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Estimating the Philippine Government's Exposure to and Risk from Contingent Liabilities in Infrastructure Projects

by

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In its desire for closure in critical infrastructure projects undertaken by the private sector, the Philippine government has routinely assumed various risks by way of guarantees. These guarantees not only relate to core guarantees, such as foreign exchange and legal risks, but also to non-core guarantees associated with infrastructure projects, such as market and construction risks. This paper argues that the present practice of estimating, monitoring and accounting for government exposure and assumption of risk severely understates the true exposure and risk arising from the unfettered provision of guarantees. Alternative modalities for estimating exposure and risk are initially proposed, and these are drawn from applications in the financial sector. Nevertheless, further refinements in techniques and methods are needed.

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I. Introduction

The initial stage in the evolutionary process of infrastructure development in most developing countries is usually characterized by full government ownership of entities engaged in the provision of services such as water, telecommunications, power, and transport. Because most of these services have cost structures which inherently make them natural monopolies, the provision of these services has usually been subject to inefficiencies. Worse, because these services are usually viewed as entitlements necessary for survival, governments have intervened in their markets from time to time, subjecting them to moderate to severe price distortions, and unrationed public access, with such conditions persisting for long periods of time. Unfortunately, postponing compensating adjustments in the pricing or rationing of these services to avoid political and popular upheaval has usually come at the expense of state-run utilities and firms. Eventually, the financial strains these conditions create in public utilities turn into full-blown and/or growing fiscal time bombs. When uncompetitive conditions are allowed to persist for long periods of time, the cost to the present and future generation(s) of potentially bailing out the ailing firms constitutes a significant overhang on the national government, which may eventually have to be passed onto taxpayers anyway, and may even undermine efforts at genuine sectoral reform.

Countries wishing to avoid the increasing fiscal strain of continued public sector provision of infrastructure services are gradually turning to several modes of privatization in order to pass on the challenges of infrastructure service provision to parties in better positions to assume the risks involved. These modalities range from greenfield structures, as in most build-operate-transfer (BOT)-type projects, joint public-private ventures, and concession-type structures. These structures represent varying degrees of private sector involvement in the provision of infrastructure services.

Aside from the desire to cut actual and potential fiscal costs (and actual and future political and social upheavals), encouraging private sector participation in infrastructure development has been driven in other countries by rapid economic growth, sometimes outpacing the government's capability to provide services exclusively and efficiently (such as in Asia). Bureaucratic systems and inefficient structures are increasingly being phased out in favor of private operation, ownership or both, which is perceived to be more efficient. However, the transition from public

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to private provision of infrastructure has not come without tremendous costs for some governments. These costs are associated with the attempt by the government to pass on risks to the private sector in the face of great uncertainties in infrastructure service markets. Depending on the state of markets prior to privatization, these risks are the result of uncertainties usually associated with market demand, legal structure, political regime and foreign exchange during the transition period from mostly public- to mostly private sector provision. In many instances, bearing these risks at the outset will not be acceptable to the private sector. Most, if not all, of these risks will be passed onto the national government. Leaving such risks to the government invariably creates contingent claims on the government, which can be triggered by events inimical to the private sector provider. These contingent liabilities take the form of explicit and implicit guarantees by the national government.

II. Transition From Public to Private Provision: The Difficulties in Transferring Risks to the Private Sector

A major concern in the field of public finance in the past few years is the rise in the amount of contingent liabilities contracted by governments in many emerging market economies. Although no concrete evidence has been given for the volumes involved, multilateral financial institutions like the World Bank have reckoned that much of the recent rise in contingent liabilities is associated with the growth in private infrastructure provision in such countries. More specifically, the rise in the volume of contingent liabilities is correlated with the increase in the degree to which the private sector is involved in the provision of goods such as infrastructure services.[2] In order to attain the welfare goals of governments, these services, which may come in the form of utilities in power, water and telecommunications, or in civil works, such as roads, bridges and ports, are presently provided under heavily regulated environments. Thus, the presence of distortions such as price controls and subsidies on public expenditure on infrastructure reduces efficiency in the delivery of infrastructure services by the public sector. In bearing the cost of these distortions, the value of many state-owned providers of infrastructure services is greatly eroded, making privatization of these state institutions difficult and complex. The costs of market distortions are aggravated by the difficulty in removing them, for political considerations.

The government facing a budget constraint and a desire to maximize social welfare through the provision of greater and better infrastructure services faces a trade-off. On the one hand, if the private sector is encouraged to help relieve this budget constraint, private firms are faced with entering highly regulated and distorted markets for infrastructure. Confronted with the uncertainty of providing services in a framework known to have eroded the value of public firms in the past, private providers seek state guarantees on a wide variety of variables. Because the provision of additional infrastructure services in power, water, and civil works is politically popular and normally perceived by the public as providing greater marginal social benefits than marginal private benefits (especially when severe water or power shortages occur), governments generally acquiesce to the provision of guarantees. These guarantees to private providers cover a wide variety of project-specific risks.

[2] That is, the increase in contingent liabilities is correlated with the proliferation of Build-Operate-Transfer (BOT)-type projects.

III. What are the Risks in Infrastructure Projects?

Project-specific risks can be classified into the following categories listed in **Table 1**. Of these risks, experience has shown that those most often voluntarily shouldered by the national government in BOT-type projects are risks regarding:

(a) Site availability – The government guarantees right-of-way (ROW) for the project. This involves purchasing the site for the project, as well as relocating project-affected personnel;

(b) Market risk – If the buyer of the service is a government entity, the government typically agrees to minimum off-take contract purchases and prices (take or pay arrangements). These have the effect of guaranteeing a market for the output of the proponent (could be power, water, or some other commodity);

Table 1: Selected Project-Specific Risks and Sectoral Examples

Type of Project-Specific Risks	Sectoral Examples (Risk-bearer)
Project performance risks High cost of service Bad/inefficient service	**Power** – Power purchase agreements refer to minimum power plant performance criteria which the proponent has to satisfy. **Water** – MWSS concession agreement states the minimum criteria for project performance to be satisfied by the proponent. The concessionaires would bear the risk of poor project performance if they are penalized by the MWSS Regulatory Office. **Transport** – Most toll road concession agreements state the minimum criteria for project performance to be satisfied by the proponent.
Project completion risks Delays Cost overruns Site availability	**Power** – NPC normally guarantees right-of-way and site availability for power projects. **Water** – The MWSS concession agreement stipulates that cost overruns in projects may be passed onto consumers provided they are covered in grounds for extraordinary price adjustments (EPA). Otherwise, such costs are borne by the concessionaires. **Transport** – Responsibility for constructing access and feeder roads necessary for ensuring the viability of many toll roads are assumed by the government.

Fuel and other inputs risk Fuel availability Skilled labor	**Power** – In many instances, power purchase agreements include commitments by National Power Corporation (also the off-taker) to guarantee the supply of fuel inputs for independent power producers. **Water** – The MWSS concession agreement transfers input risk to the concessionaire, unless there are grounds for extraordinary price adjustments. **Transport** – Inputs for road and bridge construction are usually carried by the contractor.
Market risk User demand for services	**Power** – At the height of the power crisis, the government agreed to bear significant market risks by adopting minimum off-take contracts with independent power producers. **Water** – The MWSS concession agreement transfers market risk to the concessionaire. However, a number of bulk water service contracts with pending approvals have minimum off-take provisions with government-owned off-takers. **Transport** – The MRT-3 contract includes a stipulation of minimum ridership levels below which government must compensate the contractor.
Payment risk Creditworthiness of buyers of output	**Power** – All power purchase agreements stipulate that NPC's commitments carry a full government guarantee for minimum offtake amounts. Thus, the relevant credit risk is that of NPC and government. All PPA's carry a buyout clause the IPP may invoke in case NPC commits a breach of contract or fails to make required payments to IPP's. **Water** – Many proposed service contracts between bulk water providers and offtakers, usually municipal water districts, carry guarantees of payment from the latter. Thus, the relevant credit risk is of the municipal water districts or the municipal government.

	Transport – There is no off-taker in most transport projects.
Financial risk Debt service coverage Security On-going compliance	**Power** – All PPA's carry a buyout clause the IPP may invoke in case there a change in circumstance that materially reduces or prejudices the IPP return and the Parties are unable to agree to a change in the contract after a defined period (Guaranteed rate of return risk). In addition, most capacity payments are tailored to cover the project sponsor's debt services plus a fair rate of return. **Water** – In the MWSS Concession Agreement, the government does not assume financial risk. This is instead passed onto the concessionaires. **Transport** – Debt service coverage is a risk assumed by private operators in the case of toll roads.
Country environment risk Expropriation Regulatory interference Concession revoked Legal framework Environmental approval Foreign exchange	**Power** – All PPA's carry a buyout clause the IPP may invoke in case there is a change in law or regulations, and if compliance with such laws results in: a) The power station being unable to operate; b) The interest of the operator in the project and the operator's expectation of its return on investment being materially and adversely affected and the parties are unable to agree to an amendment of the PPA after the defined period of negotiation (Legal framework risk). All PPA's carry a buyout clause the IPP may invoke in case there is a force majeure event that is within the reasonable control of the government or NPC that lasts for a defined period and the parties are unable to agree to a contract revision. In a few cases, this applies to all force majeure events (Force majeure risk). Many PPA's carry a buyout clause the IPP

	may invoke in case the NPC is privatized and this effectively results in a real or purported assignment of rights or assumption of obligations under this agreement or materially and adversely changes its net assets, projected profits, projected net cash flow from operations, or otherwise would prompt a reasonable person to conclude that the ability of NPC or its successor entity to duly perform its obligations under the PPA on a timely basis has been materially and adversely affected. **Water** – In setting the concession fee equivalent to the annual debt amortization payments of MWSS, the MWSS concession agreement effectively transfers the responsibility for paying MWSS loans to the concessionaires. Since these loans have been contracted in foreign currency, the concessionaires bear the risk. However, the concessionaires have cited the devaluation of the peso in their latest petition for EPA before the MWSS Appeals Board. There are no automatic adjustment mechanisms for passing these risks to consumers. **Transport** – In toll road agreements, most of the country environment risks are assumed by the government. **Note:** The Philippines no longer guarantees foreign exchange rates at the time of conversion. What is more prevalent is a guarantee of convertibility of domestic currency into foreign exchange.

Source: International Finance Corporation (1996) and author's own assessment

(c) Payment risk - If the buyer of the service is a government entity, the government guarantees contractual performance;

(d) Change in law risk – The government reassures proponents that changes in the legal framework will not affect contractual agreements; and

(e) Foreign exchange risk – The government/central bank agrees to provide forward cover for the proponent. This will entail either: (1) ensuring that foreign exchange is made available for the project; or that (2) foreign exchange may be purchased through a forward contract for delivery at a later date.

Of the risks mentioned above, there is a growing consensus that the provision of guarantees to cover market risks, foreign exchange risk, and contractual buyout risk in the event of project termination, contribute the greatest share to increases in the contingent liabilities of government. The amount of uncertainty inherent in the transition period and the long gestation periods of infrastructure projects implies that when such guarantees are provided, the government shoulders a large proportion of the risk of insufficient market demand, adverse exchange rate fluctuations, and other negative shocks. Moreover, there is an additional risk that various government agencies may not be able to implement, or be unable to coordinate with one another in executing their contractual obligations.

The growing contingent liabilities associated with privatization of infrastructure services has received increasing attention from academicians and multilateral institutions alike (cite WB and other studies). It has been argued that if governments fail to properly charge risk-adjusted prices for guarantees, then they are clearly not being properly compensated for the risks they are shouldering. In addition, the contingent nature of most of these claims are such that they are often off-budget, so the lack of adequate appropriations against the exercise of the private provider's option to call on the guarantee may exacerbate the government's budget constraint. For these reasons, monitoring the levels of and proper pricing government guarantees have become a critical issue in the field of public finance. If guarantees are properly priced, the allocative efficiency of the framework for guarantee provision will be enhanced, reducing risks borne by government in facilitating the provision of infrastructure. However, such price and non-price rationing mechanisms for controlling government exposure can only be justified by compensating improvements in the macroeconomy, as well as the sectoral and legal framework for the provision such services. These improvements will reduce overall risks in infrastructure development, making it more likely that all parties in such transactions assume less risk.

IV. Introduction to Contingent Liabilities

A contingent liability is a liability whose value is uniquely dependent on states of nature that will occur in the future. The timing of the occurrence of these states may or may not be certain at the outset. Because the government exercises a limited amount of control over many activities, it is not aware of how much it can lose when events trigger payment or service obligations.

Given the infrastructure risks assumed by government specified in the previous sections, the first goal of this paper is to estimate government's exposure and risk in such projects. The second goal is to establish a system for setting aside budgeted reserves to cover risks assumed by government in infrastructure projects. The third goal is to establish an improved method for pricing guarantees in the future. Finally, the fourth goal is to recommend strategies for proper risk management.

V. First Goal: Estimating Total Government Exposure and Risk

In estimating total government exposure and risk, the following is procedure is recommended:

1) *Review each contract and identify portions where risks are assumed and contingent liabilities exist. This can be done by identifying trigger events (states of nature) in contracts and the payment or service obligations by government associated with these events.*

2) *Determine whether an annual budget is set aside to cover for potential or expected payments.*

Appendix 1 presents the result of this exercise for a small sample of contracts in each sector. If it is assumed that there will only be slight variations across contracts within sectors, then based on the sample of contracts reviewed, the following **Tables 2 to 4** is a summary of the largest sources of contingent liabilities by size of exposure:

Table 2: Largest Sources of Contingent Liabilities in the Power Sector[3]

Item Guaranteed	Cost	Status in Annual Budget
1. Buyout clause or termination	Buyout or termination price	No budget
2. Force Majeure	Buyout or termination price	No budget

Table 3: Largest Sources of Contingent Liabilities in the Transport Sector

Item Guaranteed	Cost	Status in Annual Budget
1. Buyout	Buyout or termination price	No budget
2. Force Majeure	Buyout or termination price	No budget
3. Toll changes; automatic toll adjustment formula	Costs of inability to implement toll adjustments	No budget

Table 4: Largest Sources of Contingent Liabilities in the Water Sector (MWSS)

Item Guaranteed	Cost	Status in Annual Budget
1. MWSS to assume loans being paid by concessionaire	Cost of principal and interest on old MWSS loans	No budget
2. MWSS to pay early termination fee	Early termination amount	No budget
3. Loser of Appeal to pay total cost of Appeal Process for both parties	Cost of Appeals Process	No budget
4. Force Majeure	Early termination amount	No budget

[3] Note that the annual capacity payments by NPC to IPP's are guaranteed; however, they do not give rise to contingent liabilities since the payment schedule has already been predetermined in the contract.

Note from all of the tables that all of the largest exposures are uncovered and unhedged.

3) *(Exposure) Estimate the maximum loss associated with each part of the contract in which risks are assumed and contingent liabilities exist; and*

4) *(Risk) Estimate the amount of government funds at risk of loss – this involves reckoning the probabilities that events triggering actual payments will happen.*

In this exercise, note that it is important to distinguish between exposure and risk. Exposure is defined as the maximum loss associated with each risk assumed. On the other hand, risk is the expected value of this loss given the probability that trigger events will happen.

In order to estimate exposure, one must estimate the maximum loss associated with each part of the contract in which risks are assumed and contingent liabilities exist. To estimate risk, one must estimate the amount of government funds at risk of loss – this involves reckoning the probabilities that events triggering actual payments will happen.

A. Approaches to Exposure Estimation

Box 1 describes the manner in which the Philippine government presently monitors exposure and risk to infrastructure projects. Note that the present system fails to internalize many important aspects of infrastructure contracts. As a result, it will be argued later that estimation of exposure is very imprecise.

The identification of portions of the contract where government exposure exists is straightforward and is depicted in **Appendix 1**. Some exposures to risk are easily quantifiable. For example, the exposure to a contractual buyout is simply the present value of the sum of future payments to private proponent or the sum of accumulated loans from creditors to the proponent. The former may be determined from the contract itself, the latter from audited financial statements. On the other hand, other types of exposures are not so easy to estimate. Examples include the value of completed construction of section of toll road as of a certain date; and the value of investments in expanding a water supply system. These examples require a full audit to properly value.

Using data obtained from the Department of Finance, estimates of exposure were computed across sectors. The first columns in **Appendix 2** to present estimates of exposure to buyout risk across sectors, along with force majeure, the largest and most common sources of contingent liabilities. Note that the power sector has the largest estimated exposure, followed by the transport, then water sectors. The same order holds for average exposure, or exposure per project.

B. Approaches to Risk Estimation

If the probability of a trigger event occurring is small, then estimated risk may be much lower than estimated exposure. In general, the following approaches may be used to estimate risk:

Box 1

The Philippine Government's Present Practice of Monitoring Contingent Liabilities[1]

The present practice of the Department of Finance in monitoring contingent liabilities is to take the present value of the total future payments to be made within the next ten years to all BOT operators with known take-or-pay contracts, and then to compute its total exposure as the range of one- to three percent of this value. Using this approach, the total estimated value of contingent liability of government in 1999 is listed in the following **Table A.**

Table A: Estimated Value of Government Exposure to all BOT Operators in 1999 Using the Current Estimation Procedure

Item	Amount (in billions)
Discounted value, USD	1.87
Discounted value, PHP	59.71
Value of guarantee, PHP (1% risk)	0.79
Value of guarantee, PHP (3% risk)	2.37

Source: Department of Finance

It will be argued in this section that this approach is inadequate, since the present approach does not take into account the following considerations:

1) the present approach does not consider estimates of past and expected future market demand when estimating exposure to market risk;

2) take-or-pay contracts insure private operators against market risk, but the larger government exposure is to contractual buyouts, and termination payments which are triggered by force majeure and other trigger events;

3) other than those risks already mentioned, other contingent liabilities exist; and

4) the exposure to the risks enumerated in (2) may actually be higher than 1% - 3%.

The actual contingent liability estimated under an alternative approach outlined in this paper is much larger than this amount. This will be

1) Expected Value Approach;
2) Value-at-Risk (VAR) Methods and Modifications of the VAR Approach; and
3) Monte Carlo Simulation Methods

Expected Value Approach

The expected value approach is a very simple method of estimating exposure. It involves multiplying a series of probabilities by the total exposure to a particular risk. Examples of the expected value approach applied to buyout risk is depicted in **Appendix 2.**

Because of its simplicity, the expected value approach may be used as a first approximation in the computation of exposure. The suggested procedure to be applied has the following steps:

For each contract:

1) Identify sections where contingent liabilities exist, i.e., where events trigger financial payments or service obligations by the government to the private contractor or its creditors;

2) Construct a matrix similar to that in **Appendix 1**;

3) Based on this matrix, construct a decision tree for each part of the contract where a guaranteed government payment or obligation is stipulated; and

4) Assign the likely probabilities for each branch and compute for the expected value of the exposure.

The procedure for estimating government exposure in each contract starts with a thorough review of guarantees, trigger events, and payments embedded within the structure of the contract, and the construction of a decision tree for each possible outcome. Expected values are then computed for each exposure identified. Total government exposure is the sum of all exposures.

Upon a cross-sectoral review of infrastructure contracts, it was found that the greatest potential government exposure lay in assumptions of event risk (buyout/termination risk and force majeure), as well as in market risk. Thus, an effort was made to estimate the expected value of loss in each contract, as well as in a sample of contracts (see **Appendix 1**).

The main strength of the expected value approach is that it is very simple and quick to implement. The main weakness, however, is that it is arbitrary; it makes use of best guesses, and is not based on actual experience or history of loss. Thus, the information on the distribution of past outcomes is disregarded.

Value-at-Risk (VAR) Methods and Variants of the VAR Approach

The VAR is a method commonly used by financial institutions to measure the risk of their exposures given their investments in portfolios of financial instruments. Value-at-risk enables one to determine how much one can lose at a given level of probability over a given period of time. Examples of VAR applications may be found in **Appendix 3**.

A VAR model measures market risk by determining how much the value of a portfolio could decline over a given period of time with a given probability as a result of changes in market prices or rates **(Hendricks, 1996)**. Utilizing VAR enables one to answer the question: "how much can I lose with x% probability over a given time horizon?" **(J.P. Morgan, 1996)**. It is standard in VAR measurements to assume that standardized returns (returns divided by their standard deviation) are log-normally distributed.

According to Hendricks, there are two essential components of VAR models, the holding period, or the length of time over which exposure is measured; and the confidence level at which market risk is measured. The holding period is often set at the discretion of the user of the data (in our case, it is best to set it equal to one year, the fiscal year for which reserves have to be set aside for potential losses). On the other hand, the confidence level of a VAR measurement is the amount of loss that a portfolio is expected to exceed one minus the confidence level percent of the time. The most commonly used confidence level in VAR measurements is the 95th to 99th percentile range.

VAR measures are commonly taken for transactions with linear payoffs. For example, consider a corporation that is long on (i.e., has bought) a share of stock in corporation X worth P 100,000. What is the VAR over a one-day horizon period given that there is a 5% probability that the realized loss on this position will be greater than what the VAR projected? Since VAR assumes that returns are normally distributed, the VAR in this case is given by 1.65 times the daily standard deviation of historical one-day returns on stock X. If the daily standard deviation of the returns on stock X equals 0.565%, then this means that the return to stock X is not expected to fall more than 1.65 * 0.565%, = 0.932%, 95% of the time. Thus, the risk of this portfolio is P 100,000 * 0.932% = P 932. Thus, 95% of the time, you will not lose more than P 932 in the next 24 hours.

Despite the obvious appeal for using VAR in estimating risk, application of this method to the analysis of government risk has its shortcomings. Most importantly, the VAR approach can only be applied to risks where the outcome is a random variable that follows a normal distribution. Examples include the estimation of market risk and foreign exchange risk. The VAR method applied to these cases entail computing the historical mean, variance and standard deviation of fluctuations in the exchange rate or market demand for a particular product and then using the distribution function of historical outcomes to predict how much can be lost with a given probability or level of confidence over a given period of time.

Monte Carlo Simulation Methods

Another approach to estimating government risk (still under development) would be to examine the *actual* historical losses or payments incurred by the government for each type of risk assumed (refer to **Table 1** for a list of risks taken), and then to construct distribution functions for the actual outcomes. Knowledge of the shape of the distribution functions will enable us to simulate values for future losses. This type of process would enable the estimation of exposure to risk to be more actuarially sound; it would be based on historical experience, and not on guesses, such as the expected value approach.

To facilitate implementation of the Monte Carlo simulation method, one may simply assume or hypothesize that certain risks assumed by government lead to outcomes with specific distribution functions (see **Table 5**). Once the distribution or diffusion process is specified, one can utilize stochastic simulation methods to estimate risk.

Table 5: Hypothesized Distribution Function of Outcomes of Risks Assumed

Risks Assumed by Government in Contract	Hypothesized Distribution Function of Outcomes	Common Examples of Outcomes
Event Risks	Binomial	DPWH is able/unable to build an access road to a toll way by a certain date
Force Majeure	Binomial	A settlement is reached/not reached on how to compensate parties affected by force majeure event 180 days after the event
Market Risk	Normal	Demand for power from a power plant
Currency Risk	Normal	Range of values within which the value of the currency can fluctuate in a year
Convertibility Risk	Binomial	The national government suspends/does not suspend convertibility of the currency

What advantages do simulation methods have over conventional risk estimation techniques used in financial markets, such as VAR? Conventional techniques used in financial markets (e.g. value-at-risk, or VAR methods) to estimate exposure may not be appropriate to use in the case of many of the risks assumed by government, since not all outcomes are normally distributed (an assumption used in VAR).

The main strength of the stochastic simulation approach is that it is not arbitrary; it makes use of all information on the distribution of past outcomes. The main weakness of the simulation approach is that it is a time-consuming development process, but will be simple to implement once necessary program is in place.

One note: in estimating exposure and risk, one also needs to determine the extent to which events triggering large payments are correlated/dependent or independent of events triggered by small payments. For example, one must determine the extent to which the assumption of too much foreign exchange or construction risk can lead to an increase in buyout risk in the future (for example, a sudden devaluation leads to a default by NPC on all of its capacity payments at a certain date, and this triggers a request by all IPP's for buyout). If trigger events are dependent on one another, then the risk of loss is enhanced. This is most evident in cross-default provisions in a contract.

C. Total Government Exposure to Contingent Liabilities

Table 6 presents a menu of suggested methods for computing the government's exposure to infrastructure contracts.

Table 6: Suggested Methods of Computing Government Exposure

Type of Risk Assumed by Government	Distribution of Outcome	Suggested Method of Computing Government Exposure
Event Risk: Buyout/Termination	Binomial or other discrete distribution	1. Expected Value[4] 2. Monte Carlo simulations for non-linear payoff structures
Event Risk: Force Majeure	Binomial or other discrete distribution	1. Expected Value[8] 2. Monte Carlo simulations for non-linear payoff structures
Market Risk	Normal	1. Simple VAR-based computation[8] 2. Monte Carlo simulations for non-linear payoff structures
Foreign Exchange Risk	Normal	1. Simple VAR-based computation

Source: The author

[4] This technique is utilized in this study.

VI. Second Goal: Establish a System for Setting Aside Budgeted Reserves to Cover Risks Assumed by Government in Infrastructure Projects

The principle behind the practice of setting aside reserves to cover exposures over a certain period is no different from the obligation financial institutions such as banks have, to set aside reserves against exposures in their portfolios.

A fundamental aspect of accounting for and monitoring exposure is the establishment of a standard reporting format for contingent liabilities. To be helpful in monitoring exposure, contractual arrangements should be transparent, and conditions which may trigger payment obligations on the part of government should be monitored on a regular basis. The performance of sponsoring agencies and other support agencies in limiting exposure, risk, and actual payments, should also be monitored. This means that sponsoring agencies should be encouraged to list and report their contingent liabilities and payments on a regular basis. Contingent liabilities should also be regularly reported to the public.

Table 7 is a recommended format for reporting exposure. For each infrastructure project and contract, complete the following form and update on a regular basis (using expected value approach). A comparison of totals of exposure and risk across projects, across modalities, and across sectors may be made. In addition, an accumulation of these totals across proponents and across creditors may also be computed. Then, use the cumulative total of exposure and risk as basis for formulating budget for reserve coverage for the year. Upon completion, all projects must go through a post-completion review for performance. A report must be submitted to DoF and NEDA.

VII. Third Goal: Exploring Alternative Means for Pricing Guarantees

The theory on the valuation and pricing of government guarantees is one of the frontiers for research in the field of public finance. Knowledge of how to price guarantees ~~may be strengthened~~ by knowledge of the explicit costs of bearing such risks **Appendix 4** presents s brief review of the determinants of the costs of bearing market risk in the power sector.

The question of how to price guarantees has spurred a number of articles on government guarantee provision: **Sosin (1980), etc.** In a recent publication, **Mody and Patro (1996)** review the literature and the menu of options for valuing contingent liabilities. They conclude that methods for valuing government guarantees fall into three categories: the rule-of-thumb method, comparison of market values of similar instruments with and without guarantees, and the use of contingent-claims pricing theory (see **Appendix 5** for an overview of these theories).

Efforts at pricing contingent claims on governments are at their very nascent stages. While much of the previous work in pricing government's contingent claims has been devoted to the pricing of deposit insurance and loan guarantees provided by state institutions or national governments, there have been few attempts at actually pricing and valuing the assumption of risks by government in infrastructure contracts. Note that there is a distinction between the price of a guarantee (the price of being

Table 7: Worksheet for Accounting System for Exposure and Risk

Name of project: Sponsoring Agency: Private Proponent: Project Cost: Description:			Date: Sector:	
Guaranteed Item	**Trigger Event**	**Maximum Exposure to Each Event**	**Risk**	**Comments**
1. Based on contract	Based on contract	Reckon exposure based on Table 2	Use any approach outlined in text	Describe the outlook for each risk or explain why adjustments were made
2.				
3.				
Grand Total		Peso and Dollar Amount	Peso and Dollar Amount	

Status of Project

Name of project: Date: Sponsoring Agency: Private Proponent: Project Cost: Description:	Comments
Sector	
Description of Project	
Expected Duration	
Percent Completed	
Months Behind/Ahead of Schedule	
Loans Disbursed	
Loans Outstanding	
Sources and Modes of Financing	
Cost of Financing	
Creditors	
Other Government Agencies Involved	
Nature of Involvement	
Problems Encountered	
Problems Expected	

exposed to the risk) as opposed to the estimate of the actual exposure to risk. The former is what other parties would have to pay for another party to assume the risk, while the latter is the estimate of the actual size of the risk involved.

For this study, a number of alternative methods have been broached for pricing guarantees:

1) Charge Interest[5]

Charge interest based on government's exposure to the project. Cost will not be lower than the lower than rate for corresponding long-term debt; basis for computing will be total exposure.

2) Concepts From Option Pricing Theory

Government guarantees (or any insurance) are the equivalent of put options; this can be seen from examination of the payoff to put options – derivative securities whose value depends on the value of an underlying asset – put options help limit downside risk of buying an asset by giving the buyer an option to sell it once its price falls below a pre-specified strike price.

Option pricing techniques may be used to value guarantees. This has been attempted for pricing take-or-pay contracts in the power sector, but use of conventional option pricing formulas violates standard assumptions (such as normality of outcomes and continuous time trading of assets).

As in risk estimation, different diffusion processes must be modeled to make option pricing theory applicable to government guarantees. Nevertheless, should the government decide to charge a price for its performance undertakings now or in the future, some principles from option pricing theory may be adopted:

a) Guarantee premiums should be collected on an annual basis, to enhance flexibility and to allow regular review of project performance;

b) Guarantee premiums should rise in the power sector as the plant gets older;

c) the lower the risk-free rate, the higher the present value of the future guaranteed payoffs, so the higher is the required premium;

d) the higher the minimum guaranteed off-take amount, the higher the premium;

e) the greater the time period within which the put option (i.e., guarantee) can be exercised, the more likely the put option will be exercised by the owner (i.e., the private proponent), so the higher the required premium; and

f) the greater the historical volatility of the underlying cash flows, the higher the required premium.

[5] Many thanks to Dr. Gilbert Llanto for this suggestion.

VIII. Fourth Goal: Recommending Strategies for Proper Risk Management

Cross-Sectoral Recommendations

1) Review all of the existing contracts with the private sector. Note the important trigger events and survey their probabilities of occurrence. Note also all cross-default provisions in contracts. Replicate this exercise to estimate the contingent liabilities associated with future contracts.

2) Review existing contracting procedures to ensure adequate checks and balances.

3) Review BOT Law for features that allow joint venture-type arrangements. All of JV projects thus far have been the outcomes of unsolicited proposals.

4) Encouraging private sector proponents to list in the PSE allows for the potential growth of call and put options on their shares of stock. This will also help the government better price guarantees.

5) When such projects are listed in the stock exchange, consider the issuance of warrants to the government, to enable government to share in the upside of projects.

6) Increase the transparency of contractual arrangements.

7) Ration or limit the number of unsolicited proposals.

8) Encourage bidding for projects on the basis of:

    a) lower present value of contingent liabilities;
    b) partial, instead of full guarantees; and/or
    c) fewer number of guarantees.

9) To minimize moral hazard, structure payments so that the sequence/seniority of claims is preserved (equity holders have claims subordinated to those of creditors).

10) Incorporate exposure to contingent liabilities and/or funds at risk in computing economic rate of return or NPV.

11) Request all sponsoring agencies to compute their aggregate BOT exposures and contingent liabilities each year.

12) There is a need to enhance the ability of sponsoring agencies to structure contracts to minimize risks assumed.

13) Regulatory agencies across sectors must be strengthened to enable them to have enhanced capacity to make fair rulings, leading to reduced overall risks.

14) Adopt an accounting system for contingent liabilities and a system for setting aside budgeted reserves for total exposure and/or risk.

15) The structure of contracts usually builds on precedents set in the past. Thus, it is important to ensure that guarantees are progressively reduced across time. However, this may only be feasible if infrastructure markets are strengthened in terms of competitive and regulatory framework.

Specific Sectoral Recommendations

Power

1) Survey IPP's about their level of satisfaction with the current power restructuring process. To the extent that they are not satisfied, the probability of an expensive mass buyout being triggered is higher.

Transport

1) For toll road projects, responsibility for the construction and planning of access roads should be assumed by the private sector. Construction and planning of access roads should be decided and planned by the proponent and should be part of the project.

2) Survey public willingness to pay tolls during the feasibility study stage of project development. Query drivers on their ability and willingness to pay tolls.

Water

1) Concession-type arrangements let the government assume the *least* risk, since the proponent assumes control over bulk water supply development *and* the distribution system.

IX. Conclusion

This study has covered a wide range of issues related to risks being assumed by the Philippine government and the management of these risks. The study seeks to identify these risks, estimate the government's exposure to these risks, and recommend steps for mitigating them in the future.

The most important finding of this study is the increased awareness of the government's shortcomings in its ability to manage its own risks in the development of infrastructure projects. The Philippine government does not have the ability at present to identify, manage, and budget for the risks it assumes in infrastructure projects. These shortcomings are manifested in the very wide spreads in the implied call and put option prices on cash flows from the projects, which are assumed to be the underlying assets. These wide spreads suggest that the government tends to assume too much of the market risks in such projects.

The exposure of the government to infrastructure contract-related risks may be measured using a number of modalities. For exposure to demand and foreign exchange-related risks, value-at-risk (VAR) measurements may be considered. VAR methods enable the government to estimate at a given level of confidence its expected loss based on a particular position over a given time period. The basic VAR method assumes that the probability distribution of the returns to the underlying asset follows a standard normal distribution and that the asset's returns display a linear payoff. However, to get an adequate measure of the VAR of a non-linear position, such as the government's position whenever it provides a guarantee, the estimation of government exposure should rely on Monte Carlo simulation techniques and other analytical methods.

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APPENDIX 1

Guarantees, Guarantee Triggers, Opportunity Costs and Incentives in Power Purchase Agreements

Guarantee	Trigger that will convert contingent liability into a real liability of NPC or NG	Maximum Expected Cost of Trigger Event
Buyout Clause – NPC/Government agrees to buyout IPP contracts at a price equivalent to the value of all remaining payments	All PPA's carry a buyout clause the IPP may invoke in case NPC commits a breach of contract or fails to make required payments to IPP's. All PPA's carry a buyout clause the IPP may invoke in case there a change in circumstance that materially reduces or prejudices the IPP return and the Parties are unable to agree to a change in the contract after a defined period (Guaranteed rate of return risk). All PPA's carry a buyout clause the IPP may invoke in case there is a change in law or regulations, and if compliance with such laws results in: a) the power station being unable to operate; b) the interest of the operator in the project and the operator's expectation of its return on investment being materially and adversely affected and the parties are unable to agree to an amendment of the PPA after the defined period of negotiation (Legal framework risk).	The total cost is the sum of: (1) the total remaining amount of capacity fees payable to the IPP until the transfer date on the assumption that contracted capacity during each year of the cooperation period equals the dependable capacity of the power station; and (2) the total remaining amount of energy fees payable to the operator until the transfer date on the assumption that the annual output of energy for each contract year until the transfer date equals the average annual output of energy for each contract year prior to the buyout, including any and all interest and other amounts due and payable on such senior debt all discounted to their values on the date of the completion of the buyout using a discount rate using the last CIRR (internal rate of return) plus any other penalties and costs the IPP may incur in connection with the buyout.

	All PPA's carry a buyout clause the IPP may invoke in case there is a force majeure event that is within the reasonable control of the government or NPC that lasts for a defined period and the parties are unable to agree to a contract revision. In a few cases, this applies to all force majeure events (Force majeure risk). Many PPA's carry a buyout clause the IPP may invoke in case the NPC is privatized and this effectively results in a real or purported assignment of rights or assumption of obligations under this agreement or materially and adversely changes its net assets, projected profits, projected net cash flow from operations, or otherwise would prompt a reasonable person to conclude that the ability of NPC or its successor entity to duly perform its obligations under the PPA on a timely basis has been materially and adversely affected. The buyout clause can also be triggered if: a) not earlier than 20 years after the completion date, NPC gives the operator > 90 days notice that it wishes to close the plant; or b) NPC has failed to ensure due payment within 90 days of due date; or c) the IPP offers, and NPC opts to accept the buyout offer.	

	Note: There seem to be too many possible trigger events, some of which also overlap.	
Termination Price – NPC/Government agrees to pay IPP's a termination price	Same triggers as buyout clause.	
The NPC agrees to bear market risks by adopting minimum off-take contracts with independent power producers.	If actual dispatch of power generated by the plant falls below the contracted capacity, either due to lack of market demand or excess capacity/excess supply in the power industry, NPC still pays IPP full contracted capacity payment.	Much of this cost is passed onto the consumer.
In many instances, power purchase agreements include commitments by National Power Corporation (also the off-taker) to supply of fuel inputs for independent power producers.	NPC is bound to purchase fuel under all circumstances. Note: All fuel risk must be transferred to IPP's.	Import duties and taxes not levied on regular fuel imports by private sector.
National Government provides NPC with a performance undertaking statement which guarantees NPC's performance of its obligations of the provision of the agreement.	If NPC cannot meet the terms of its contract, the IPP has full recourse to the National Government.	All of the real and contingent costs and liabilities in the PPA.
NPC grants IPP entitlements to privileges and incentives given by the NG under the Omnibus Investment Code of 1987.	Note: Given the significant excess capacity in the power market, IPP's should no longer be granted these priveleges.	
NPC is responsible for payment of all taxes, import duties, fees, charges and other levies imposed by the NG or its agencies or instrumentalities. NPC is also responsible for payment of all real estate taxes and assessment, rates and other charges in respect of the site (i.e., the NPC bears the full cost of site acquisition), the buildings and its improvements, and the power station.	Note: Given the significant excess capacity in the power market, IPP's should no longer be granted these priveleges.	Opportunity costs of all otherwise taxable activities undertaken by IPP's.

Force majeure does not include: a) changes in market conditions; b) unavailability of equipment; c) inability to maintain or renew permits; d) general labor strikes or slowdown; and e) failure or unavailability of transmission or distribution facility.		
IPP guarantees the following operating parameters for the plant, otherwise, NPC may draw on performance bonds: a) plant capacity factor; b) plant availability; c) net heat rate; d) dispatchability; e) outage rate; and f) cooperation period.	Plant performance falls below guaranteed levels.	Cost of performance bond.
IPP guarantees the following types of insurance during the construction and operation of the power station: a) insurance on plant and equipment imported into the Philippines; b) all-risks insurance; c) third party liability insurance; d) workmen's compensation insurance; and e) other insurance	These types of insurance are required at all times.	Cost of performance bond.
IPP is responsible for financing, designing, supplying, delivering, installing, erecting, civil works, testing and commissioning of the power station.	Guaranteed performance at all times.	Cost of performance bond.

IPP is also responsible for importing and transporting equipment to the site, obtaining of building, construction, operating, environmental and other permits, licenses and approvals for the project, and of visas and work permits for foreign personnel, the recruiting of local labor and complying with all local and other regulations including the payment of all fees and costs thereof.		
NPC is responsible for the provision of all necessary interconnection facilities.	Trigger event is non-performance Note: Given the significant excess capacity in the power market, IPP's should be made responsible for interconnection expenses.	Full recourse to NG.
IPP ensures that its power station is equipped with the necessary protective apparatus and shall consider NPC's power system characteristics in the design and construction of the power station.	Trigger event is non-performance	Cost of performance bond.
IPP shall be responsible for the receipt and integrity of the fuel and will exercise due diligence and care in the acceptance, management and use of the fuel.	Trigger event is non-performance	Cost of performance bond.
If the IPP opts to enter into a long-term contract for fuel supply, it must demonstrate that this supply is provided on a competitive basis, and not higher than the fuel's regular import price.	Trigger event is non-performance	Cost of performance bond.
The IPP shall guarantee the level of performance of the power plant throughout the cooperation period (i.e., guarantees in net	Trigger event is non-performance	Cost of performance bond.

capacity, plant availability,		
Foreign exchange convertibility guaranteed by NPC/NG	Trigger event is a severe foreign exchange crisis which forces the government to suspend the Peso's convertibility Note: Since government did not suspend convertibility even at the height of the recent Asian currency crisis, there must be higher premia paid for this guarantee cover.	
IPP has minimum debt-equity ratio	Note: This must be improved to raise equity participation from project developers.	

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IPP has minimum debt-equity ratio	Note: This must be improved to raise equity participation from project developers.	

Guarantees, Guarantee Triggers, Opportunity Costs and Incentives in the Manila-North Luzon Expressway Toll Agreement

Guarantee	Trigger that will convert contingent liability into a real liability of PNCC or NG	Maximum Expected Cost of Trigger Event
Right-of-Way	Non-performance by grantor.	Costs of material adverse grantor action
DPWH agrees to construct at its own cost access and secondary roads to and coming from the project roads.	Non-performance by DPWH.	Costs of material adverse grantor action
Adjustments in toll rates to compensate contractor for lost revenues incurred in association with a partial termination of the contract	Partial termination of the contract	None, if the resulting loss of revenue due to the difference between the authorized toll rate actually collected by the contractor and the authorized toll rate the contractor could have collected had said adjustments been implemented are collected and passed onto motorists.
That adjustments in toll rates to compensate contractor for lost revenues incurred in association with a partial termination of the contract are paid for even if toll rates do not rise.	Toll rates do not rise after a partial termination of the contract occurs.	The difference between the authorized toll rate actually collected by the contractor and the authorized toll rate the contractor could have collected had said adjustments been implemented.
Grantor commits to assist the contractor in: a) obtaining all NG authorizations, approvals, licenses, permits and or consents necessary for construction, and performance; b) obtaining all NG authorizations, approvals, licenses, permits and or consents required for funding the loans; c) availing of any incentive provided under the Omnibus Investment Code and any or all subsequent legislation or regulations		

and to include this project in the Investment Priority Plan; and d) ensuring that all relevant government authorities provide all necessary assistance in the areas of traffic enforcement, traffic control, traffic assistance, toll enforcement and other related services.		
National Government guarantee on: a) the authorized toll rate and adjustment effectiveness; b) payment due from the grantor under the agreement; and c) free convertibility of the peso into foreign currency and the absence of any restrictions on the repatriation of funds outside the Philippines.	If PNCC (the Franchisee) fails to perform on its commitments.	Maximum contingent liability(ies) under the agreement.
Undertaking by grantor and PNCC that proponent will not be responsible for breaches by PNCC in PNCC's obligations to other parties and other projects. (In effect, the project is bankruptcy-remote).		
Grantor will indemnify and keep proponent indemnified from and against any and all actions, suits, claims, demands, proceedings, damages, compensation, costs (including legal costs), charges and expenses of any kind or nature whatsoever for which the proponent shall or become liable which the proponent may be authorized or obliged to do		

under the agreement prior to the construction period.		
Force majeure	120 days lapse after a force majeure event and parties are unable to come up with a solution.	The grantor reimburses the proponent in the amount of the latter's investment contribution. This is the aggregate amount of: (1) principal outstanding under the loans together with all other amounts payable by the proponent to the lenders; and (2) the book value of the aggregate amount of equity subscribed in the proponent. Where contribution is in respect of only part of the project roads, the investment contribution shall be the proportion of the above calculation attributable to the phase in which termination occurs, as certified by an audit firm agreed upon by the parties. The currency of payment of the investment contribution will be same in which the loans were contracted. The grantor will pay interest in case of default in the payment of the investment contribution. The grantor's obligation will survive the termination of the agreement. Upon expiry or termination of the agreement,

		the grantor is liable for any termination costs associated with the ceasing of construction, operations and maintenance agreements with the proponent.
The proponent will indemnify and keep grantor indemnified from and against any and all actions, suits, claims, demands, proceedings, damages, compensation, costs (including legal costs), charges and expenses of any kind or nature whatsoever for which the grantor shall or become liable to pay third parties as a consequence of all aspects of the construction, operation and maintenance and financing activities of the project attributable to the proponent for which the proponent is liable except where such claims are due to the grantor's gross negligence, or if the event was caused by the proponent's compliance with obligations, instructions, advice, responses and standard regulations in respect of the basic design, detailed design, and construction, operation and maintenance of the project roads and other activities pursuant to the agreement authorized by the grantor, provided grantor is notified without delay.		
If force majeure or the results thereof otherwise prevent the affected party and/or its subcontractors from perfroming any of its obligations, the proponent and the grantor shall, within 7 days of notification, consult to find a resolution to the problem, which may include adjustment in authorized toll rates,		

the extension of the concession period, rescheduling of the construction and/or adjustment of the project implementation schedule and/or other compensation. The period of negotiation is 120 days. If the parties are unable to agree to a solution within the prescribed period, the proponent can terminate the agreement.		
No material adverse grantor action will occur.	The following are grounds for declaring grantor default: 1) Any NG or LGU agency or action such as: a) any failure to compensate the proponent for adjustments to the authorized toll rate that were not implemented due to reasons not attributable to the proponent; b) any non-delivery, incomplete or late delivery of the land required (to be delivered by the grantor to the proponent) under the schedule; c) any failure to issue a toll operation permit within the time required under the agreement, provided the right procedures were complied with by the proponent; d) any failure to issue a toll operation certificate pursuant to the agreement; e) non-compliance on the part of DPWH in building access and secondary roads;	Grantor default is declared. The proponent may terminate the agreement with respect to the whole of the project roads or just the affected phase. The proponent may claim just compensation in this regard. a) If the termination of the agreement occurs prior to the operation date of the first phase to be completed, then the just compensation is computed to be the 110% of the cost of completed construction. b) If the termination of the agreement in respect of either the whole of the project roads or solely the affected phase occurs after the operation date of the first phase to be completed, then the just compensation is computed to be the greater of: (1) the value of the aggregate net cash

	f) any change in existing laws, regulations or policies in the Philippines which makes performance by the proponent of its obligations impossible, materially difficult or materially more expensive; g) any change in existing laws, regulations or policies in the Philippines which makes it impossible or unlawful to freely convert the peso into another currency or to repatriate amounts to which the proponent, its shareholders, lenders or other creditors are entitled; or h) any act of the NG which adversely affects the ability of the proponent to exercise or enjoy the benefits of its rights and privileges under the agreement or to perform the its obligations, duties or undertakings, or the revocation, suspension, or amendment of the agreement which adversely affects the feasibility of the project. Material adverse grantor action can also cover any substitution deemed illegal by judgment or prevented by the grantor or by an act of omission of any national or local agency. 2) Revocation or suspension by grantor of the agreement and/or PNCC franchise and any other agreement related to the project which adversely and materially	flow for the entire project which includes the PNCC revenue share, as set out in the financial projections, other than that for phases in which the proponent has not commenced construction at the date of termination and phases in respect of which the proponent is not terminating the agreement, calculated from the date of termination to the end of the concession period to be paid annually, or the NPV of the foregoing amount using a discount rate equal to the WACC as stated in the financial projections; or (2) the total amount payable by the proponent to its lenders in respect of the loans. Where termination is only in respect to a part of project roads, just compensation shall be the proportion of the above computation attributable to the phase in which termination occurs, as certified by an audit firm suitable to the proponent and the grantor.

	affects the financial feasibility and economic balance of the project other than for reasons attributable to the default of the proponent. 3) A requisition occurs. A requisition is the take-over by government of the ownership and control of the proponent and/or a majority of its shares. 4) Failure to issue the corresponding notice to proceed within the proponent's compliance with the precedents therefor. The notice to proceed is to be issued for the relevant phase where the proponent will commence construction in accordance with the project implementation schedule to be issued by the grantor.	
The grantor will pay the lenders of the loans of the proponent.	If the grantor does not elect to take over the concession in the event of a proponent default and the lenders have not established a substituted entity for the proponent.	The amount of the outstanding loans.
The grantor will fulfill all of the requisites to construction within 180 days from the proponent's compliance with the requirements of the specific requisites of construction in the agreement.	Non-delivery by the grantor.	Just compensation.

Other causes of termination		Just compensation.

Guarantees, Guarantee Triggers, Opportunity Costs and Incentives in NAIA Terminal 3 Project[1]

Guarantee	Trigger that will convert contingent liability into a real liability of Sponsor Agency or NG	Maximum Expected Cost of Trigger Event
Termination Price/Exclusivity of Service	If DOTC/MIAA fails in its obligations to ensure exclusivity for NAIA 3 to operate as the international passenger terminal for Luzon until after it has served 10 million passengers for 3 consecutive years.	a) Reasonable compensation for equivalent or proportionate contract cost actually disbursed by concessionaire plus liquidated damages (during construction); b) Purchase price of development facility (during operation); and c) Reasonable rentals for all property, facilities, and equipment when DOTC/MIAA assumes operation (during operation).
Assumption of corollary obligations	Termination or rescission of contract	Lease rentals, taxes fees and charges
Change in circumstances	Any change in rules and regulations that materially reduces or prejudices the concessionaire's interests or economic return on investment.	Termination provisions apply if issues are not resolved within a 90-day negotiation period.
Minimum share in passenger service charge	DOTC/MIAA changes passenger service charge in the national interest.	Difference between the existing and minimum share of concessionaire (equal to the previous share before the change was imposed by the government).
Concessionaire guarantees design and construction	Non-performance	Performance bond
Concessionaire guarantees operation and maintenance of the development facility	Non-performance	Termination and rescission of agreement
Concessionaire guarantees debt-equity ratio and make-up of consortium	Non-performance	Take-over of facility and operations

[1] This list courtesy of C.V. Valbuena of the Transport Sector.

Guarantees, Guarantee Triggers, Opportunity Costs and Incentives in MWSS Concession Agreement

Guarantee	Trigger that will convert contingent liability into a real liability of Sponsor Agency or NG	Maximum Expected Cost of Trigger Event
Obligations of MWSS: a) cooperation with concessionaire MWSS shall, upon request of the concessionaire, cooperate in all reasonable ways to facilitate the concessionaire's carrying out of its responsibilities. This cooperation will include, but not be limited to cooperation with actions undertaken by the concessionaire to implement changes to the standard rates for water and sewerage services as instructed by the Regulatory Office or by the Appeals Panel. MWSS shall not be required to finance or Guarantee the financing of any expenditure required in connection with the concession or to undertake any liability in favor of a third party. b) easements, eminent domain, right of way and similar powers. c) MWSS appoints the concessionaire as its agent to apply for easements, eminent domain, right of way and similar powers.	See MWSS event of termination	See MWSS event of termination

The concessionaire shall be solely responsible for the payment of any compensation to third parties occasioned by the exercise of such rights and powers.		
Concessionaires' warranties: a) water supply and new connections; b) continuity of supply; c) obligation to make connections to a water main; d) drinking water quality standards; e) water supply for public purposes; f) provision of water other than through a water main; g) supply of sewerage services and new connections; h) continuity of service; i) wastewater standards; j) septic and sanitation cleaning; k) exclusivity; and l) other customer service standards.	See concessionaire event of termination	See concessionaire event of termination
Other obligations of the concessionaire: a) hiring; b) mandatory severance payments; c) non-diminution of benefits; d) employee stock option plan; e) taxes f) interconnection; g) concession fee; h) asset management obligations:	See concessionaire event of termination	See concessionaire event of termination

1) asset condition disclosure; 2) audit; 3) remedial works; i) disconnections; j) insurance k) compliance with laws; l) performance bond; m) procurement; n) equity capital; o) concessionaire debt; p) existing projects; q) financial model; r) new assets;		
Compensation to the concessionaire in the event of an MWSS event of termination.	MWSS event of termination covers each of the following events: a) MWSS makes an assignment for the benefit of creditors, petition or apply to any tribunal for a receiver or trustee for itself or of any substantial part of its property, commence any judicial or legal proceedings due to its financial difficulties under any reorganization, arrangement, readjustment of debt, dissolution, or liquidation law or statute of any jurisdiction, or there shall be commenced against such party any such proceeding which shall remain undismissed for a period of 60 days, or such party shall indicate its consent to the	Early termination amount: a) the then outstanding amount of all concessionaire loans shall be assumed by MWSS with NG guarantee ranking at least pari passu with other unsecured/unsubordinated NG debt; and b) reimburse concessionaire for any amounts lost during the concession period. This amount will be paid by MWSS in lump sum not earlier than 45 days after the early termination date or discharged through the delivery to the concessionaire of a USD-denominated debt instrument with NG

	appointment of any receiver or trustee, or shall suffer any receivership or trusteeship for a period of 60 days, or there shall be any reorganization, arrangement, readjustment of debt, dissolution, or liquidation with respect to such party which does not involve a judicial proceeding and the occurrence of any or all of the above events shall materially impair the rights of the concessionaire under the CA; b) The undertaking letter, or any government authorization or approval necessary to enable MWSS perform its obligations under the agreement shall be revoked or fail to be issued or to remain in full force; and c) MWSS fails to perform its obligations under the CA and this prevents the concessionaire from carrying out its responsibilities under the CA and such failure continues for a period of not less than 30 days after written notice from the concessionaire to the MWSS.	guarantee ranking at least pari passu with other unsecured/unsubordinated NG debt having a cash value equal to the present value of the early termination amount.
Compensation to the concessionaire in the event of an concessionaire event of termination.	Concessionaire event of termination covers each of the following events: a) The concessionaire makes an assignment for the benefit of creditors, petition or apply to any tribunal for a receiver or	The MWSS may draw upon the performance bond to recover out-of-pocket costs incurred due to Concessionaire event of termination. The Concession reverts to the MWSS for a discounted payment equal to 75% of the

	trustee for itself or of any substantial part of its property, commence any judicial or legal proceedings due to its financial difficulties under any reorganization, arrangement, readjustment of debt, dissolution, or liquidation law or statute of any jurisdiction, or there shall be commenced against such party any such proceeding which shall remain undismissed for a period of 60 days, or such party shall indicate its consent to the appointment of any receiver or trustee, or shall suffer any receivership or trusteeship for a period of 60 days, or there shall be any reorganization, arrangement, readjustment of debt, dissolution, or liquidation with respect to such party which does not involve a judicial proceeding; b) The concessionaire shall fail to perform an obligation under the CA and the Regulatory Office opines that this amounts to an abandonment of the CA since it jeopardizes the provision of essential water and sewerage supply services in all or any significant part in the service area and this failure continues 30 days after written notice from the RO to the concessionaire. c) In the opinion of the RO, the	value of current assets and 75% of the depreciated value of all fixed assets installed by the concessionaire in the service area and all improvements to such fixed assets. Provided that the early termination amiunt does not exceed the then-outstanding concessionaire loans and other debts of the concessionaire. This amount will be paid by MWSS in lump sum not earlier than 45 days after the early termination date or discharged through the delivery to the concessionaire of a USD-denominated debt instrument with NG guarantee ranking at least pari passu with other unsecured/unsubordinated NG debt having a cash value equal to the present value of the early termination amount.

	concessionaire fails to perform its obligations under the CA for which the RO determines that the financial penalty stipulated in the CA would be inappropriate, if such failure will continue for a period of not less than 180 days after written notice from the RO to the concessionaire. **And if the concessionaire's lenders do not nominate a qualified replacement operator within six months of the termination.**	

Risk Profile Across Infrastructure Sectors

Important Risk Elements	Water	Power	Transport
Proponent	Mostly highly-rated, sophisticated, and experienced players.	Developers run from small and inexperienced to large and experienced players.	Mostly unrated domestic players with some past experience in the case of roads.
Sponsor	Usually local government. May not be too experienced in project finance. Sectoral templates available.	Usually national government or private utilities. Some experience with privatization and project finance. Sectoral templates available.	May be national or local government.
Offtaker/Market	Local utility – usually not rated; not guaranteed by NG. Usually a single offtaker is accountable. Bulk water supply contracts are risky if offtaker has inefficient distribution systems.	National utility – usually rated; often guaranteed by NG. A generator's market expands as far as it can transport power within physical (transmission) and economic (transportation fees) constraints.	Multiple offtakers possible.
Nature of output/supply	Storable; not too many substitutes, except if people dig their own wells.	Non-storable; generated on demand and when needed by user, may be substitutable.	Rival and excludable.
Demand for product	Less prone to economic cycle, but more sensitive to weather changes. High demand may be due to price distortions or rising leakages.	More prone to economic cycle, but also somewhat sensitive to weather changes	More prone to economic cycle, but sensitive to congestion.
Cost structure; source of competitive pressure	Natural monopoly; no competition due to local franchise agreements. Also no substitutes. Main competitive pressure may be from regulatory benchmarking.	Competition at generation segment; less in transmission and distribution segments. Consensus is that the last two should remain monopolies.	Competition from smaller municipal, national, and provincial roads.

	Marginal costs usually decline. Water is expensive to transport but cheap to store.	Competition at generation may be on the basis of price, but also non-price factors (reliability, deliverability and some value-added services). Many competitors may exist at generation level.	
Pricing	Fixed or volumetric charges. A rational, full-cost recovery is not yet developed in many areas. Little experience in incorporating sanitation costs into fees. Inadequate output may cause health and environmental risks, so government usually has a strong interest in extending access to service, regardless of ability to pay. Thus water is usually affordable. Nevertheless, consumers are more willing to pay for water delivery service which yields immediate benefits.	Based on power consumption	Based on distance traveled within the project road.
Ability to pass through market risks or increases in costs to end-consumers	May be difficult, because water is an essential commodity; this implies that offtaker could be at serious risk if contract stipulates minimum offtake.	Pass through may be justified	Pass through may be justified, but there is a history of public opposition to toll increases.
Overall project risk	Generally higher for new projects, but lower for systems in more	Generally lower for new projects, since operating costs can still be	

	mature markets. Thus need for local government or state guarantees is less acute.	low, but higher for older plants, since O&M may run high with plant age. Transmission and distribution are generally low risk.	
Legal and regulatory framework	Regulatory regime is still developing in many emerging markets, so legal risks are still high. Environmental laws impact creditworthiness of sponsor.	Emerging markets have more experience in regulating power markets. Environmental laws impact creditworthiness of sponsor.	Regulatory regime is still developing in many emerging markets, so legal risks are still high.
Capital structure	High levels of debt and low coverage ratios; DSCR = 1.2x – 1.5x		
Common mode of private participation	Concession or greenfield bulk capacity additions. The former is associated with transfers of low levels of risk to NG. Full operational and investment risk and commercial risk is with private sector, maximizing efficiency gains (but these require good regulatory environment). But the latter are riskier due to difficulties in assessing distribution network risks (NRW, for which offtaker is not paid but water is delivered).	Greenfield; many risks mitigated by proponent by transferring them to government.	Greenfield
Cash flow	Predictable and stable for mature systems; more lumpy since billing cycles occur less frequently.	More unpredictable as project matures. Cash flow more lumpy since billing cycles occur more frequently.	

Losses of output	NRW is significant; water sector generally has lowest rate of cost recovery.	System losses may also be significant. Cost recovery may also be a problem.	
Input risk	Water supply is not too risky; cost of operational inputs are low. Input risk is almost nil. Nevertheless, input supply and effluent source (quantity and quality) are often not controllable by BOT sponsors, so they usually don't assume risk for these factors. Also, there might be limited knowledge of asset conditions and valuation.	Fuel risk can be significant; so cost of operational inputs can be high.	
Operating risks and revenue risks	Less risky. Nevertheless, water and wastewater facilities are usually dedicated to perform specific functions that may be catchment dependent. This reduces asset flexibility and heightens their reliance on protective contractual arrangements. Collection efficiency may also be low.	More risky	
Life of assets	Long-term	Short-term to medium-term	Long-term
Regular contract terms	Long-term	Short-term to medium-term	Long-term
Key to high credit rating	Consistency and stability of cash flows to service debt, finance	Consistency and stability of cash flows to service debt, finance	Consistency and stability of cash flows to service debt, finance

	operations, and fund investments	operations, and fund investments	operations, and fund investments
Government commitment to develop sector	Not the top priority except in emergency situations.	Priority.	Priority.
Public attitude towards output	Water is an entitlement. Water is more of a priority than treatment. But wastewater treatment also becomes essential at some point.	Power is not necessarily an entitlement.	Low cost access to roads is an entitlement.
Technology risk	Not too high; water and wastewater treatment plants in fact benefit from better technology through increased efficiency.	High; technological change may lead to obsolescence. New technologies are riskier than proven design.	Low.
Existing financiers	Not too many creditors hold water paper. This is because many investors are not in a position to evaluate and mitigate risks.	Many creditors hold power paper.	Not too many creditors hold transport paper. This is because many investors are not in a position to evaluate and mitigate risks.
Nature of financing	Limited- to full-recourse financing.	Full recourse financing.	Limited- to full-recourse financing. Securitization of toll fares has been done in the past.

APPENDIX 2

Expected Value Approach:

Application to Buyout Risk

Total Exposure and Estimated Expected Value of Buyout Risk (All Projects, in Billions) Data Used is Future Payments to BOT Operators Based on DoF Data

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 10% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 28.43	0.28	0.85	1.42	2.84	7.11	14.21	21.32
PHP 1,137.15	11.37	34.11	56.86	113.71	284.29	568.57	852.86

Total Exposure	Expected Value of Buyout Risk (Baseline) Probabilities						
NPV @ 15% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 21.24	0.21	0.64	1.06	2.12	5.31	10.62	15.93
PHP 849.47	8.49	25.48	42.47	84.95	212.37	424.73	637.10

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 20% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 16.64	0.17	0.50	0.83	1.66	4.16	8.32	12.48
PHP 665.60	6.66	19.97	33.28	66.56	166.40	332.80	499.20

Total Exposure and Estimated Expected Value of Buyout Risk (All Projects, in Billions) Without PNOC-EDC Contracts

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 10% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 22.00	0.22	0.66	1.10	2.20	5.50	11.00	16.50
PHP 880.07	8.80	26.40	44.00	88.01	220.02	440.03	660.05

Total Exposure	Expected Value of Buyout Risk (Baseline) Probabilities						
NPV @ 15% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 16.33	0.16	0.49	0.82	1.63	4.08	8.16	12.25
PHP 653.11	6.53	19.59	32.66	65.31	163.28	326.56	489.83

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 20% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 12.76	0.13	0.38	0.64	1.28	3.19	6.38	9.57
PHP 510.37	5.10	15.31	25.52	51.04	127.59	255.19	382.78

Total Exposure and Estimated Expected Value of Buyout Risk (Power Sector, in Billions)

Total Exposure	Expected Value of Buyout Risk Probabilities					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
USD 20.88	0.21	0.63	1.04	2.09	5.22	10.44	15.66
PHP 835.07	8.35	25.05	41.75	83.51	208.77	417.53	626.30

Total Exposure	Expected Value of Buyout Risk (Baseline) Probabilities						
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
USD 15.80	0.16	0.47	0.79	1.58	3.95	7.90	11.85
PHP 632.14	6.32	18.96	31.61	63.21	158.03	316.07	474.10

Total Exposure	Expected Value of Buyout Risk Probabilities						
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
USD 12.50	0.12	0.37	0.62	1.25	3.12	6.25	9.37
PHP 499.91	5.00	15.00	25.00	49.99	124.98	249.96	374.93

Total Exposure and Estimated Expected Value of Buyout Risk (Power Sector, in Billions) Without PNOC-EDC Contracts

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 10% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 13.43	0.13	0.40	0.67	1.34	3.36	6.72	10.08
PHP 537.36	5.37	16.12	26.87	53.74	134.34	268.68	403.02

Total Exposure	Expected Value of Buyout Risk (Baseline) Probabilities						
NPV @ 15% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 10.15	0.10	0.30	0.51	1.02	2.54	5.08	7.61
PHP 406.12	4.06	12.18	20.31	40.61	101.53	203.06	304.59

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 20% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 8.04	0.08	0.24	0.40	0.80	2.01	4.02	6.03
PHP 321.73	3.22	9.65	16.09	32.17	80.43	160.87	241.30

- Note that these estimates would only be valid in case all IPP contracts are bought out without NAPOCOR being privatized.

- Should National Power Corporation be privatized soon, then these figures would constitute only the gross exposure to buyout risk.

- In case NPC is privatized and all IPP contracts are concurrently bought out, the government's net exposure to contingent liabilities in the power sector is the net stranded cost associated with IPP contracts due to NPC privatization, which has been estimated to be in the vicinity of USD 1.2 billion.

Total Exposure and Estimated Expected Value of Buyout Risk (All Projects, in Billions), Using Net Stranded Costs of IPP Contracts, Instead of Gross Cash Flows

Total Exposure	Expected Value of Buyout Risk (Baseline) Probabilities						
NPV @ 15% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 7.37	0.07	0.22	0.37	0.74	1.84	3.69	5.53
PHP 295.00	2.95	8.85	14.75	29.50	73.75	147.50	221.25

Total Exposure and Estimated Expected Value of Buyout Risk (Power Sector, in Billions) Using Net Stranded Costs of IPP Contracts, Instead of Gross Cash Flows

Total Exposure	Expected Value of Buyout Risk (Baseline) Probabilities						
NPV @ 15% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 1.20	0.01	0.04	0.06	0.12	0.30	0.60	0.90
PHP 48.00	0.48	1.44	2.40	4.80	12.00	24.00	36.00

Total Estimated Exposure to Buyout Risk (Transport Sector, in Billions)

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 10% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 6.58	0.07	0.20	0.33	0.66	1.64	3.29	4.93
PHP 263.15	2.63	7.89	13.16	26.31	65.79	131.57	197.36

Total Exposure	Expected Value of Buyout Risk (Baseline) Probabilities						
NPV @ 15% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 4.73	0.05	0.14	0.24	0.47	1.18	2.36	3.55
PHP 189.16	1.89	5.67	9.46	18.92	47.29	94.58	141.87

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 20% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 3.60	0.04	0.11	0.18	0.36	0.90	1.80	2.70
PHP 144.00	1.44	4.32	7.20	14.40	36.00	72.00	108.00

Total Estimated Exposure to Buyout Risk (Water Sector, in Billions)

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 10% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 1.02	0.01	0.03	0.05	0.10	0.25	0.51	0.76
PHP 40.62	0.41	1.22	2.03	4.06	10.16	20.31	30.47

Total Exposure	Expected Value of Buyout Risk (Baseline) Probabilities						
NPV @ 15% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 0.74	0.01	0.02	0.04	0.07	0.19	0.37	0.56
PHP 29.67	0.30	0.89	1.48	2.97	7.42	14.83	22.25

Total Exposure	Expected Value of Buyout Risk Probabilities						
NPV @ 20% discount rate	1%	3%	5%	10%	25%	50%	75%
USD 0.57	0.01	0.02	0.03	0.06	0.14	0.29	0.43
PHP 22.94	0.23	0.69	1.15	2.29	5.74	11.47	17.21

APPENDIX 3

A Case Study in Government Exposure to Contingent Liabilities: The Case of the Philippine Power Sector

A. The Structure of Typical Contracts

There are at least three parties to a typical contract to provide infrastructure services: the national government, the private sector service provider, and the sponsoring agency. Because of the urgency with which the power crisis of the early 1990's had to be addressed, virtually all of the early BOT contracts in the Philippines were between independent power producers (IPP's), National Power Corporation (NPC – the offtaker state utility firm and sponsoring agency), and the national government. An example of a typical power station contract, or power purchase agreement is presented in the **Appendix 6** to this paper.[1] **Table 3.1** presents a summary of the types of payments made by NPC to IPP's to cover for various costs.

[1] The sample contract in this paper presents a good view of power contracts, but it does not attempt to include all of the guarantees and incentives.

Table 3.1: Payments to Independent Power Producers and the Costs They Cover

Type of Payment	Costs Covered
Capacity Fee	100% of debt amortization plus fair rate of return to IPP's (about 15% - 20%). Capacity charges often are payable on a per-kilowatt-of-capacity basis (regardless of actual output in a billing period) and are calculated to be sufficient to pay all of the owner's fixed costs incurred to finance and maintain the project, including debt service, other ongoing financing expenses (such as letter of credit fees), and fixed operation and maintenance expenses (such as demand charges payable with respect to fuel supply and transportation), as well as a profit element: the owner does not want its return to be dependent upon actual project operation to the extent the power purchaser, rather than the owner, determines whether the project will operate or not.
Energy Fee	Whereas a capacity payment should be designed to cover all of a project's fixed costs (plus profit), variable or energy payments should be sufficient to pay the incremental costs of actually operating the project to generate and deliver a given kilowatt-hour of electricity. Energy payments usually are calculated to cover the variable cost of fuel consumed when the project is operating, as well as other variable operating expenses, such as water treatment expenses and costs of consumables. Variable payments often are tied to the power purchaser's own variable costs of generation (if an appropriate analogue exists within the power purchaser's system), or to an index that reasonably reflects changes in operating costs. Since the largest component of variable operating costs is fuel, the index by which variable payments under the PPA are adjusted should be heavily weighted to the same index used to adjust the price of fuel under the project's fuel supply agreements. Variable payments assume particular importance if a project is dispatchable, since the operating characteristics of the generating equipment can change significantly if operated in a dispatchable, rather than baseload, mode. Heat rates, for example, can deteriorate during low-load conditions, resulting in increased fuel costs and more frequent maintenance. Costs of start-up and shut-down also should be addressed.
Other Fees	Finally, the PPA's pricing provisions also should provide for an adjustment sufficient to cover new or higher taxes imposed on the owner, either through sales or consumption taxes borne by owner, or through income, withholding, or similar taxes that would have a confiscatory impact on the owner or the lenders.

Source: Orrick, Herrington and Sutcliffe, 1998

The typical guarantee structure saw the NPC and IPP's entering into contractual arrangements to create new generating capacity, while the national government backstopped NPC by providing letters of undertaking to reaffirm and guarantee NPC's performance under the contracts. Because of the need to construct power stations quickly, preference was given for power stations run by bunker and diesel fuel. While the operation of these power stations required the importation of expensive fuel from abroad, they could be constructed more quickly and at lower costs relative to alternative power stations, such as geothermal plants, which tend to require more capital expenditure (but are relatively less expensive to operate).

It was also standard procedure to have NPC assume responsibility for purchasing all fuel inputs as well, and such supply commitments were also covered by the national government undertaking.[2]

The design and structure of many PPA's for greenfield infrastructure projects is usually as much driven by the interests of the proponent's creditors as it is by the interests of the proponents themselves. To the extent that projects are financed with bank or bond creditors, projects are structured to ensure to the greatest extent possible that its stream of cash flows are certain and stable to allow smooth repayment of loans or bonds. Capacity payments to be made to BOT proponents typically cover 100% of their debt amortization owed to creditors, plus a fair rate of return for themselves. For additional coverage, or should the project face financial difficulties, creditors are thoroughly covered through numerous structures designed to effect timely and sufficient repayment. These structures include cash traps, escrow accounts, and other such structures.

During the term of each PPA, the extent to which NPC could assume or incur the real costs associated with any event that could trigger a call on any of its performance guarantees depends on its ability to pass on these costs to other parties (usually consumers). If there are no price adjustments to compensate for the real cost of trigger events, NPC's balance sheet and income statement would have to bear the cost. However, since power rates in the Philippines are regulated and the Philippines already has one of the highest power rates in Asia, regulators have tended to postpone these price adjustments even when necessary. As a result, NPC's own financial viability has been compromised. NPC's exposure to these contingent liabilities can be measured as the extent to which these expected costs are not fully passed onto consumers. Since the NPC has secured a national government guarantee for all of its obligations under a PPA, NPC's exposure is effectively government's as well. It is the accumulation of large contingent liabilities that the NG wishes to avoid in the future. But should they be necessary to encourage investment in a key area, the potential government exposure to contingent liabilities should be properly accounted for, covered by adequate reserves, and priced to reflect the scarcity value of government guarantees.

[2] These have also come at the cost of foregone customs revenues and other taxes.

In order to value contingent claims, it is first necessary to determine their underlying nature; how they come about, the risks they involve, and how they lead to fiscal costs for the government. Because the vast majority of BOT projects in the Philippines to date have been in the power sector, that sector will be the primary focus of this part of the paper.

Because of the severity of the power crisis in the early 1990's, the Philippine government voluntarily agreed to insure a number of risks faced by prospective independent power producers (IPP's) in the construction and operation of power stations. The assumption of these risks by government was justified on the basis of the large opportunity costs the country would incur in terms of foregone industrial production, reduction in competitiveness both in the price of goods and as a destination of foreign direct and portfolio investment, if the country did not undertake drastic corrective action. Estimates of the opportunity costs the country would incur if prompt corrective action would not be taken ranged from to . In order to facilitate the necessary investments in power stations, President Fidel V. Ramos signed into law Republic Act 7718, also known as the BOT Law. The BOT Law standardized and broadened the modalities and procedures for encouraging private sector participation in various infrastructure projects. All of the early private sector investments in power stations as a result of the power crisis of 1993-1995 benefited from the procedures outlined under the BOT Law. In addition to presenting a wide array of modalities for private sector participation in infrastructure, the BOT Law also stipulated that investments contracted under its framework were eligible for a variety of incentives under the Omnibus Investments Code, including government guarantees. All subsequent investments in infrastructure now had a structured legal framework with which they could be eligible to avail of incentives and guarantees.

The standard guarantee package offered by NPC in its power purchase agreements (PPA's) included its assumption of: (1) part or all of the market risks; (2) fuel or input purchase commitments; (3) fundamental risks, such as sovereign and political risk, including expropriation, nationalization, change in laws and force majeure; (4) foreign exchange convertibility risk; and (5) project-specific risks where the guarantee is limited to the senior lender, for the term of the loan, (and excludes returns to equity holders) right-of-way, peaceful site occupancy and related concerns **(see Table 3.2 and Delgado, et. al, 1999)**. Of the contingent liabilities associated with these guarantees, real costs have actually been triggered in the past only under (1) and (3). If the pricing of guarantees is to be based on the history of calls, then there will only be sufficient basis to price the assumption of market risks.

Table 3.2: Risks Assumed by NPC in IPP Contracts

Risk	Extent to Which Risk is Passed Onto Other Parties
Market Risk	When real liabilities are triggered by contractual commitments to pay for contracted amounts of generation regardless of market conditions, NPC assumes the cost. But it is not clear to what extent these costs can be passed onto consumers. This risk is not assumed by consumers to the extent that the basic charge cannot be fully passed onto consumers.
Fuel Risk	Fluctuations in the price of fuel purchased by NPC are ultimately assumed by consumers through the Fuel and Purchased Power Cost Adjustment (FPCA) mechanism. This covers adverse fluctuations in the prices of in fuel oil (bunker and diesel), steam and coal.
Foreign Exchange Risk	Adverse foreign exchange fluctuations are covered by the Foreign Exchange Adjustment Clause covering automatic cost adjustments in debt service and/or operating expenses denominated in foreign currencies. This allows consumers to bear the costs of such risk. Foreign exchange convertibility risk is assumed by NPC, and there are presently no mechanisms in NPC's tariff mechanism to pass the costs associated with this risk if a real liability is triggered.
Fundamental Risks	There are no mechanisms for passing to consumers the costs triggered by these risks.
Project-Specific Risks	There are no mechanisms for passing to consumers the costs triggered by these risks.

Source: The World Bank and the author.

B. Exposure to market risks

NPC's exposure to market risk arises primarily from contractual commitments to purchase power regardless of market demand-supply conditions in contracts with IPP's. Under such commitments, NPC agrees to be exposed to market risks if the sponsor is unable to bear the risk that the demand for output will be below a level that will undermine its ability to operate profitably. A contingent liability exists since the NPC agrees to pay for the cost of the difference between contracted generation and the actual generation of the power plant. A real liability and cost is incurred if the former exceeds the latter in any payment period.

Among the risks that NPC may bear in contracts with independent power producers, the one of the most costly risks to bear is market risk. It is a well-known fact that most project developers are highly risk-averse, preferring to minimize project downside risks rather than participate in projects on the basis of promised upside potential. It is with these downside market risks in mind that most IPP's transferred market risks to government in many of the early power contracts at the height of the Philippine power crisis.

A review of IPP contracts suggests that NPC assumes two types of market risk:

a) in *minimum off-take agreements*, the risk that actual demand for power falls below the guaranteed off-take level; and

b) in other types of contracts (mostly *capacity-based power purchase agreements*), the risk that the actual operating capacity of the IPP's plant (which NPC controls through its system of planning and dispatch) falls below the level of plant capacity contracted with the IPP.

The first case, (a), is an offshoot of very low levels of market demand. The second case, (b), is an offshoot of very high levels of market supply (excess capacity).

All of the contracts with government institutions (i.e., NIA and PNOC) contain minimum off-take agreements. In the NPC taxonomy, these are simply known as PPA's. NPC bears market risk in the second manner in typical BOT, BOO, and BTO contracts. In both cases, NPC bears the cost of having to pay for power contracted but not actually dispatch. To the extent that NPC cannot pass on these costs to the consumer or the IPP, this cost constitutes an open exposure.

However, there are differences in which the two types of costs are computed. In the minimum off-take case, the cost can be computed as the difference of the cost of power actually dispatched and the cost of the minimum off-take level of power. In the case of the other contracts, the cost can be computed as the difference between the cost of contracted capacity and the implied cost of capacity based on actual levels of generation and dispatch.

While the NPC expects IPP's to bear guarantees on plant capacity factor (among other operating parameters), this is usually breached in the case of most IPP's since NPC dispatches less power from most plants relative to the volume implied in the contract. Since contracted plant capacity is dictated by NPC based on its power development program, and the NPC guarantees a reasonable rate of return to the IPP in the structure of its contracted capacity payments, the NPC effectively bears market risk for levels of dispatch below the contracted amount. If payments by NPC cover the difference between levels of dispatch below the contracted amount plus some reasonable capacity for reserve power and contracted capacity, the difference constitutes excess capacity payments. Past and future excess capacity payments constitute a real cost to NPC and a contingent liability of the Philippine government to the extent that such costs are not passed onto consumers.

Excess capacity payments may arise due to: (1) the introduction of technologies and plants which generate power at a lower marginal cost relative to existing plants (the main criteria in NPC's merit-order system of dispatch); (2) plant obsolescence facilitated by rapid introduction of newer, more efficient, less costly and more environment-friendly plant technologies; or (3) an inefficient dispatch system at NPC. However, these are risks that the NPC and the government have the ability to control. Controlling such risks should increase the market value of NPC prior to privatization.

Should the government decide to charge a price for its performance undertaking to guarantee NPC's obligations, then an examination of the historical cost of excess capacity payments and related risks suggests how guarantees may be priced in the future. The results of this exercise are detailed in **Section H.1 of Appendix 3.**

The results of the analysis in **Section H.1 of Appendix 3** also suggest the following:

a) guarantee premiums should be collected on an annual basis, to give the DoF flexibility in pricing and reviewing annual plant performance;

b) guarantee premiums should increase as the plant gets older (because rising O and M costs increase the risk that it gets bumped down in the merit order system of dispatch);

c) guarantee premiums should be higher if the plant will not be initially owned by NPC (since historical excess capacity payments suggest that non-NPC plants have higher excess capacity payments on average);

d) guarantee premiums should be higher if the plant is not located in Luzon (since historical excess capacity payments suggest that non-NPC plants located in the Visayas and Mindanao have higher excess capacity payments on average).

Note that many of our recommendations are consistent with the principles of option pricing theory, where it has been shown that a obtaining a government guarantee on any risky activity is the equivalent of purchasing a European put option on an asset **Merton (1977)**. The idea of a guarantee as a put option will be developed further in the following sections.

Despite its financial difficulties, NPC has been able to bear a variety of risks since its liabilities (and even its contingent liabilities) are backed explicitly and fully by the Philippine government (this explicit backing also allows NPC to borrow from international capital markets at interest rates which reflect sovereign risk). Its status as a government corporation also vests it with special privileges, such as the ability to import much of its equipment and fuel duty-free.[3]

C. Exposure to fuel and other input risks

The following are risks assumed by NPC in committing to purchase fuel for the IPP. These are the risks that: (1) the world price of the fuel inputs rises, and NPC is partially or fully unable to pass the adverse change in cost to the consumer; and (2) the price of foreign exchange rises, and NPC is partially or fully unable to pass the adverse change in cost to the consumer. For the most part, NPC's current tariff-setting mechanism allows such costs to be recovered **(see Delgado, 1999)**.

[3] It will be shown later that this privilege is also being exploited by independent power producers.

The fuel supply commitments cover mainly imports of bunker and diesel fuel, coal and geothermal steam extraction costs (and in the near future, this will cover extraction costs for natural gas as well). NPC's bulk fuel purchases enable costs to be lowered, but NPC's tax-exempt status deprives the government of customs duties and other taxes. Thus, even though no contingent liabilities are associated with the assumption of fuel risk, the foregone duties constitute a real cost to government.

D. Exposure to foreign exchange risk and foreign exchange convertibility risks

NPC's foreign exchange risk is essentially: (1) the risk of currency mismatches in its balance sheet (currency risk); and (2) the risk assumed through the guarantee of foreign currency convertibility. Currency mismatches may arise because NPC's revenues are denominated in pesos, while many of its liabilities (and even its contingent liabilities) are denominated in dollars. In this regard, the foreign exchange risk associated with IPP contracts turns into real liabilities for NPC when NPC is unable to pass onto consumers adverse fluctuations in the dollar cost of committed fuel purchases (as mentioned earlier), as well as adverse fluctuations in the cost of capacity payments and energy fees to IPP's. Like fuel risk, however, NPC's tariff structure, allows 100% of currency risk to be passed onto consumers.

NPC regularly guarantees full foreign exchange convertibility in its PPA's. Convertibility risk and currency transfer risks are similar to one another. The latter reflects the possibility that foreign currency may be prevented from leaving the country; the former refers to the possibility that the proponent may be prevented from exchanging domestic for foreign currency. Volatile and adverse exchange rate movements could increase the probability of suspension of convertibility if the government suffers from a chronic foreign exchange constraint and the shadow price of foreign exchange rises dramatically. In the case of the Philippines, investors can justify passing on convertibility and currency transfer risks to the government in light of episodes of unilateral impositions of capital controls in the past. During the economic crisis of 1984-1985, the Central Bank took actions that effectively rationed foreign exchange. Export proceeds and remittances from overseas workers could only be surrendered to authorized agent banks, and only certain forms of foreign income, such as interest and dividend payments, could be repatriated. Foreign exchange trading at the Bankers Association of the Philippines trading floor was restricted to half an hour daily, and the CB at times subjected market participants to moral suasion.[4] Even the imposition of capital controls by its neighbors (notably Malaysia during the recent currency crisis) appears to have had an impact on perceptions by investors of convertibility risks in the Philippines.

However, given the recent past and prevailing conditions in Philippine foreign exchange markets, the current risk of suspension of currency convertibility appears to have declined markedly. The foreign exchange market was deregulated in 1992, in order to enhance market efficiency and achieve exchange rates more consistent with economic growth. At the same time, restrictions on foreign exchange transactions by banks were lifted and prudential limits on foreign exchange positions by banks were

[4] For a more thorough review of episodes of capital controls, see Gochoco-Bautista, forthcoming, 1999.

redefined. By 1992, exporters could retain 100 percent of their foreign exchange earnings, restrictions on the purchase of foreign exchange were lifted, and the full and immediate repatriation of investment without prior Central Bank approval for duly-registered foreign investments was allowed. In addition, rules governing the remittance of export proceeds by exporters were relaxed, and exporters were allowed to take out loans from FCDU's. Moreover, restrictions on repatriation of foreign investment income were lifted, and the Foreign Investments Act of 1991 simplified the registration process for investments. The system for remittances was improved to facilitate payments, and rules for automated teller machines were loosened. In 1994, ten foreign banks were allowed entry under specified modes.

Another strong argument in favor of reduced convertibility risk is the fact that despite the severity of the recent currency crisis, the Philippine government has desisted from taking any major action in the direction of suspending convertibility or transferability of foreign exchange. During the Asian currency crisis, the Philippine Central Bank limited its interventions in foreign currency markets to rationalizing the system and safeguards for foreign exchange trading. A dollar hedging facility for banks was introduced, called the Currency Risk Protection Program (CRRP) (also known as the non-deliverable forward (NDF) facility), prescribing prior clearance with the Central Bank for sales of non-deliverable forward contracts by banks, adjusting the overbought/oversold foreign exchange position of banks.

E. Exposure to legal, regulatory, and event risks

A review of **Appendix 1** confirms that guarantees against legal, regulatory, and event risks are a major contributor to the value of contingent liabilities assumed by NPC. Although there have been no comparative cross-country studies on infrastructure contracts, it appears that thorough coverage of these risks is consistent with international legal practices for infrastructure. Nevertheless, NPC's exposure to contingent liabilities associated with such risks is dependent on the risk that the following events may occur:

(1) domestic court rulings and legal and policy reversals which may undermine established interests of foreign investors;

(2) changes in or introduction of laws, rules and regulations which, if complied with, will undermine the profitability of foreign investors ; and

(3) strong public and political opposition to compensating tariff adjustments, leading to tariff rigidity.

These events may constitute sufficient grounds to trigger the costliest contingent liability and largest government exposure under IPP contracts: the commitment for a contractual buyout.

F. Exposure to Commitments for Contractual Buyout

In addition to the protection afforded by guarantees insuring against specific risks, many of these risks have also been backstopped by an additional commitment by NPC for a contractual buyout of the future remaining payments to the IPP's. Commitments by NPC for contractual buyouts constitute perhaps the single greatest contingent liability in a typical contract. Since a buyout clause in a contract involves a guarantee to make a lump-sum payment of the net present value of all future capacity payments until the transfer date (as well as a fraction of expected future energy payments that will depend on historical power generation by the plant), it may dramatically alter the profile of the payment stream to BOT operators if triggered. A close examination of PPA's indicates that contractual buyout clauses may be triggered by some or all of the events listed in **Appendix 1**. A lump-sum buyout payment terminates the contract for NPC to purchase power from the IPP. Ownership of the power station is transferred to NPC only in BOT (and not BOO) contracts. From the **Appendix 1,** note that the buyout clauses may be triggered by the same events in many or all of the PPA's (for example, a change in law which undermines the ability of all IPP's to operate profitably or a force majeure event that adversely affects all IPP's). Thus, a scenario in which all of the guarantees are called at once is entirely possible, and this would entail a massive fiscal cost. 1999 NPC estimates place the total contingent liability associated with the buyout clauses to be P 6.0 - P 12.7 billion depending on the value of the discount rate used **(Delgado, 1999)** as of January, 1999. This figure represents the present value of all contracted future payments to private proponents. Note, however, that the actual exposure of government will depend on the probability of the trigger event(s) that is (are) most likely to occur. Any reserves to be set aside or budgeted should cover the expected cost of the most likely trigger event but should also reflect adjustments for the costs and probabilities of other likely trigger events. Using the expected value approach, the potential exposure of the NPC and the national government to these buyout clauses is estimated to be (see **Appendix 2**).

Belated information from NPC reveals that not all IPP contracts are subject to buyout provisions. A number of contracts stipulated that terminal prices are to be paid by NPC at the termination date. Moreover, note that PPA's negotiated between government entities (mostly those negotiated with PNOC-EDC) do not have buyout provisions or terminal price payments. Nevertheless, these terminal price payments also constitute a contingent liability of government.

Note that if NPC is privatized and this undermines the interests of the IPP's materially, this qualifies as a trigger event. Given the serious moves and proposals to privatize NPC at the present time, and the large costs of triggering the buyout clauses, the importance of allowing the IPP's to participate in industry restructuring should be emphasized. To the extent that IPP's interests are considered in the restructuring, and their contracts honored, the likelihood that all of the IPP's will request a contractual buyout will be minimized.

G. Techniques for Estimating NPC and Government Exposure to Contingent Liabilities

The extent of NPC's exposure to contingent liabilities is the extent to which costs caused by events triggering guarantee clauses cannot be fully passed onto consumers. On the other hand, the contingent liability of the Philippine government corresponds to the extent of their commitment to backstop NPC's commitments under their contracts with IPP's. Since NPC's commitments carry a full sovereign guarantee, the national government's exposure is equivalent to NPC's. Since NPC's contractual capacity payments to IPP's are already known with certainty prior to any fiscal year, they may be embedded in NPC's tariff structure subject to ERB approval. However, the expected value of contractual buyouts is much less certain, so estimating government exposure to these requires more rigorous analysis.

NPC's recent financial history provides some indication of the national government's exposure. In 1999, NPC is projected to lose P 2.1 billion, much of this caused by its inability to pass on costs and risks to consumers. To the extent that this loss is related to increases in NPC liabilities arising from IPP contracts, this figure is indicative of NPC and government exposure to IPP's. Thus, P 2.1 billion constitutes a lower bound for NPC's exposure to IPP contracts in a single year.

The finance literature suggests several ways by which NPC and government exposure to loss may be estimated. A conservative estimate of potential losses in a year could be established by reviewing every PPA contract and constructing a matrix, of guarantees, trigger events and of the maximum loss NPC or government could incur under all circumstances (as in **Appendix 1**). Estimates of maximum losses incurred under every circumstance could then be adjusted downward depending on the probability that the trigger event will occur within the year. To facilitate the task of estimating maximum losses, monitoring the probability of all of the trigger events occurring within the year could be very helpful. Awareness of the probability distribution of the trigger events would facilitate the estimation of expected losses, and would enable the government to create budget items for covering these expected losses every year.

Lewis and Mody (1998) have suggested that the underlying process of foreign exchange and market demand fluctuations could be modeled as following a normal probability distribution. Under these circumstances, exposure to foreign exchange and market demand risks appear to be best estimated through techniques which assume that the outcomes follow the normal probability distribution. A good example of an application of this technique is called *value-at-risk* (VAR), a technique developed by JP Morgan investment bank to aid financial institutions evaluate their exposures. On the other hand, **Lewis and Mody** suggest that event risks, such as force majeure, counterparty risk, and termination risk, could be modeled as following a binomial probability distribution. In this case, exposure to downside risks may best be estimated techniques utilizing the binomial probability distribution function.

G.1 Simple VAR-Based Estimates of Exposure of Power Plants to Market Risk

If it is assumed that NPC-to-IPP payment streams implied by historical fluctuations in actual dispatch of power from power plants are normally distributed,[5] then a simple VAR-based estimate for estimating the maximum loss or exposure that can occur within a 95% confidence interval (exposure to market risk) would be:

$$\textbf{Contracted Annual Payments - } (\mu_{IP} - 1.65\sigma_{IP})$$

where σ_{IP} is the historical standard deviation (or volatility) of the annual implied payments stream and μ_{IP} is the historical mean of the annual implied payments based on the exercise in **Appendix 4**. This formula helps answer the question, "how much can I lose with 95% probability over a given time horizon?". 1.65 is the number of standard deviations associated with the 95% level of confidence (note that we are using just one tail of the normal distribution, the tail associated with a loss). This VAR measure is a very simple first approximation for measuring the exposure to market risk.

While the VAR-based approach enables one to compute the net exposure to market risk for a large sample of plants, this exposure is already covered ex ante, since the fixed stream of capacity payments made by NPC to IPP's are passed onto consumers via NPC's tariffs. The figure for net exposure, however, is relevant in that it answers the question, "given that x dollars has been set aside for paying off a specific contract to cover market risk in 1999, how much can actually be lost in terms of excessive payments to IPP's?" Unfortunately, this exposure to market risk is not internalized ex ante, in the process of setting payment schedules for IPP's.

G.2 Monte Carlo (Stochastic) Simulation Approach[6]

The Monte Carlo approach is a numerical method that is allows one to estimate the future value of a variable by simulating its behavior over time. The Monte Carlo approach may be used to compute the VAR exposure when the payoff to a position, such as that on a put option or a government guarantee, has a non-linear payoff structure. In general, the following are the steps to be followed when using this procedure:

1) Identify the stochastic nature (i.e., the probability distribution) of the input variables;

2) Imitate the movement of the random variables by repeatedly drawing random numbers that are adjusted to have the same probability distribution as the underlying variables. These adjusted random variables will become input variables;

[5] A report on the normality of such outcomes will be made in a subsequent paper.
[6] This section is based on Watsham and Parramore, 1997.

3) Simulate the underlying variable by combining the input variables together according to the logic of the system. From repeated drawings of the random number, future values of the underlying variable are generated; and

4) Repeat this process several thousand times. The mean of all of the outcomes is the future or expected value of the variable being simulated. Discount this future value by the appropriate discount rate to determine the present value of the variable being simulated.

When the government issues any guarantee, it is selling a put option on an underlying asset. Since each contract typically contains a number of guarantees, each contract may be seen as a portfolio of separate transactions to short or sell put options. Since the payoff structure on each of these positions is non-linear, the Monte Carlo approach may be utilized, along with conventional option pricing techniques, to estimate the value of each position. The VAR for each position may be computed, and each position's VAR may be interpreted as the government's exposure to changes in the theoretical value of each position. The total VAR, and thus, the total government exposure for the contract will be the sum of each of the VAR's for each guarantee.

H. Valuing and Pricing Contingent Claims on NPC and Government

The theory on the valuation of government guarantees is one of the frontiers for research in the field of public finance. The question has spurred a number of articles on government guarantee provision: **Sosin (1980), etc.** In a recent publication, **Mody and Patro (1996)** review the literature and the menu of options for valuing contingent liabilities. They conclude that methods for valuing government guarantees fall into three categories: the rule-of-thumb method, comparison of market values of similar instruments with and without guarantees, and the use of contingent-claims pricing theory (see the **Section H.1 of this Appendix** for an overview of these theories).

Efforts at pricing contingent claims on governments are at their very nascent stages. While much of the previous work in pricing government's contingent claims has been devoted to the pricing of deposit insurance and loan guarantees provided by state institutions or national governments, there have been few attempts at actually pricing and valuing the assumption of risks by government in infrastructure contracts. Note that there is a distinction between the price of a guarantee (the price of being exposed to the risk) as opposed to the estimate of the actual exposure to risk. The former is what other parties would have to pay for another party to assume the risk, while the latter is the estimate of the actual size of the risk involved.

The outcome of actual market demand for power in a given year is assumed to follow a normal distribution. In this regard, conventional option pricing techniques may be used to estimate the value of a put option (equivalent to taking out an insurance policy) on the cash flows arising from a specific power station project.[7]

[7] The cash flows are assumed to be the asset underlying the options in these computations.

Ideally, the return on investment on the power station would be the insured asset, but this data is unavailable for most IPP's. Instead, payments to IPP operators (their gross revenues from payments made to them by the NPC) are used. The simplifying assumption that these payments are the underlying assets being insured against market risks enable the computation of the price of a put option to be patterned after conventional option pricing techniques where the underlying asset is usually a financial asset, such as shares of stock or foreign exchange. The simplifying assumption can be further justified on the basis of the fact that these payments in capacity-based PPA's[8] are based on a fixed schedule of capacity fees, which are already stipulated in the contract, and which constitute the effective insured value of the underlying asset.

H.1 Pricing and Valuing the Assumption of Market Risk by Government: The Use of Option Pricing Techniques

Recognition that a government guarantee is actually a put option purchased by owners of insured assets (from the government or NPC, the sellers of the put option) makes the pricing of guarantees a relatively straightforward exercise. Given the solution to the value of a call option by **Black and Scholes**, put-call parity theory can be used to derive the value of a put option (and therefore of a guarantee).

A take or pay arrangement is a guarantee provided by the buyer of a particular product that it will pay the seller regardless of the state of nature (i.e., regardless of whether the buyer actually needs the product or not). Since the inception of the Philippines' BOT Law, take or pay arrangements have been standard features of power purchase agreements (PPA's) between independent power producers (IPP's) and state-run National Power Corporation (NPC), the largest wholesale off-taker of electricity in the Philippines. While NPC is able to generate its own power, the power crisis in the Philippines in the early 1990's exposed its insufficient capacity and prompted rapid efforts to encourage IPP's to provide power. However, mindful of market risks in the generation of power and the resulting uncertainty in the profile of cash flows, these IPP's asked for guaranteed off-takes from NPC. Thus, NPC purchases power from IPP's based on guaranteed off-take amounts, exposing it to large market risks because of fluctuations in power demand.

In order to facilitate the pricing of the put option on the project, simplifying assumptions are necessary. First, market demand is proxied by actual past power dispatch levels for each plant. Second, when an IPP secures a commitment of a guaranteed level of capacity or off-take from NPC, this is assumed to be the equivalent of the IPP purchasing an insurance contract, or a put option on the cash flow of the project. While conventional option pricing techniques require data on actual asset returns to estimate the prices of put and call options, the unavailability of data on actual annual returns to each power plant makes valuation using returns data impossible. However, since payments figures are available for each plant, the valuation in this paper assumes that payments implied by actual gross energy generation data (this equals actual energy dispatched from the plant) serve as a reasonable proxy for actual annual returns. This will be the case if the costs of running power plants are not very sensitive to the amount of power dispatched by the plant (so

[8] We consider capacity-based PPA's (as opposed to minimum off-take PPA's) since the former constitute the bulk of PPA's contracted to date.

higher cash flows correspond to higher profits). In this case, the asset insured is the (uncertain) gross payment from power purchases by the NPC, instead of the uncertain return.

When the uncertain payment stream is insured through the issuance of a government guarantee, the insured value of the payment flows is a fixed stream of payments known with complete certainty (the project's contracted cash flows). Under certain conditions, **Merton (1977)** shows that the premium or fee to be paid for insuring an asset by buying a put option is:

$$(1)\ P = -VN\left\{\frac{-\ln(V/X)-(r+\sigma^2/2)T}{\sigma\sqrt{T}}\right\} + Xe^{-rT}N\left\{\frac{-\ln(V/X)-(r-\sigma^2/2)T}{\sigma\sqrt{T}}\right\}$$

where:

P is the insurance premium
V is the current market value of the insured asset, or the stream of payments
X is the insured value of the asset (the strike price, below which, the owners of the asset will exercise their put option)
T is the time to maturity of the contract
r is a measure of the risk-free rate of interest
σ^2 is the variance of the current market value of the insured asset, or the variance of the stream of payments
N{·} is the cumulative standard normal density function

The partial derivatives for the above equation have the following signs:

$$\frac{\partial P}{\partial V}, \frac{\partial P}{\partial r} < 0 \quad and \quad \frac{\partial P}{\partial X}, \frac{\partial P}{\partial T}, \frac{\partial P}{\partial \sigma^2} > 0$$

These partial derivatives intuitively imply that:

a) the higher the current value of the insured asset, the lower the premium or guarantee fee since it is less likely that the value will fall below the minimum off-take value;

b) the higher the risk-free rate, the lower the present value of the guaranteed payoffs, so the lower is the required premium;

c) the higher the minimum guaranteed off-take amount, the higher the premium;

d) the greater the time period within which the put option can be exercised, the more likely the put option will be exercised by the owner (the IPP's in this case), so the higher the required premium (to be paid to the NPC or to the government); and

e) the greater the historical volatility of the underlying cash flows, the higher the required premium.

The explanation for (e) is that if the historical volatility of underlying cash flows is high, then the probability is greater that the put option will be exercised by the owner (the IPP's in this case) during the relevant time period. **Equation (1)**, the formula for the theoretical value of a put option yields an indicative value of the premium for the assumption of market risks. V, the current market value of the insured asset, the uncertain payment stream, can be proxied by the payments implied by average actual gross power generation data. High levels of power dispatched in the past suggest that implied payments are high relative to the insured value of payments for the plant. X, the strike price, is the guaranteed capacity payment commitment of NPC (which is known with complete certainty because it is computed using parameters given in the contract). r could be proxied by an estimate of the expected Treasury bill rate for the period, while σ^2, the variance in the current market value of the insured asset, or the payment stream, can be based on historical data provided by NPC for projects and contracts of similar nature. ***The usefulness of equation (1) for determining actual insurance premia, however, is limited by two factors: (1) while the validity of equation (1) hinges on the normality of outcomes, the distribution of outcomes of risks assumed by government remains to be determined; and (2) the true diffusion process of the risks assumed by government still have to be determined. Future theoretical work will concentrate on ascertaining the distribution of outcomes and the nature of the true diffusion processes of risks assumed by government, as well as solving for closed form pricing solutions, similar to that in equation (1).***

APPENDIX 4

POWER SECTOR CASE STUDY: DETERMINANTS OF THE COSTS OF BEARING MARKET RISK

Objective

1) To estimate the historical exposure and cost to government of bearing market risks in the power sector

2) After determining the amount of this exposure, to determine the costs of not being able to pass these risks on, and finally to determine the value of a performance undertaking given by the Philippine government guranatees NPC's performance of its obligations in BOT-type contracts.

ASSUMPTIONS USED IN COMPUTING THE COST OF BEARING MARKET RISK:

Table 4.1: Plant Factor and Plant Load

Input/Fuel	Assumed Plant Factor in Contract	Assumed Present Plant Load
Diesel	85%	Intermediate
Bunker C	85%	Peaking
Hydro	30%	Variable
Geothermal	None; mostly covered by minimum offtake agreements	Baseload
Coal	75%	Baseload
Naptha	85%	Intermediate
Combined Cycle	85%	Intermediate

Source: NPC

Methodology used in computing the historical cost (i.e., defined as excess capacity payments) assumed by NPC in bearing the market risks generated by the second type of market risk.

1) Consider gross generation figures of plants operated by IPP's, and from the figures provided, compute implied plant capacity factors based on actual energy generation for each plant using the following formula:

Implied Plant Capacity Factor in Percentage Terms (IPCF)

= (Gross Generation x 1,000) / (8,760 x Contracted Capacity)

2) Based on IPCF's, reckon whether sufficient or excess capacity payments were made for each year following the following procedure:

    a) Compared the IPCF of each plant in the sample with the plant factor that can reasonably be assumed to have been contracted (CPCF) given the type of plant and fuel input used;

    b) If IPCF < (>) CPCF, the plant is assumed to be operating below (above) the CPCF;

    c) If the plant is operating below (above) the CPCF, this suggests that an excess (sufficient) capacity payment has been made;

    d) The difference between the IPCF and the CPCF is considered the percentage excess capacity of the plant;

3) Segregate the DoF data on capacity payments:

    a) Pre-1999 payments may be used in computing the historical cost of assuming market risk and pricing this risk;

    b) Post-1999 payments may be utilized in computing the stranded costs associated with buying out IPP contracts.

4) Segregated the data from 3 (a) into:

    a) Payments covered by minimum off-take agreements (mostly contracts with PNOC-EDC); and

    b) Contracts with other IPP's.

5) Reconciled payments data from 4 (a) and 4 (b) with gross generation figures from NPC;

6) Multiplied capacity payments for each plant in each year by the percentage excess capacity to determine the historical value of excess capacity payments. The historical total of excess capacity payments given by NPC to IPP's is the cost of the assumption of market risk by NPC.

7) For a sample of 22 IPP's with BOT contracts whose capacity payments and gross generation were known with certainty, the historical cost from of assuming market risks from 1992-1998 was computed in this manner as

8) For each plant in the sample, the average annual excess capacity payment was computed. The ratio of this variable to total investment in the plant was also computed.

9) The value of this ratio was regressed against a constant, contracted plant capacity, a dummy that equals one if the plant is IPP-owned and zero if otherwise, another dummy that equals one if the plant is located in Luzon and zero if otherwise, as well as the average annual plant factor based on the last 3 years of generation data. The results of the estimation are listed in **Table 4.2**, and the results suggest that excess capacity payments vary directly and significantly with contracted capacity, are high if the plant is IPP-owned, are marginally higher if the plant is located in Luzon.

Table 4.2: Regression Results

Independent Variable	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.08453	0.03239	-2.60982	0.01636
Contracted Capacity	0.00023	6.08E-05	3.784015	0.001088
IPP-Owned	0.059466	0.021649	2.746842	0.012084
Location	0.101752	0.056224	1.80974	0.084673
Average Actual Plant Factor	0.067173	0.023254	2.888681	0.008787

Multiple R	0.76578
R Square	0.586419
Adjusted R Square	0.507641
Standard Error	0.049814
F-Statistic	7.443996
Observations	26

APPENDIX 5

An Overview of Modalities for Pricing Contingent Claims

A. The Rule-of-thumb Method

The rule-of-thumb method usually involves deriving an implied value of government guarantees on corporate bonds. Following Merton (1990), the implied value of a guarantee is the difference between the known market price of bonds (issued by the recipient of the guarantee) and an estimated default-free price. The risk- or default-free price of a corporate bond as of a specified date was derived by discounting the expected principal and coupon payments at the corresponding yield of US Treasury Bonds and Notes.

Another possible rule-of-thumb method for valuing government guarantees is to compute the subsidy cost for each type of guarantee (and varying time periods). This method is normally utilized by export-import banks when providing guarantees to exporters or investors. Countries are ranked according to sovereign risk (similar to the assignment of a credit rating). Then, the country's risk premium is computed as the difference between the historical average of the risk premiums of commercial bonds (with the same ratings) over investment-grade bonds. The subsidy cost is computed as the difference between the present value of the loan payments at the US Treasury rate and a rate equivalent to the sum of the Treasury rate and the risk premium.

Mody and Patro recommend the use of the rule-of-thumb method if detailed information required for more sophisticated valuation is unavailable.

B. Market Values With and Without Guarantees

This method involves a comparison of the market value of comparable instruments with and without government guarantees. This could be possible if market values for a security exist before and after a guarantee. An interesting result of studies on this method of valuing government guarantee is the finding that guarantees help improve the value of not only debtholders (who are guaranteed directly), but also equity holders (who hold only residual claims on the assets of the firm). Thus, the overall value of the firm increases because of the guarantee. This notwithstanding, taxpayers (who bear the risk in the event of a call on the guarantee), only bear downside risk, and do not share in the upside benefits of gains in the value of the firm due to the presence of a guarantee. This has the innovative practice of including warrants in guarantee arrangements. Warrants are options which give the holder the right to purchase an asset at a specified price on or before a certain date. With the issuance of warrants to the guarantor, project proponents would give them a share in the upside benefits of a project.

C. Using Contingent-Claims Theory to Price Guarantees

Contingent-claims models value guarantees based on the underlying dynamics of assets and liabilities. Under certain conditions, contingent-claims models allow for direct numerical computation of the value of contingent liabilities based on the payoff structure implied by the guarantee.

Among the option pricing methods, the most widely-used is the method developed by Black and Scholes.

The following parts of the text provide several examples of government guarantees. Then, proposed valuation techniques are presented. In order to motivate the valuation of government guarantees, it is necessary to first review the basics of option valuation.

Contingent Claims: An Introduction to Option Pricing Theory and the Guarantee as a Put Option

The study of how to price government guarantees starts with the recognition that a guarantee is a form of contingent claim. A contingent claim is a security which yields a variety of payoffs, with each payoffs triggered by the occurrence of particular events (or states of nature). Thus, a government guarantee can be considered a security whose value to the owner depends on the (yet unknown) payoffs.

In order to develop methods of pricing contingent claims, it is necessary to understand two types of contingent claims: call options and put options. Later, it will be shown that every guarantee is equivalent to a put option purchased by the owners of assets as a hedge against unexpected declines in asset values. In order to understand the concept of options further, it is necessary to review the payoffs from purchasing or selling them.

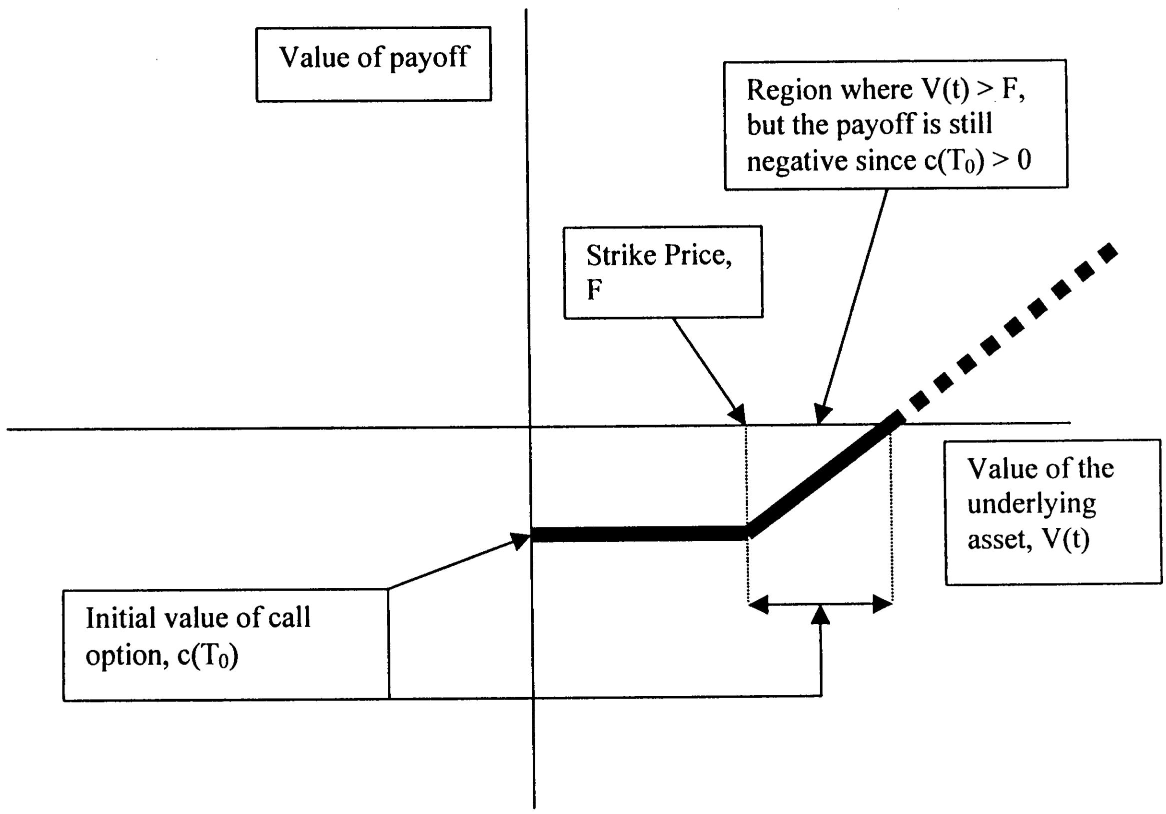
A. Payoffs to Sellers and Buyers of Call Options

A particular form of contingent claim is that of a call option on an asset. The buyer of a call option buys the right to *purchase* an asset at a particular strike, or exercise price within some specified period. Thus, the owner of a call option gets a positive payoff if he exercises his option to buy the asset when its price is *above* the strike price. The payoff of this "in the money" call option is the difference between the current asset price and the sum of the exercise price and the cost of buying the call. A call option is a contingent claim since the payoff in buying the call is triggered only when the current price of the asset reaches the strike price within the specified period. If the period ends without the strike price ever being reached, the call option is worthless and expires unexercised.

A call option gives its owner the right to purchase an asset at a specified strike, or exercise price, say F, within a specified period, say $T_E - T_0$, where T_E is the end of the period and T_0 denotes the start of the period. The value of the underlying asset, say V, is a function of time, so that $V = V(t)$. Because of its nature, the call option will only yield a positive payoff for its buyer if the value of the underlying asset, $V(t)$, is greater than the strike price, F , plus the initial value of the call, $c(T_0)$. On the other hand, the buyer of the call option will receive a negative payoff if the value of the underlying asset falls below the exercise price. The payoff to buying the call option, π_{bc}, is summarized by the following relation:

$$\pi_{bc} = \begin{cases} V(T_E) - [F + c(T_0)] & \text{if } V(T_E) > F \\ -c(T_0) < 0 & \text{if } F > V(T_E) \end{cases}$$

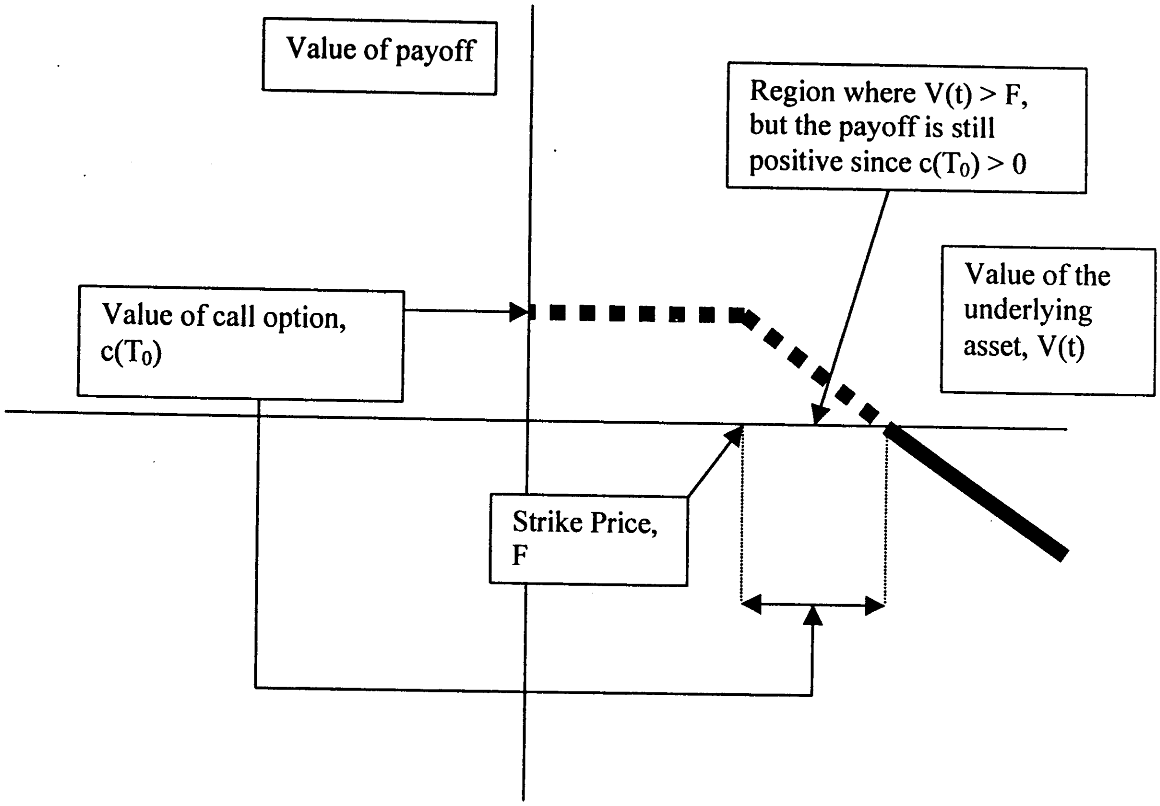
This relation can be graphed in the following manner (shaded line is the payoff)



Value of Payoff to Buyer of Call Option

The solid line denotes a negative payoff, while the broken line denotes a positive payoff. Note that if the value of the underlying asset already exceeds the strike price, the payoff can still be negative if the cost of purchasing the call option is not recovered. However, if the asset price goes beyond F + $c(T_0)$, then the buyer of the call option starts to receive a positive payoff. Note that the upside potential for the call option is unlimited. Thus, buyers of call options profit on the expectation that asset prices will rise. On the other hand, the maximum loss for purchasing the call option is limited to the initial price of the call, - $c(T_0)$.

This relation can be graphed in the following manner (shaded line is the payoff)



Value of Payoff to Seller of Call Option

The end-of-period profit from selling a call option, π_{sc}, is:

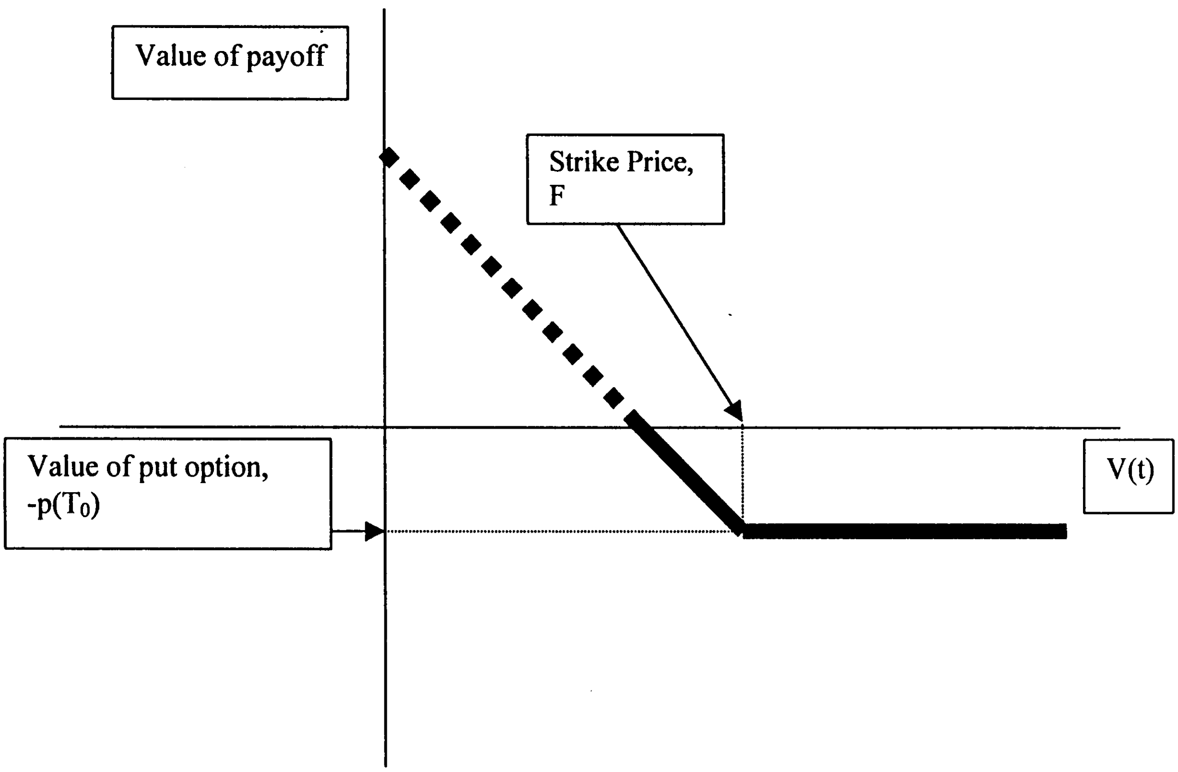
$$\pi_{sc} = \begin{cases} -\{V(T_E) - [F + c(T_0)]\} & \text{if } V(T_E) > F \\ c(T_0) > 0 & \text{if } F > V(T_E) \end{cases}$$

Note that if the value of the underlying asset exceeds the exercise price, the payoff to the seller of the call starts to decline because he has given up the opportunity to purchase an asset whose price is rising in value. Also note if the value of the underlying asset exceeds the exercise price, the seller of the call option still has a positive payoff because he receives the initial value of the call, $c(T_0)$. Note that for the seller of a call option, the upside potential is limited.

B. Payoffs to Sellers and Buyers of Put Options

A put option on an asset is also a form of contingent claim. The buyer of a put option purchases the right to *sell* an asset at a particular strike, or exercise price within some specified period. Thus, the owner of a put option gets a positive payoff if he exercises his option to sell the asset when its price is *below* the strike price. If the period ends without the strike price ever being reached, the put is worthless and expires unexercised.

For purposes of the discussion on government guarantees, it is the put option that is the relevant option. This is because it has been shown that insuring an asset is equivalent to taking a long position on the asset purchasing a put option on the same asset. The payoff to the buyer of a put can be graphed in the following manner:

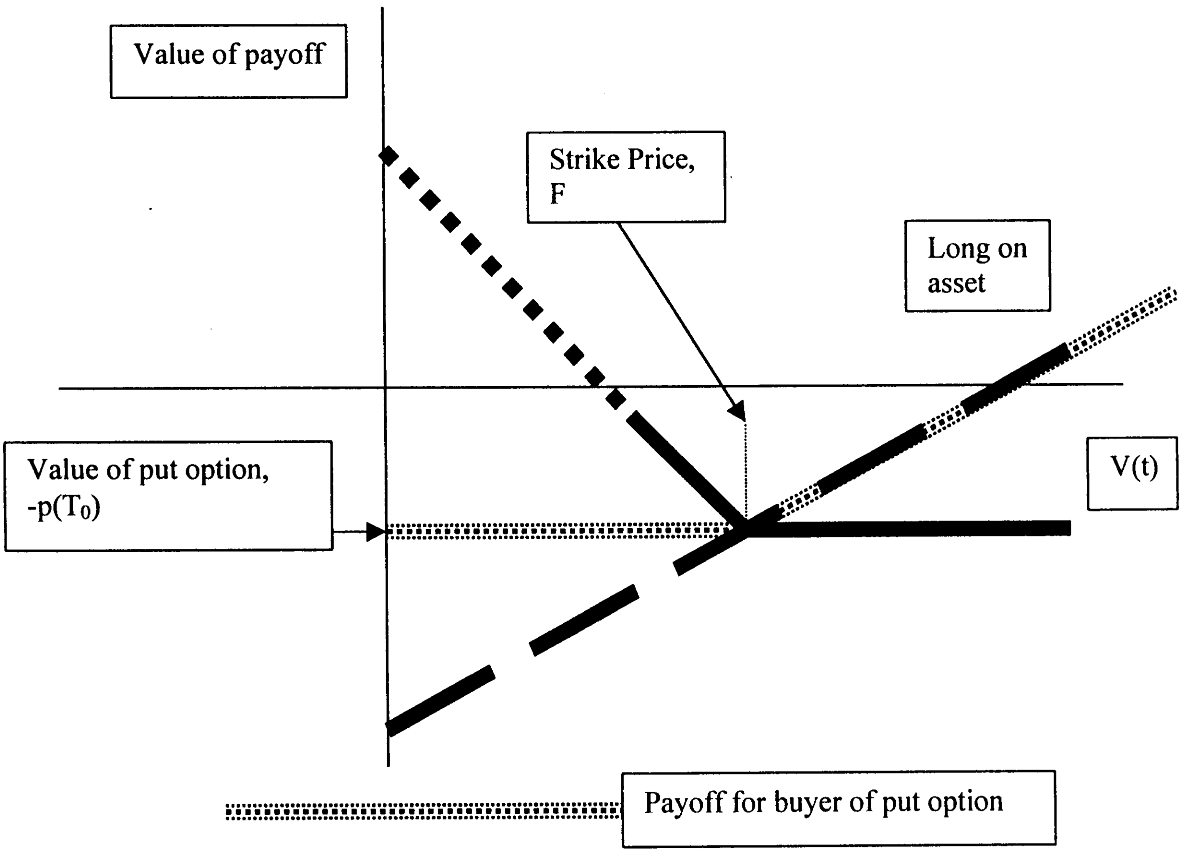


Value of Payoff to Buyer of Put Option

The end-of-period payoff to the buyer of a put option is

$$\pi_{bp} = \begin{cases} F - V(T_E) - p(T_0) & \text{if } V(T_E) > F \\ -p(T_0) < 0 & \text{if } F > V(T_E) \end{cases}$$

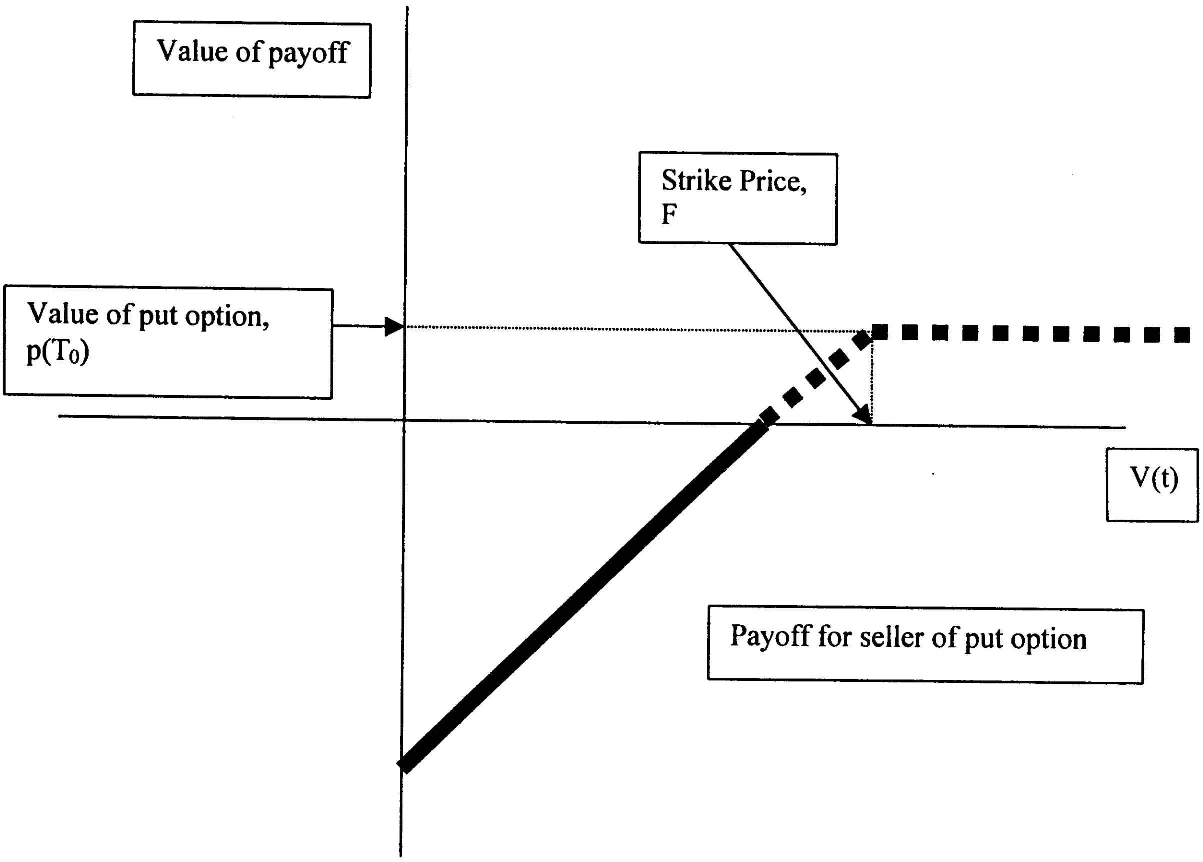
Note that if one is long on an asset and buys a put on the same asset, one is in effect limiting his downside losses to the cost of buying the put:



Note that the minimum payoff for the buyer of the put is the price of the put. It is this "protective put" position that is equivalent to a guarantee on the value of a long asset. ***Analogously, should a firm incur debt with a face value of F and the equity owners purchase a guarantee that the debt will be repaid at full face value, this is equivalent to saying that the owners of the firm have purchased a put option to sell the assets of the firm (valued at V(t)) to the debtors at the exercise price, F within a specified period (say, from now on until the asset expires).***

On the other hand, the seller of a put option (the provider of the guarantee), faces a payoff that can be graphed in the following manner:

The payoff faced by the seller of a put is:



$$\pi_{sp} = \begin{cases} p(T_0) > 0 & \text{if } V(T_E) > F \\ -[F - V(T_E)] + p(T_0) & \text{if } F > V(T_E) \end{cases}$$

Note that the seller of a put option faces a limited positive payoff, but great downside risks. ***This is the essence of the problem when the government provides a guarantee or is short on the put option: besides facing large downside risks, it does not charge a price for the provision of the protective put option.*** Thus, at maturity date, if the value of the asset is less than the exercise price, the payoff to the seller of the put option could be a loss if the difference between the exercise price and current value of the asset is more than the price of the put option.

Since the government guarantee is the equivalent of a put option which reduces the downside risks of purchasing an asset, then it must have value to the owners of an asset subjected to volatile price movements. If the government provides the put for free, for assets such as infrastructure projects, then it is not being adequately compensated for agreeing to bear downside risks for the asset. The challenge then is to seek ways to estimate the value of put options when they come in the form of government guarantees.

APPENDIX 6

APEC Energy Regulators' Forum
IPP Power Purchase Arrangements

SUMMARY SUBMISSION - PHILIPPINES

NATIONAL POWER CORPORATION - IPP EVALUATION CRITERIA

SUPPLY A TOTAL OF 900 MW CAPACITY FROM COAL-FIRED THERMAL POWER PLANTS TO NATIONAL POWER CORPORATION ON A BUILD, OPERATE AND TRANSFER (BOT) BASIS

I. INTRODUCTION

A. A review of the load forecast in the Luzon Power Grid shows that annual average demand for electricity will grow at an average of seven percent (7%) up to year 2000. With this growth rate, base load plants such as geothermal power plants and coal-fired thermal power plants are programmed for implementation. Consistent with the policy of reducing dependency on oil-fired generating units, coal-fired thermal power plants form the bulk of the National Power Corporation's power expansion program. Coal power projects presently in the pipeline include the 700-MW Hopewell BOT plant in Pagbilao, Quezon, the 300-MW Calaca II project and the 600-MW Masinloc Facility. Considering the present government's thrust for more private sector participation in the country's economic development, NAPOCOR has decided to allow private organizations to undertake the construction of additional capacity from coal-fired thermal power plants on a Build, Operate and Transfer (BOT) scheme. Thus, NAPOCOR has prepared this document to prequalify proponents to this Project.

B. BOT Concept

BOT refers to a contractual agreement whereby a private enterprise shall undertake to finance, design, supply, construct, test, commission, operate and maintain the power facilities over a predetermined period of time after which period, ownership of the facility is transferred to NAPOCOR at no cost. In consideration for these services, NAPOCOR undertakes to purchase the electricity generated by the power plant throughout the cooperation period.

C. Legal Framework - Executive order No. 215

The participation of the private sector in power generation is made possible by the promulgation of Executive Order No. 215 issued on July 10, 1987. This legislation sets the national policy of allowing the private sector to finance construct and operate electric generating plants.

D. Government Incentives/Guarantees

Proponents of the Project under the BOT scheme and registered with the Board of Investments (BOI) may be entitled to the privileges and incentives given by the government under Section 74, Republic Act No. 265 and the Omnibus Investment Code of 1987, respectively. NAPCOR does not have the authority to grant these privileges and incentives as, in previous BOT contracts. However, NAPOCOR may secure from the National Government a Performance undertaking Statement which guarantees NAPOCOR's performance of its obligations of the provision of the BOT agreement.

II. PROJECT DESCRIPTION

Scope of Work

The Project calls for the construction of coal-fired thermal power plant(s) for Luzon with a nominal aggregate capacity of 900 MW and ready for base load operation in 1997 under the BOT scheme. The project proponent shall be responsible for financing, designing, manufacturing supplying, delivering to site, construction, installing/erecting, testing, commissioning, operating and maintaining the coal-fired thermal power plant station. The Proponent is given the options to elect the capacity of the plant he wishes to enter in the bid. The maximum units size allowable is 350 MW.

A. Site

The Proponent is given the free-hand to choose the site that is best suited for his project proposal. Site acquisition shall be the responsibility of the Proponent. However, the cost of such site shall be for the account of NAPOCOR.

NAPOCOR has identified a site in Sual, Pangasinan, Luzon that is capable of accommodating a 600-MW Coal Power Station. NAPOCOR shall give the project proponent vacant possession of the site in Sual. Such land shall be made available at no cost to the project proponent.

B. Power Station

The project-proponent is responsible for the financing, designing, supplying, delivering, installing/erecting including civil works, testing and commissioning of the coal-fired thermal power

plant station. The proponent is also responsible for importing and transporting equipment to the site, the obtaining of building, construction, operating, environmental and other permits, licenses and approvals for the project, and of visas and work permits for foreign personnel, the recruiting of local labor and complying with all local and other regulations including the payment of all fees and costs thereof.

C. **Interconnection Facilities**

NAPOCOR shall be responsible for the provision of the necessary interconnection facilities. The Project Proponent shall ensure that its power station is equipped with the necessary protective apparatus and shall consider NAPOCOR's power system characteristics in the design and construction of the Power Station.

D. **Fuel**

NAPOCOR shall supply and deliver all coal fuel required by the project proponent necessary for the power station to generate the electricity contracted with NAPOCOR in accordance with the specifications set forth ...

The project proponent shall be responsible for the receipt and integrity of the coal delivered and shall exercise due diligence and care in the acceptance management and use of the coal fuel inventories to avoid loss of fuel inventories and/or damages to the power plant.

The coal fuel shall be delivered by sea vessels at the plant site. The project proponent shall provide the needed facilities for the storage, coal handling and conveyance of the coal fuel for use by the power plant. NAPOCOR anticipates that coal transport shall require PANAMEX vessel sizes.

The project proponent may opt to supply the coal for the power plant station on a long-term basis of 10 years. However, such supply agreement shall be separate and distinct from the contract relate to the power plant station's construction, ownership and operation. The project proponent shall demonstrate that the supply of the coal fuel be on a competitive basis and the price shall not bee higher than the import parity price which may be regularly determined.

E. **Operation and Maintenance**

The project proponent shall operate and maintain the power station for a period of Thirty (30) years after which ownership of the facility will be transferred to NAPOCOR. All expenses related to the operation and maintenance of the power plant, e.g. spare parts, labor costs, lube-oil, shall be for the account of the proponent.

The project proponent shall guarantee the level of performance of the power plant throughout the 30year cooperation period i.e., net plant capacity (KW), Plant Availability (percent of time in a year the power station is capable of operating 95% of its nominal capacity), energy delivered to the grid (kWh) and net plant hear rate (Btu/kWh).

III. PROJECT TIMETABLE

A. The project Proponent and NAPOCOR shall work together to achieve the timely completion of the Project in accordance with the following schedule:

Activity	Date
Prequalification to Bid Notice to Interested BOT Proponents	April 28, 1992
Submission of Prequalification Documents	July 15, 1992
Selection of Qualified Proponents	August, 3, 1992
Notice to Bid to Qualified Proponents	August 10, 1992
Submission of Bids/Proposal	November 10, 1992
Selection and Notice of Award	January 7, 1993
Contract Signing	March 1, 1993
Submission of Feasibility Study	October 1993
Submission of Environmental Impact Study	February 1994
Securing of Environmental Clearance Certificate	May 1994
Financial Closing	November 1994
Contract Effectivity	November 1994
Start of Construction	December 1994
Commercial Operation	September 1997

B. A penalty shall be imposed for any delay in the completion of the Facility.

IV. OPERATING PARAMETERS

NAPOCOR expects the project proposal to bear guarantees on the following operating parameters.

A.	Plant Capacity Factor	- 75%, minimum
B.	Plant Availability	- 80%, minimum
C.	Net Heat Rate	- 9,300 Btu/kwh, maximum
D.	Dispatchability	- Full
E.	Outage Rate	- 20% (Including maintenance)
F.	Cooperation Period	- 30 years

V. PREQUALIFICATION REQUIREMENTS

A. Application, Registration and issuance of Documents

To participate in the Prequalification and to obtain official registraion to the bidding, an applicant is required to submit an application signed by his representative for obtaining, upon payment of Ten Thousand Pesos (P10,000.00), the Prequalification Document and also stating in the same application his complete address where NAPOCOR may send further information.

B. Parties who may apply for prequalification

Application for prequalification is open to all trading firms, engineering firms, manufacturers, equipment suppliers, corporations or consortia engaged in the electric power business. The project proponent should demonstrate that one or more of its equity participants has developed a financing package for a large infrastructure project and/or has designed, constructed and operated an electric power plant similar to the type, magnitude and scheme envisioned for this project.

The applicant may be Filipino and/or foreign-owned. If Filipino, the contractor must be duly registered by the SEC for purposes of undertaking component activities of the project. If foreign-owned, the contractor must be duly accredited by its government to undertake component activities of the Project and certified as such by its embassy in the Philippines, or by the Philippine Consular office located in the contractor's domicile/head office location.

The applicant together with his consortium partners shall be a corporation duly organized and existing or registered under the laws of the Republic of the Philippines or the firm's country of origin.

C. Prequalification of the Applicant

In order to prequalify, the Proponent (i.e., trading firms, engineering firms, manufacturers, equipment suppliers, or consortia engaged in the electric power business) should, among other things, be able to meet the following criteria:

1. The Proponent has not been suspended or blacklisted by NAPOCOR or by any other agency whether in his capacity as individual contractor or partnership or corporation or as a member of a joint Venture.

2. The Proponent has not had any negative slippage of more than ten percent (10%) in any of his on-going contracts; no record of unsatisfactory past performance particularly non-compliance with contract terms, plans and specifications; no record of defective workmanship and materials supplied, abandonment of work and similar deficiencies.

3. The Proponent has no overdue debts of any kind toward the Revenue Authorities, the Customs, or the Social insurance of the Republic of the Philippines or the Applicant's country.

4. The Proponent has no record of unsatisfactory performances and no criminal or civil cases in court pending or finally decided against him involving nonpayment of tax, duty or undertaking with the government or any of its sub-divisions, branches or instrumentalities, including government-owned or controlled corporations, both local and foreign.

5. The Proponent has the ability to perform the project satisfactorily taking into account the following factors:

    a. Experience on similar works or track record.

b. Technical organization and personnel

c. Equipment/Manufacturing capability

d. Financial capability To validate the Proponent's technical and financial capability, the following documents are to be submitted as par of the Prequalification Document:

   i. List of projects completed within the last ten (10 years similar to the size and type called for in this project.

   ii. Authenticated Certificates, Final Acceptance and Certificates of Good Operating Performance duly issued by owners or clients for the projects described in (a) above.

   iii. List and short description of on-going projects similar to the size and type called for in this project. (Names of owners with corresponding addresses and telephone numbers should be included in the list.

   iv. List of different equipment and/or materials suppliers or manufacturers from whom firm commitments to supply the required equipment and/or materials will be made.

   v. List of technical managerial personnel with technical experience in types of projects similar to the one called for in this project, whether members of the organization or not, but with written option to hire for the work called for.

   vi. Literature/brochures/technical magazines describing completely the equity participant's business, facilities and organization.

   vii. Equity Participant's Financial Statements for the last three (3) years certified by an independent Certified Public Accountant.

D. Debt/Equity

It shall be a requirement in the Contract with the project proponent that, at least, an 80/20 debt-equity ratio be maintained throughout the cooperation period. The principal sponsor or the project shall hold at least 20% equity in the enterprise implementing the project.

VI. EVALUATION METHODOLOGY

All project proposals which shall be received by NAPOCOR from those who will be prequalified to bid shall be evaluated using the criteria set forth hereunder. These criteria have been designed to measure each project proponent's capability and experience. The proposal of each prequalifying applicant must meet certain minimum requirements in order to be included in a shortlist to be made by NAPOCOR of qualified participants that will be allowed to participate in the bidding for the Project.

A. Tariff Structure

The tariff structure that will be applied for the payment of fees for this project is shown in Item D of Section VII. The project proponent shall supply its acceptance of this pricing structure in the Project Proposal form of this document.

The project proponent my propose any reasonable tariff structure in its proposal. Escalation indices that form a part of the project proposal's price bid formula (if any) must bear a reasonable relationship to the proponent's cost structure.

B. Design and Engineering

Based on the information included in Annex C, the project proponent shall complete the preliminary design and engineering studies which include major equipment to be utilized, plant layout based on the site in Sual, Pangasinan or on the site chosen by the proponent and a project milestone schedule indicating critical path requirements including a schedule for project financing, permits and licensing, equipment procurement and project construction. Such studies and schedules are to be attached with the Project Proposal Form of this document.

C. Permits and Licenses

The project proponent shall identify all required permits and licenses and all data requirements of applicable permitting/licensing agencies and a prepared schedule and plan for obtaining all permits and licenses. Included in this criterion is the project proponent's compliance with the environmental impact study and permitting requirements of the Philippines. The project proponent shall indicate its acceptance in meeting the permitting and licensing requirements of the Republic of the Philippines.

D. Security

The security/guarantee requirement for this project is presented in Item B of Section VII.

The project proponent shall indicate its acceptance in this security provision in the event of an award of the project.

E. Financing

The project proponent shall develop a financing plan including expected levels and costs of equity and debt and sources. Proponent must show indicative Sources and Uses of Funds during the construction phase and the first five years of operation.

F. Management

The project proponent shall develop a management plan including identification of principals, expected construction management lines of authority and responsibility, and expected operation staffing levels. The project proponent shall provide in its project proposal a list of firms which will participate in the design, construction, operation and maintenance project.

G. Operation and Maintenance

The project proponent shall accept NAPOCOR's condition that its power plant station shall be operated following the dispatch order of the Power Management Center of NAPOCOR and shall also maintain its facilities in coordination with NAPOCOR.

The project proponent shall indicate its acceptance to abide with the operating requirements of NAPOCOR.

VII. GENERAL "CONTRACT" TERMS

Among others, the items below are the major provisions (of the Agreement) to be considered by the project proponents in their proposals to NAPOCOR.

A. **Cooperation Period** - The project proponent shall deliver electric power and energy to NAOCOR for 30 years commencing from the commercial operation date.

B. **Security** - To guarantee the faithful performance of its obligations to construct and operate the Power Station, the project proponent shall post the following security instruments which may be in the form of cash, irrevocable standby letter of credit and bankdraft guarantee acceptable to NAPOCOR, surety bond callable on demand, or a combination thereof.

1. **Proposal Bond** - posting on submission of bids/tender in the amount of US$ 3 Million per 100 MW of proposed project capacity.

2. **Signing Bond** - positing on signing of Agreement in the amount of US$ 6 Million per 100 MW of proposed project capacity to be reduced by $0.75 Million wherever a milestone date accomplishment as stated in Item A of Section III thereof is arrived at until the Financial Closing Date.

3. **Construction Performance Bond** - posting on effective date of Agreement in the amount of US$ 3 million per 100 MW of proposed project capacity.

4. **Operation Performance Bond** - posting on start of cooperation period in the amount of US$ 3 Million per 100

MW of proposed project capacity.

C. Coal Supply

NAPACOR shall supply the coal requirements of the power plant at the agreed specifications. However, the project proponent may opt to contract with NAPACOR for the supply of the required coal fuel of the facility. Such undertaking shall be treated as a separate and distinct agreement.

D. Tariff Structure

To assure the project proponent's recovery of its investments in the power plant station and a return on these investments and fixed operating cost, NAPOCOR shall pay capacity fees to the project proponent. The capacity payments shall be comuted using the following formula:

Capital Recovery Fee (A):

A = ((CCR x CC x F) - (Y x 1.05)(CCR)(NC-CC))

Fixed Operating Fee (B):

B = ((OCR x CC x F) - (Y x 1.05) (OCR) (NC-CC)

Service Fee (C):

C = ((SFR x CC x F) - (Y x 1.05)(SFR)(NC-CC))

Infrastructure Fee (D):

D = ((BIF x CC x F) - (Y x 1.05)(BIF)(NC - CC)

Variables in the above Capacity Formulae are:

A = Capacity Fee to recover Capital Cost for the billing period
B = Capacity Fee to recover Fixed Operating cost for the billing period
C = Capacity Fee to reflect return on investments for the billing period
D = Capacity Fee to recover Infrastructure Cost for the billing period
CCR = Contract Capacity Rate for capital cost per KW per month
OCR = Contract Capacity Rate for fixed operating costs per KW per month
SFR = Service Fee Rate for return on investment per KW per month
BIF = Basic Infrastructure Fee per KW per month
NC = Nominal Capacity in KW
CC = Contracted (Nominated) Capacity for the year in KW
F = Outage Factor as derived using the following formula to be used. If Forced Outage does not occur, or if the following formula results in F being greater than 1, then F shall be 1:

F = Monthly Actual Gross Generation / TMEG

Where **TMEG = Theoretical Maximum Energy Generation**, being the Nominal Capacity of the Unit/Power Station multiplied by the hours in the relevant month, less any adjustments made for allowable Downtime, dispatch order, allowable Force Majeure and for the Unit/Power Station commencing generation after a period of non-generation.

Y = Variable

The variable is defined as follows:

If (X NC < or = CC, then Y = 0
If CC < (X NC), then Y = 1

Where X = 0.95 for the first 12 years of the Cooperation Period and 0.90 thereafter.

NAPOCOR shall pay the contracted project proponent an energy fee which shall be computed as follows:

E = (BER x ED) + (U x (Vt - Vg)

where

E = Energy Fees for the billing period
BER = Base Energy Rate, kilowatt hour delivered
ED = kWh delivered during the billing period
U = Weighted average coal price per metric ton based on the average of last three (3) purchases made by NAPOCOR
Vg = Coal consumption in metric tons computed as the basis of the Guaranteed Plant Net Heat Rate (HRG) and the High Heating Value (HHV) of the coal multiplied by the energy delivered; by formula:

Vg = ED x HRG x 1/HHV

Vt = Coal consumption in metric tons computed as: the basis of the Tested Net Plant Heat Rate (HRT) and the High Heating Value (HHV) of the coal multiplied by the energy delivered; by formula:

Vt = ED x HRT x 1/HHV

where:

HRT is the **tested plant net heat rate** taken during the commissioning date and after every general overhaul of the Units; **HHV** is the **weighted high heating value** of the coal for the last three (3) purchases made by NAPOCOR in accordance with ASTM standards.

The Fixed Operating Fee and Energy Fee may be subjected to agreed price adjustment factors.

E. Buyout

May be resorted to by NAPOCOR if any or all of the following conditions shall occur:

1. If project proponent offers, and NAPOCOR opts to accept offer of buyout;
2. If, in the opinion of the parties, material changes in Government policies, laws and regulations adversely affect the operation of the Facility.

NAPOCOR shall in no way buyout the project proponent's Facility within twenty (20) years from the start of the commercial operation of the Facility and/or if the tested capacity of the Facility is 10% lower than the nominal capacity.

F. Taxes

NAPOCOR shall be responsible for payment of all taxes, import duties, fees, charges and other levies imposed by the Government of the Republic of the Philippines or any of its agencies or instrumentalities. NAPOCOR shall also be responsible for the payment of all real estate taxes and assessment, rates and other charges in respect of the Site, the buildings and its improvements and the Power Station.

G. Insurance

The Project Proponent shall ensure that there is effected insurance during the construction and operation of the Power Station. The following insurances shall be required of the project proponent:

1. insurance in respect of plant and equipment to be imported into the Philippines;
2. All risks insurance to cover the entire works from all kinds of damages arising out of any cause whatsoever;
3. Third Party Liability Insurance to cover injury to or death of persons or damages to property caused by proponent's vehicles, tools or equipment;
4. Workmen's Compensation insurance; and
5. Other additional insurance coverage for the reinstatement of the Power Station and parts thereof against loss or damage such as, but not limited to, machinery breakdown insurance, facility loss or damage following fire and natural perils.

H. Force Majeure

1. **During Construction** - nether party shall be responsible or liable for or deemed in breach hereof because of delays in the performance of their respective obligations hereunder due solely to circumstances beyond the reasonable control of the party experiencing such delay, including but not limited to the following:
    a. war, hostilities, belligerence, blockade, revolution, insurrection, terrorism or guerilla activities;
    b. riot, public disorder, expropriation, requisition, confiscation, nationalization or sabotage;
    c. extortion, abduction or life threatening acts;

d. earthquakes, hurricanes, tidal waves, typhoons, or violent storms, floods, volcano eruption, volcano ash, fire, lightning, lahar, avalanche, landslide, or other natural physical disaster and other acts of God;
e. contagious and life threatening diseases;
f. strike or lock-out or other industrial action in the locality of the facility or elsewhere in the Philippines or abroad including industry wide strikes and general strikes by workers or employees, provided however strikes at the project proponent's power station on its employees or strikes of the project proponent's suppliers or contractors locally or abroad, unless they are in the nature of an industry wide strike or general strike, shall not be deemed Force Majeure;
g. if circumstances occur in the Philippines or elsewhere which cause foreign government embassies or consulates to instruct or advise their subjects to leave or not come to the Philippines or instruct or advise that special precautions be taken by said subjects to ensure their safety provided however the project proponent shall replace affected personnel or find temporary substitute personnel if the problem arises merely as a consequence of inter governmental differences between the Republic of the Philippines and one other nation;
h. requirements, actions or failures to act on the part of governmental authorities preventing performance; and
i. inability despite due diligence to obtain required licenses provided that:
    - the non-performing party gives the other party a written notice describing the particulars of the occurrence within forty-eight (48) hours;
    - the suspension of performance is of no grater-scope and of no longer duration than is' required by the force majeure event;
    - the non-performing party uses its best effort to remedy its inability to perform; and
    - the force-majeure was not caused or connected with any negligent or intentional acts, errors or omissions, or failure to comply with any law, rule, regulation, order or ordinance or for any breach or default of the Agreement.

    When the nonperforming party is able to resume performance its obligations under the Agreement, that: party shall give the other party written notice to that effect.

2. **During Cooperation Period** - The same conditions as in Force Majeure during construction apply to force majeure during Cooperation Period except for the following conditions:

- changes in market conditions, unavailability of equipment, inability to obtain or renew permits, general labor strikes, or slowdown, or failure or unavailability of transmission or distribution capability unless the latter is caused by an occurrence which should fit the definition of Force Majeure,
- unless a forced outage is excused under Force Majeure, a forced outage does not relieve project proponent of any of its obligations under the Agreement.