple currencies and hedging using currency forward or futures. In Fauji Kabirwala power project, the foreign exchange rate insurance was obtained to minimize the financial risk.

(3) Political & Legal Risk

There are some ways in which project companies protect themselves from political risk and legal risk when investing in projects located in potentially politically unstable countries. One method is to obtain a well prepared concession agreement includes these risk items. Second, risks can be lessened greatly if the project company is owned by a number of investors from a variety of countries including, multinational interactive banks, prominent local investors from the host government or even the host government itself if possible. Third, it is also possible to obtain insurance against political risk and legal risk, but it is expensive.

In all the sampled projects, either multinational interactive banks or strong local partners were involved in equity investment. And the concession agreement includes many features to reduce the political risk and legal risk. For example, the concession agreement between the host government and project company states when any political event or changes in law result in a delay in project implementation, government will compensate the project company for the increase in interest.

(4) Social Risk

All the project company hired a large numbers of local work force, local subcontractors or local suppliers and advertised the positive economic effects of the completed project through seminars to receive the full understanding and supports from the local community.

(5) Environmental Risk

In order to manage the environmental risk, all the projects went through the Environment Impact Assessment (EIA) by the private consultants. Then the recommendations and conditions stipulated in the environmental clearances have been incorporated into the project design and cost.

(6) Technical Risk

Technical risk can be reduced greatly by the lump sum fixed price turnkey contract with very experienced contractors. All the sampled projects contracted fixed lump sum turnkey contract or design build contract with liquidated damage except for the Himal power project. The Himal project has a fixed price contract for the underground powerhouse and tunnel, but has a negotiated price contract for the intake and de-sanding basin due to the possible design changes resulting from the hydraulic model studies. The liquidated damage varies from 20% to 35% of the total turnkey contract amount. Table 3 shows the feature of the construction contract for each sampled projects.

Technical risk is also high when the project adopts new technology or utilizes new equipment in the process and method of construction. If the project requires new technology or equipment, pilot test has to be performed before the actual contract is made for the construction. Technology used in all the sampled projects were already firmly tested or established in other similar scale of projects and the principal construction and O&M contractors.

To prevent the risk in case of cost over runs beyond the control of the turnkey contractor, the promoting companies of the sampled projects: 1) require the bonds or insurance from the contractors; 2) arrange subordinated loans to cover the shortfall; 3) allocate some contingency allowance to cost over run component; and 4) provide an additional contingent equity that can be drawn during the construction to cover any financial shortfall.

Table 3. Feature of the construction contract

Projects	Construction Contract	L/D * for delay & performance
Hopewell Power	Lump Sum Turnkey	Max 20 % of total cost
Batangas Power	Lump Sum Turnkey	N/A
PT Paiton Power	Lump sum Turnkey	Max 25% of total ($575,000/day)
Fauji Kabirwala	Lump Sum Turnkey	Max 35% of total
Himal	Fixed price & Negotiated price	Change orders Predicted Negotiation allowable

L/D * : Liquidated Damage

(7) Managerial Risk

Promoting companies for all the sampled projects are considered to be very skilled in communication and negotiations. For example, Hopewell, Statkraft who was the promoting company for Himal project and Erron who was the promoting company for Batangas project have accumulated a substantial expertise in project management of power project. In Fauji Kabirwala project, the project company hired a professional management company specialized in power sector.

(8) Physical Risk

Appropriate insurance for the natural disaster were obtained by the project company in all the sampled projects. To reduce the man made disaster, recruited work force were trained and educated through the intensive education program such as safety program.

7. CONCLUSION

There has been many arguments in regards to the implementation of the BOT, however, the BOT scheme has been one alternative for meeting the increasing demand in the infrastructure development in both developed and developing countries. And its application tends to expand in the upcoming 21st century.

Based on the five sampled power projects in Asian developing countries, this paper identified not only the basic structure of BOT project with four important agreements but also various risks, risk factors and some managing methods for each risk through a comparative study on five

BOT power projects. Each project exhibited in this paper has developed its unique strategy and has shared the common methods to minimize the identified risks. The selected projects are currently being evaluated to be either successful or satisfactory by all the participants.

Unpredictability has to be reduced as much as possible for the successful implementation of the BOT project. The success of the BOT project greatly relies on the capability of the promoting companies that can identify and properly reduce and manage the risks.

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