UNIVERSITY OF GHANA

RISK MANAGEMENT IN OIL AND GAS PROJECT FINANCING

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DECLARATION

I, Noble Yao Akaba hereby declare that I am the author of this thesis and that this work has never been presented for any other degree or purpose anywhere.

NOBLE YAO AKABA

CERTIFICATION

We, the undersigned certified that we supervised and examined this thesis entitled 'risk management in oil and gas project financing'. A case study of international financial institutions, by Noble Yao Akaba and we recommend its acceptance to the School of Administration, University of Ghana for the award of Master in Business Administration, Finance.

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Nevertheless, I am solely responsible for any error or shortfall in this thesis.

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ABSTRACT

Securing adequate financing for oil and gas investments is a difficult task in the best of environments. In Africa, the task is more difficult on account of political, commercial and force majeure risks. These factors serve to limit the interest of international commercial banks, the main source of oil and gas finance in making long-term credit available for the region.

This thesis examines the risk mitigation arrangements that can relief the fears of the international financial institutions. Issues of concern to potential lenders, such as completion risk, performance risk, market risk, economic risks, environmental risk and political risks are evaluated.

Measures, which tend to minimize lenders risks, such as escrow accounts, political risk insurance, hedging programmes and standby fund facility, are examined. Security packages such as implementation agreement, land conveyance agreement, fuel supply and transportation agreement, and energy purchase agreement, ownership structure agreement and operation maintenance agreement are all examined. Also the various ways of strengthening these security packages to attract private financial institutions to finance oil and gas projects.

The study is an evaluation of the roles played by the international financial institutions namely: International Finance Corporation (IFC), the World Bank, Multilateral Investment Guarantee Agency (MIGA), United States Agency for International Development (USAID) and NIB (Ghana) Limited.

The findings of the study were gathered through structured personal interviews and questionnaires and are presented in tables and matrices.

The study addressed the following research problems:

(1) How are oil and gas project risks identified, how are they analysed how are they allocated and what measures are taken to mitigate the risks?

(2) What is the quality of security package available for lenders, are how are these security packages be strengthened.

(3) Does the involvement of the international financial institutions in oil and gas financing serve as an additional security for private financial institutions?

The findings of the study have been analysed within the researchers conceptual framework on risk management. The conclusions of the study are:

The financial institutions that finance oil and gas projects do not use any scientific method to identify and analyse risk for oil and gas projects, but rather they base the risk identification on the poor infrastructure, debt burdens, refuge problems, war and civil conflicts and perceived political, commercial and force majeure risks of African countries, instead of assessing oil and gas project risks on the performance of the project's profitability and viability, generally.

The security packages exist in almost all oil and gas projects financed but the difficulty is about how they should be enforced or strengthened to make them workable in the less developed financial markets in African countries. The World Bank has therefore taken the task of improving the financial markets so as to cushion the financial markets. When the financial markets functions very effectively with its legal systems, then security packages can work well.

The involvement of the international financial institutions such Multilateral Investment Guarantee Agency (MIGA), the World Bank, International Finance Corporation (IFC), and United States Agency for International Development (USAID) serve as additional security package for private financial institutions since the risk is reduced by the surveillance of

these corporations. MIGA's political insurance also serves as additional financial tool used to cover risks expected by these lenders.

In view of the findings of the study, the researcher has recommended some extra work to be done by these international financial institutions to help attract private financial institutions to finance oil and gas projects in Africa.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Africa is known to have significant resources of hydrocarbons in its own right. This only shows up partially on statistics of proven reserves of oil and gas; the levels of exploration in Africa are tiny compared with other parts of the world, and gas discoveries are often not even recorded. But even with what has been discovered and recorded, Africa has potential resources equivalent to several hundred years' consumption of hydrocarbons. Yet these remain in the ground or in the case of associated gas are flare into the atmosphere.

There are several reasons why indigenous reserves have not been developed. First, the development of oil and gas is generally left to private sector companies; this is as it should be, for only those who have the knowledge and expertise necessary for these highly technical, risky and capital-intensive operations. The obvious reason why domestic resources have not been developed is that all too often, the fiscal terms available to the private operators have not been appropriate. The oil company must be able to make a decent profit to compensate it for its investment and geological risk. However, fiscal terms are not the only reason that resources remain undeveloped. Some Sub-Sahara African countries now have excellent fiscal terms, and while this may have triggered development of oil reserves for export, smaller oil fields for domestic consumption and more importantly, gas field, remain undeveloped. Fiscal terms are therefore not the only obstacle.

A more serious obstacle, which prevents development of indigenous resources, is what we would like to call commercial, force majeure and political risk. This manifests itself in situations where investors are ready to invest but shy away from investments because of the impossibility of exchanging profits in local currency into foreign exchange and transfer these abroad. Also, concern about the objectiveness of the local judiciary system and the risks related to governments "changing the rules of the game" as the project proceeds can

also be an obstacle. The core problem concerns country risk. The researcher holds that development of Africa's natural resources is a task far beyond what governments; international financial institutions and other multilateral institutions can manage on their own.

Importantly, the search for hydrocarbons in the oil importing developing countries has been the emerging role of international financial institutions. The level of finance required forms a formidable block for any under-developed country wishing to commence hydrocarbon exploration or production. The less developed countries find little solace in attempting to organize finance through traditional financial institutions. Assessment of energy loans by banks tend to be stringent with the following five questions requiring responses:

- What are the recoverable reserves in place?
- Is there a risk that the wells will not be completed?
- Are there operational risks?
- Will there be purchasers for the oil and gas produced?
- Who is sponsoring the project?

Assuming the responses to these questions encourages the bank to make the loan, the borrower may be faced with a loan document including various non-financial covenants, for instance:

- The borrower will abide by the terms of the license.
- He will arrange insurance cover acceptable to the bank.
- He will not abandon the project during the period of the loan unless and until lenders are satisfied by means of a specified economic test that the project is no longer economic.
- He will pay the sales proceeds of all production into a trustee account for distribution in accordance with the loan documentation.

There are therefore formidable obstacles to less developed countries in attracting foreign private capital or in securing bank loans for oil and gas related programmes. Risk mitigation is the only way out to hold brief for the sponsor and project company in need of finance.

1.2 PROBLEM STATEMENT

Securing adequate financing for oil and gas projects is a difficult task in the best of environments. In Africa, the tasks are even more difficult on account of the debt burdens, poor infrastructure, foreign exchange shortages and perceived political risk. These factors serve to limit the interest of international commercial banks, the main source of minerals resources, in making long-term credit available for oil and gas projects in Africa. Financing of oil and gas investments is based on a careful appraisal of the project's risks and potential returns and on sharing those risks, costs, and rewards among a group of sponsors and investors.

It has therefore been the concern of host governments about the manner in which lenders and sponsors assess the risk associated with oil and gas projects located in their countries and the resultant level of security that would be required. It is the suspicion of most West African countries that risk assessment by most foreign lenders is based on popular sentiments regarding their countries generally, rather than on the basis of the likelihood of occurrence of adverse events based on actual historical facts about the countries. The questions therefore are that: how are oil and gas project risks identified, how are they analyzed, how are they allocated and what measures are taken to mitigate the risks identified or perceived?

Another major concern of passive investors who normally provide much of the financing but do not have the capacity to control the operation of the project is the project structure and security package since these can help mitigate risk. If the type of structure and quality of security available are strong, the project becomes creditworthy, and a greater share of project costs can be financed. Thus, the research questions are: what is the quality of the security package available for lenders? Does the involvement of international financial institutions in oil and gas project financing serve as an additional security for the private investors? How can the security packages be strengthened?

On the whole, the researcher is interested in finding out how the international financial institutions help to mitigate risk in oil and gas projects and how risks management help in

a successful financing. Other matters that the researcher cannot over look are the sponsors and the host government activities in the project implementation.

1.3 OBJECTIVES OF THE STUDY

Capital investment is an important part of economic development. In economic terms, investment in any project is essentially a process, which involves a definite outlay of resources now, in order to obtain an anticipated inflow of resources in the future. Investment is therefore a risky business, because future events will have an impact upon the benefits arising from it, although it is impossible at the onset to assess just how. Because of this, centuries of investment experience have evolved a whole series of financial tools aimed at mitigating project risk.

The aim of the study is to establish flexible but stern and compromising guidelines that will be suitable for lenders, sponsors and host government taking into account the prevailing conditions in the developing countries.
The objectives are:

1. To evaluate the factors to be considered in determining the risk component of oil and gas projects in West Africa and how these risk factors can be mitigated to attract foreign private financial institutions to participate in financing through project finance.

2. To examine the security packages of financial institutions and structure a suitable one for West African oil and gas projects that will encourage private financial institutions to participate in the financing of these projects.

These objectives will be achieved through the following means:

(i) A study of the existing project finance structures and the risks that are factored into its discount rate.

(ii) A study of the existing security packages available to local and international financial institutions to determine how effective these security packages in minimizing risks in the oil and gas project financing.

(iii) Through the study, data will be collected from the key financiers in the oil and gas industry, which will be analyzed to determine the risk factors and how they are mitigated.

(iv) A risk mitigation matrix will be designed for various risk factors encountered in the oil and gas project financing.

(v) An outline of measures to improve security packages for risks that are most feared by private financing institutions will be made.

It is believed that this study will permit a better and well-informed decision-making and thereby reduce the likelihood of unsuccessful investments.

1.4 HYPOTHESIS

From the foregoing trends, it may be hypothesized that:

1. The key to a sound financial structure in oil and gas project financing is risk management.

2. Successful mitigation of risks of commercial, political, technical and force majeure events are critical to a project's financial feasibility.

3. Multilateral Investment Guarantee Agency improves risk factors of oil and gas projects in less developing countries.

4. The structure and security package help mitigate risk in oil and gas projects for lenders.

1.5 SIGNIFICANCE OF THE STUDY

This study provides information on the complexity of the process, identifies and discusses areas in which financial institutions need additional information, support or both to facilitate their negotiation. It also serves as a yardstick in determining whether the host-country is attractive to sponsors and investors. In other words, it serves as a reference point for decisions relating to oil and gas projects in West African countries.

The study will also be useful to Ghana National Petroleum Corporation (GNPC) and other future private oil and gas companies in their endeavour to embark on the development and exploration of oil and gas in the Tano basin.

The work will serve as a guideline for sponsors and host governments of West African countries with minerals resources in the attempt to bargain for interest rates of finances, amount of loan required and foreign partnership share, especially, in joint venture relationships.

Equity holders who are scared of debt holders taking over the project in the future will be able to assess their position and determine how much return they should demand on their investments. In other words, the study will determine an appropriate level of gearing that will be acceptable to equity holders.

1.6 SCOPE OF THE STUDY

This section delineates the boundaries of the study. It encompasses the major international financial institution that invests in oil and gas projects in Africa. The study covers risks encountered in the oil and gas development and operation, and mitigation arrangement that can be put in place to reduce the risk associated with the project. The study is expected to enhance the understanding of risk management and the financial tools that are use in the process. The study does not cover the measurement of risk and hedging process since these since will be too broad within the limited resources available to the researcher. However, hedging has been examined in the literature review as a method of mitigating risks. The study thus highlight the role of the World Bank, International Finance Corporation, Multilateral Investment Guarantee Agency, United

States Agency for International Development and National Investment Bank of Ghana in mitigating of risk in the oil and gas project undertakings.

1.7 METHODOLOGY

This comprises the detail procedure to be used in executing the entire research work.

1.7.1 POPULATION

The research is conducted to cover all financial institutions involve in project financing in West Africa. Time and finance available will not allow the researcher to work with the total population hence the use of sample size.

1.7.2 SAMPLE SIZE

The sample size of this study is made up of key financial and investment analysts of the institutions selected, namely International Finance Corporation, Multilateral Investment Guarantee Agency, United States Agency for International Development, National Investment Bank of Ghana and the World Bank.

1.7.3 METHOD OF SELECTION OF SAMPLE SIZE

Purposive sampling was used because of the technical nature of the matter under discussion with a small number of key personnel directly involved.

1.7.4 DATA COLLECTION INSTRUMENTS

Data was collected from primary and secondary sources. Secondary sources covers academic journals, working documents of investment banks, conference papers and academic literature. Primary sources include data collected through interviews and questionnaires. Interviews were used because it gives the interviewer the opportunity to explain to the respondents what is really needed for the study. Interviews also broaden the scope of questions and answers. Questionnaires on the other hand were designed using structured and open-ended questions. It was for the collection of guarantee statistical data from the officials who could not make time to meet the researcher for interview.

1.7.5 DATA HANDLING AND PRESENTATION

Secondary data shall be sorted, classified and edited. This is to ensure that all irrelevant responses are eliminated. For the purpose of analyzing, interpreting and presenting the data, tables and matrix presentation of risk will be used. In the risk matrix, risk factors shall be outlined, causes of the risks, remedies for each risk and the consequences of each risk factor for lenders and investors.

1.7.6 PROBLEMS ENCOUNTERED IN DATA COLLECTION

The major problem encountered is the attitude of respondents towards the research. The respondents felt the research topic was too technical for the researcher to handle, hence was not willing to give out data. The respondents were also too busy to attend to the researcher interview for the expected time. Questionnaires given out were responded to but not adequately. However the researcher made several follow ups to fill up gaps created in the responses.

Financial constraints also limit the scope of the study to risk management without fully assessing the extent of risk in the oil and gas projects.

These problems were however resolved in the following ways.

The negative attitude of respondents towards the research eventually became positive during the last few days of data collection as the respondents got used to the researcher and the research. Even though this positive cooperation came quite late, it turned out to provide useful data. The financial constraints compelled the researcher to narrow down the research to the core issues in the study and data was collected from web sites of international financiers to cushion responses from questionnaires and interviews conducted in Ghana.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

The impact of the recent upswing in the exploration activity in Africa and the likely future demand for capital as a consequence of exploration success call for attention. African oil production increased by an average of 3% between 1986 and 1996 and has surged forward in the last two years where growth rates of 5.6% and 5.9% have been almost double the world's average rate with countries such as Angola showing significant growth. This strong growth outlook is the result of a combination of factor such as:

- Many African governments have taken the initiative to open up new areas for foreign investment, particularly in deep water, and have amended economic terms to encourage this investment.
- In addition, the balance sheets of major oil companies are strong and large energy and power budgets are being directed to Africa as companies seek to replace declining reserves in North America and Northern Europe.
- Technological advancement has also played its part in making the West African area economically viable; whereas even five years ago, its cost relative to the quality of interpreted results limit its use.

A survey of a sample of West African economies shows strong growth rates for many countries. Among them, Ghana and Cote d' Ivoire have growth rates of 5% and 6% respectively in 1997. West African economies are being driven forward in part by investment in the mining and industrial sectors, which can be energy intensive. This combined with rising domestic demand for power, has put pressure on the power resources of the region.

The emergence of a domestic energy market, whose demand is constrained by supply, may change the fundamentals of some fields, particularly natural gas fields. In the past, fields that contained high levels of associated gas have been de-prioritized by many companies, due to flaring restrictions and the lack of a readily available market available

for gas. Converting gas into electric power has taken giant strides in the past ten years with strides in gas turbine technology making this process highly efficient. The question now is, how should the risks that militate against financing oil and gas investments be managed to alleviate the fear of investors and lenders from financing.

2.2 OIL AND GAS FINANCING STRUCTURES

Projects in developing countries can be generally be financed in one of three ways:

- First, with the sponsor's equity,
- Secondly on a project-finance basis, or
- Thirdly as a combination of these two possibilities.

Under the equity approach, sponsors, who may be from the public or the private sector, either fund oil and gas investments directly from their own pockets or fully guarantee the debt to be raised for the project completion. If debt financing is secured from third-party lenders, the lenders will base their decisions on the financial strength of the sponsors and not so much on the underlying economics of the project.

In contrast, under project financing, a special purpose company is created to own and operate the project and to become the borrower of the project loans. The project lenders rely heavily on the strength of the project's cash flows, as there is generally no recourse to the project sponsors.

A hybrid financing strategy incorporating both equity and project finance approaches, may be appropriate where there are divergent views among consortium members over a financing strategy.

Project finance is a method of financing new investments by structuring the financing around the project's own operating cash flow and assets, without additional sponsor guarantees. This technique is able to alleviate investment risk and facilitate funding at a relatively low cost, to the benefit of sponsors and investors alike.

The use of the above financing structures is not new in the business world. What is important is the combination of the two structures instead of the use of them individually in

the past two decades. Recent economic theory suggests that combing the two structures reduces investment risk drastically. This will be tested in the data analysis stage of this study.

2.3 PROJECT FINANCING AND RISK SHARING

Davis, Henry A. (1996) in his book "Project Financing" explains that, project financing is usually tailored to meet the needs of a specific project. Repayment of the financing relies on the cash flow and assets of the project itself, the risks of which are borne not by the sponsor alone but by different types of investors, equity holders, debt providers, and quasi-equity investors. Because risks are shared, one criterion of a project's suitability for financing is whether it is able to stand alone as a distinct legal and economic entity. Davis et al emphasizes that project assets, project related contracts, and project cash flows need to be separated from those of the sponsor.

Scheinkestel, Nora (1997) identified two types of project finance: no recourse and limited recourse project finance. According to him, no recourse project finance is an arrangement under which investors and creditors financing the project do not have any direct recourse to the sponsors as might traditionally be expected. Although creditors' security will include the assets being financed, lenders rely on the operating cash flow generated from those assets for repayment. Before it can attract financing, the project must be carefully structured and provide comfort to its financiers that it is economically, technically, and environmentally feasible, and that it is capable of servicing debt and generating financial returns commensurate with its risk profile.

Limited recourse project finance permits creditors and investors some recourse to the sponsors. This frequently takes the form of a precompletion guarantee during a project's construction period or other assurances of some form of support for the project. Creditors and investors, however, still look to the success of the project as their primary source of repayment. In most developing market projects with significant construction risk, project finance is generally of the limited recourse type.

2.4 CORPORATE LENDING AND RISK SHARING

Thobani, Mateen (1996) in his book entitled Corporate Finance explained that, traditional finance is corporate finance, where the primary source of repayment for investors and creditors by the sponsoring company, backed by its entire balance sheet, not the project alone. Although creditors will usually still seek to assure themselves of the economic viability of the project being financed, so that it is not a drain on the corporate sponsor's existing pool of assets, an important influence on their credit decision is the overall strength of the sponsor's balance sheet as well as business reputation. Depending on this strength, creditors will still retain a significant level of comfort in being paid even if the individual project fails. In corporate finance, if a project fails its lenders do not necessarily suffer, as long as the company owing the project remains financially viable.

Risk under corporate lending is backed by the assets of the balance sheet of the sponsoring company and the project company unlike the project finance risk, which is backed by the project and its products. Davis, Henry et al. Project finance benefits primarily sectors or industries in which projects can be structured as a separate entity apart from their sponsors. A case in point would be a stand alone production plant, which can be assessed in accounting and financial terms separately from the sponsor's other activities. Generally, such projects tend to be relatively large, because of the time and other transaction costs involved in structuring, and to include considerable capital equipment that needs long-term financing. In the financial sectors, by contrast, the large volume of finance that flows directly to developing countries' financial institutions has continued to be of the corporate lending kind.

Traditionally, in developing countries at least, project finance techniques have shown up mainly in the mining and oil and gas sectors. Projects that depend on large scale foreign currency financing are particularly suited for project finance because their output has a global market and is priced in hard currency. Since market risk greatly affects the potential outcome of these projects, project finance tends to be more applicable in industries where the revenue streams can be defined and fairly easily secured.

The distinction between corporate lending and project finance is particularly important for this study because it encourages investors who will be willing to invest in projects such as mining and oil and gas sectors but for fear of the collapse of the sponsoring company which will mean that full repayment of their funds cannot be made. Literature review revealed that investors are more willing to put their funds into projects that are backed by the project itself and the project outputs, which is the main focus of project finance. It is therefore not surprising to find more international financial institutions investing in mining, oil and gas projects.

2.5 STRENGTH OF PROJECT FINANCE IN OIL AND GAS INVESTMENTS

In the appropriate circumstances, project finance has two important advantages over traditional corporate finance: it can (1) increase the availability of finance, and (2) reduce the overall risk for major project participants, bringing it down to an acceptable level. (Davis, Henry 1996).

For a sponsor, a compelling reason to consider using project finance is that the risks of the new project will remain separate from its existing business. Then if the project, large or small, were to fail this would not jeopardize the financial integrity of the corporate, sponsor's core business. Proper structuring will also protect the sponsor's capital base and debt capacity and usually allow the new project to be financed without requiring as much sponsor equity as in traditional corporate finance. Thus, the technique enables a sponsor to increase leverage and expand its overall business, sharing the risk with other participants such as project contractors, insurance companies and host governments.

By allocating the risks and the financing needs of the project among a group of interested parties or sponsors, project finance makes it possible to undertake projects that would be too large or would pose too great a risk for one party on its own. This was the case in 1995 when International Finance Corporation helped structure financing for a $1.4 billion power project in the Philippines during a time of considerable economic uncertainty there. Sharing the risks among many investors was an important factor in getting the project launched.

According to Ahmed, Priscilla (1999), raising adequate funding for a risky project brings to bear on the project sponsors, an obligation to settle on a financial package that both meets the needs of the project in the context of its particular risks and the available security at various phases of development and is attractive to potential creditors and investors. By tapping various sources of finance (for example, equity investors, banks, and the capital markets), each of which demands a different risk/return profile for its investments, a large project can raise these funds at a relatively low cost.

Also working to its advantage is the globalization of financial markets, which has helped create a broader spectrum of financial instruments and new classes of investors. By contrast, project sponsors traditionally would have relied on their own resources for equity and on commercial banks for debt financing. Particularly significant is the increasing importance of private equity investors, who tend to take a long-term view of their investments. These investors are often willing to take more risk (for example, by extending subordinated debt) in anticipation of higher returns (through equity or income sharing) than lenders. A project that can be structured to attract these investors - to supplement or even to substitute for bank lending may be able to raise longer-term finance more easily.

Further reasons given by the available literature for project finance over corporate lending are the increase in finding because of the willingness of financiers and the reduced overall risk for the major project participants. It is rational to increase funding for projects that have higher returns with reduced risks, no doubt there is increased funding for oil and gas projects that have their risks managed efficiently, especially, where experts such as MIGA and the World Bank are involved in these activities. It can be deduced from the above that project finance is not suitable for small projects even though financiers have in the past released funding to small projects. The fact is that, project finance benefit large projects than small projects, which can rely on corporate lending.

2.6 RISK MANAGEMENT

The word management can be defined in terms of the organization of activities and controlling the use of resources in such a manner as to achieve some desired objective(s). For an industrial or commercial firm the objective may be to maximize profits, or it may be to increase revenue, net worth, or perhaps market share over a period, or to achieve a combination of several objectives, or just to stay in business. The government places certain social and financial objectives on nationalized industries, and local authorities must pay in regard to the costs of their operation. An individual, too, may seek to manage his own activities and resources in order to attain certain objectives.

All such plans may be upset by the occurrence of unforeseen events, and it is the exposure to events, which cannot be predicted with absolute certainty that may broadly be thought of as risk. Therefore, in the broadest of terms, risk management is concerned with the planning, arranging, and controlling of activities and resources in order to minimize the impact of uncertain events.

Benjamin Frank (1992) in his book " risk assessment, managerial emphasis" observed that in this world nothing could be said to be certain, except death and taxes'. Yet there is some uncertainty about even those two phenomena: no one can be sure when he will die, and tax rules and rates are frequently changed. In fact, life is surrounded by uncertainty.

No individual, firm, organization, or society knows what the future holds in store. Life however is full of surprises, sometimes pleasant, at other times unpleasant, sometimes of minor importance, on other occasions catastrophic. Some unexpected events are the result of one's own actions, perhaps due to a failure to exercise care, or through tackling things for which one is ill equipped. Other experiences may be due to the actions of other individuals groups, or society as a whole, and sometimes nature is the culprit. In other words, whereas some of the uncertainties are within the control of the individual or firm, others are part of the environment in which one lives or operates.

Benjamin Franklin et al gave the following examples: Individuals and families are exposed to the chances of loss due to disease, accidental injury and death,

unemployment, loss of possession, and many other events which may diminish their welfare. On the brighter side there can be unexpected gains too, such as a large win on the football pools, or a chance encounter that lends to a better job or a happy marriage.

Firms, too, may suffer loss due to the destruction or loss of property either belonging to them or for which they are responsible. They may also incur large liabilities to third parties for accidents attributable to the wrongful acts of employees or agents, or defects in their products, or incorrect advice. In addition, associated with the conduct of any business, there are other uncertainties, which may be classified as follows: production risks, making and distributing risks, financial risks, personnel risks and environmental risks.

The issue of risk cannot be avoided. It can only be minimized and/or transferred. Oil and gas projects are more risky than other projects, especially in developing economics of Africa. Managing its risk encourages financiers to invest their funds into these risky projects. The colossal amount of money required by these projects and the long-term nature of the investments particularly makes its more risky and unless the uncertainties are minimized through efficient management, financiers will be unwilling to invest in these projects.

2.7 RISK MANAGEMENT PROCESS

The job of risk management can be broken down into three elements, which follow each other in a logical sequence:

- Risk analysis
- Risk control
- Risk financing. Brown (1995)

2.7.1 Risk Analysis

The first step in the process is to analyze the risks of which an organization may be exposed. Risk analysis itself has two prime elements – the identification of risk and its evaluation.

Identification requires a knowledge of the organization, the market in which it operates, the legal, social economic, political, and climatic environment in which it does its business, its financial strengths and weakness, its vulnerability to unplanned losses, the manufacturing processes, and the management systems and business mechanism by which it operates.

Any failure at this stage to identify any risk which may cause a major loss will eave the organization still exposed to the chance of bankruptcy, however thorough the rest of its risk management programme. Risk identification provides the foundation for risk management.

Risk evaluation can be broken down into two parts – the assessment of:

a) The probability of a loss occurring and
b) Its severity.

It is not sufficient just to know that an organization owns or is responsible for property, which is exposed, to damage by fire, explosion, windstorm, flood, or other perils or that it produces and/or sells products that could cause injury or damage. The formulation of sensible decisions about the way such risks should be handled also requires information regarding values at risk or potential liabilities, and the estimated frequency of losses of differing size, including losses caused by any interruption to its business. Only with such information is it possible to judge the cost effectiveness of spending on risk reduction or deciding whether a risk can be retained or should be insured and, in the latter, whether the premium required is an acceptable price to pay for the risk transferred.

2.7.2 Risk Control

Risk control according to Brown et al, covers all those measures aimed at avoiding, eliminating or reducing the chances of loss producing events occurring, or limiting the severity of the losses that do happen. Here, one is seeking to change the conditions that bring about loss producing events or increase their severity. Though some measures call for little more than commonsense, often considerable technical knowledge is required, for which the risk manager will need to turn to experts in the particular field.

2.7.3 Risk Financing

Brown et al argued that one is concerned with the manners in which the risks remaining after the risk control measures have been implemented is be taken care off. It has to be recognized that in the long run an organization will have to pay for its own losses. Therefore the primary objective of risk financing is to spread more evenly over time the cost of risk in order to reduce the financial strain and possible insolvency, which the random occurrence of large losses may cause. The secondary objective is to minimize risk costs.

Essentially an organization can finance its risk costs in three ways:

- Losses may be charged as they occur to current operating costs; or
- Ex ante provision may be made for losses, either through the purchase of an insurance cover which losses can be charged,
- When losses occur they may be financed by loans, which are repaid over the next few months or years.

The probability and severity of possible losses play an important part in the structuring of a risk-financing programme. It is axiomatic that in practice high probability of loss generally goes hand in hand with relatively low severity, and vice versa. If it were otherwise, exposure to a high probability of catastrophic losses would place any organization in an untenable position. For example, if a pharmaceutical company developed a new treatment for an unpleasant though not fatal complaint, but the drug caused a side effect which was almost certain to lead to the death of one in ten of the users, one can be sure that, regardless or any governmental controls, it would not be marketed. Any enterprise exposed to such a probability, high severity risk would have to be abandoned.

Risk management may be expressed in the truth; 'prevention is better than cure', or, 'it is better never to have suffered a loss than to suffer and collect under an insurance policy.' The reason for this fundamental truth of risk management is that nothing can ever repair or put right the effects of a casualty. In fact, at the extreme, the enterprise might fail entirely notwithstanding that it has the finest risk-financing programme it would devise.

There is ample evidence, for example, that a significant proportion of firms never fully recover from the effects of a major fire and some have to be wound up within a short time even if fully insured. The main reason is that in a competitive industry it is almost impossible to recapture one's former share of the market after a prolonged interruption of business.

Risk control and risk financing, however, are not independent parts of the whole risk management process. A reduction in loss expectancies brought about by risk control measures will usually also reduces the cost of the risk financing programme.

Therefore, if one starts form the basic premise that transfers of risks by insurance or other means is no substitute for risk control then other means have to be employed. According to Donaldson et al, regardless of the techniques that may be employed at each stage, or the eventual form of the risk handling arrangements, every risk management programme must proceed according to the following logical sequence of events if it is to stand any chance of success.

- All exposures to risk must be identified;
- All exposures need to be evaluated according to cause effect, the aim being to quantify probabilities and severities;
- The possibility of avoiding or eliminating any of the risks should be investigated, and if feasible the appropriate steps should be taken;
- In the case of other risks, risk reduction measures need to be explored and implemented;
- The residual risks need to be evaluated so that decisions can be taken about the best methods of financing them; and finally
- The results of the whole programme need to be monitored and regularly reviewed in the light of changing conditions.

2.7.4 Administration of the Risk Management Process

The emergence of risk management as a separate specialist area of management has led to the appearance of risk managers in the management structure of an increasing number of companies and other organisations. Broadly, every risk manager is charged with the

task of administering his organisation's risk management programme, but precisely what role risk manager's play and where he or she is placed in the management structure varies from organisation to organisation.

2.8 RISK MANAGER'S ROLE

Whether a risk manager's responsibilities are limited to dealing with the pure risks to which his organization is exposed, or extend to some of the speculative risks too, his role is likely to be both advisory and executive.

Although the risk manager may be given primary responsibility for the identification of risks, to a significant extent, particularly in a multi-national corporation, much of that task may devolve upon local management. Indeed, that point takes one immediately to one of the most difficult features of risk management which is that no one man can posses all of the expertise required to carry out every part of the risk management process. Even a risk management department composed of individuals with different skills may still need t seek the advice and guidance of experts in particular fields. Arguably the best placed people in any organisation to discover hazards and identify major exposures are local operating management.

Therefore, a risk manager must certainly obtain local co-operation and advice, and it may be that his risks identification task is limited to providing operating line management with the tools to research systematically the risk exposures within their own areas of operation. Likewise, in regard to the remainder of the risk management process, the risk manager's role may largely consist of advising top management, including, in a decentralized organization, the top management of the various operating divisions, on the techniques to be used for the evaluation, control and financing of risks.

In that role, in conjunction with engineering, production, financial, and other specialist colleagues, he may be drawn into the task of helping to establish for the organisation standards of feasible and sensible risk control compatible with the corporate objectives. He will also be expected to advise on the financing of residual risks.

Clark (1989) in his article communicating risk emphased that the extent to which risk managers are involved in executing agreed risk management policies varies considerably. Most are responsible for administering insurance programmes; though in some multi-national corporations even that task may be wholly or partially undertaken locally, subject perhaps to advice and guidance from the central risk management department. If central contingency fund forms part of the risk financing programme, again the risk manager probably will play some part in its administration, though the investment of the funds may be outside his control. It is the physical risk control area which is far less likely to be placed under his control: by the very nature of the tasks involved in most organisations, responsibility for the administration of safety, product quality and security programmes tends to be given to other staff managers, such as works engineers quality control, and computing managers.

Clearly, communication and co-operation with colleagues throughout an organization are essential ingredients of any risk manager's job whatever may be the precise terms of his duties. Clark et al, goes so far as to argue that communication, co-operation, and motivating management in the advantages of risk management are essential elements of the work of a risk manager. "(Organizational relationships; co-coordinating risk handling activities); Handbook of risk management, Clark et al.

2.9 COMMUNICATION AND CO-OPERATION OF RISKS

If a risk manager is to do his job efficiently he must gain the co-operation of all colleagues who possess information he requires and/or help is needed for carrying out risk handling decisions. Any department of an organisation may impinge on the risk manager's work in some way but usually there will be a more frequent, direct relationship with legal, finance, production, and personnel departments. For example, the legal department will be involved in the preparation and the vetting of sales and purchasing contracts, the leasing of buildings and plant, and dealing with claims from contracts may involve the shifting of legal liabilities for damage or injury, or provisions regarding insurance, all matters on which the risk manager will need to be informed and consulted. In turn, he may want assistance from the legal department in the drafting of new insurance contracts or in setting up a captive insurance company.

Finance departments possess the information required to value potential losses, and inevitably will be involved in formulating the organisation's risk handling policies.

Production and works managers are directly involved in many of the activities that create risks and, may be given responsibility for the welfare of employees that will be involved in programmes to reduce industrial accidents, and the risk manager may be responsible for arranging and operating insurance schemes that form part of the package of employee benefits negotiated by the personnel department.

It is not surprising that communication is seen not only by Clark but also by other writers and many risk managers as a major part of their work. Clark et al again stressed the need for the risk manager to educate himself in all of the major aspects of the organisation in which he works including the personalities of its members. Clark et al added that:

> *The risk manager also needs to appreciate the limitations of his own knowledge. It is impossible for any man to acquire all of the knowledge and skill brought together in an organization. Therefore the risk manager must learn from whom he can acquire the technical information and advice he will require to identify and evaluate risks, and to formulate his own risk handling advice.*

A part of the risk manager's education process must also be directed at the management of his organization in order to dispel the idea that 'it can't happen to us', and to appreciate the benefits of a sound risk handling programme. The effective control of risk is only likely to occur if the measures taken have the full support of the top management.

Apart from that education process is the preparation of a risk and insurance manual, not only for the risk manager's own use, but also for circulation to other managers throughout the organization who may be affected by or have some responsibilities for the handling of those risks that fall within the risk manager's province.

2.10 RISK ADMINISTRATION

Exactly who is given responsibility for carrying out the analysis, control and financing of risks is an organizational problem to which there is no uniquely correct solution. What, those tasks involve, and the principles and techniques, which may be applied to them, are the subject of the following discussion. There are, however, two other aspects of the job of a risk manager which need to be considered here: they are record keeping and the reporting of the activities of the risk management department.

2.11 RECORD KEEPING OF RISKS

Record keeping is essential to provide information, including statistical data, required for risk analysis and risk handling purpose. Records also provide the information required for the preparation of report for management.

Among the records, which the risk management department should, either keep, or to which it should have access, are:

- A building and plant register recording buildings, plant machinery and other fixed assets owned by the organization or for which it is responsible, providing such details as date of purchase, purchase price, location and current value;
- A regularly updated record of stocks and other moveable assets, with a breakdown between locations;
- Insurance records, including a policy register, premium payments, claims data, inspection reports, and reports prepared on coverage, etc.
- Records of all losses including uninsured losses, showing date of loss, dates and amount of interim payments and of final settlement, nature of loss, cause of loss, steps taken to prevent any repetition;
- Risk analysis reports, recommendations made for the handling of risks.

2.12 REPORTS

The risk manager should prepare, for both top management and departmental heads, annual reports on the activities of his department. The reports for top management could include such matters as changes in the costs, arrangement and scope of insurance coverage, highlighting changes in levels of retained risks; and analysis of claims and their relationship to premiums paid, and data on insured values and other measures of exposure to risk. An analysis of the cost of operating the risks management department should also be included, with estimates of the benefits it provides.

Reports may be provided for other departmental heads dealing with matters under their control. For example, an analysis of vehicle accidents and costs may be prepared for the transport manager, and similar analyses of industrial injuries may be prepared for personnel and production departments.

2.13 USE OF BROKERS AND CONSULTANTS TO MANAGE RISKS

It is common practice for all types of organisation to employ outside consultants occasionally, or even on a regular basis, to help in dealing with all sorts of management problems. There can be various reasons for doing so, but in general such action in no way implies any criticism of internal management. Unless a consultant is employed regularly by a particular organization there is no way in which he can possess an in depth knowledge of its business, its management structure and personalities, and all of the other details that will be known and understood by internal management. On the other hand, consultants can offer various advantages, such as:

- The resources to tackle an urgent problem quickly, free from the difficulties that internal managers have of attending to their normal duties at the same time;
- Specialist skills and knowledge which may not be available in the same depth inside the organization;
- Access to information which either may not be available to internal management or could involve very high search costs;

- A breath of knowledge and experience in dealing with similar problems not possessed by internal management;
- Impartiality when dealing with and advising on issues that involve the interests of individual managers.

It has long been the custom of the majority of firms to employ insurance brokers to assist in dealing with insurance matters, and as risk management has developed as a separate management function, so consultancy firms have been formed to assist and advise on other aspects of risk management programmes.

If it is desired to place insurance business at Lloyd's then a broker has to be used but even if that special case is excluded the report by the AIRMIC study group. The status and techniques of insurance and risk managers in industry and commerce showed that over four-fifths of the 142 respondents employed insurance brokers for handling at least some of their risks. Donaldson (1989)

2.14 MONITORING RISK MANAGEMENT PROCESS

If organisations operate in an unchanging world, then once the controllers of an organisation had formulated their risk management objectives and had translated those into a set of policies which had been implemented, that would be the end of the risk management process, apart from the need to check that the results were in accord with the chosen objective. Life, however, is subject to change. Corporate controllers may change their attitudes to risk, either of their own free will (perhaps because of a change in the composition of a board of directors) or by force of circumstances.

Risk conditions, too, alter over time, both within an organization (for Example, in consequence of product, process, or personnel changes) and in the outside environment in which it operates. And the constraints on risk handling choices also may change. Therefore the risk management process is a continuing process calling for action on two fronts:

- Results of policies adopted need to be monitored. Risk handling decisions are always concerned with the future, and one of the difficulties confronting

risk managers is that decisions usually have to be taken on the basis of information which falls far short of perfect, and so policies may need to be reviewed in the light of fresh information:

- Policies need to be reviewed at regular intervals in the light of changing conditions.

The techniques employed in the monitoring and review process will be the same as those used in the initial risk analysis, control and financing processes. If results are to be monitored, then the appropriate records must be maintained on:

- Loss producing events and, ideally, of near misses too;
- The costs of risks and the benefits of risk handling programmes.

2.15 RISKS IN OIL AND GAS INVESTMENTS

Oil and gas projects involve risk for all parties – the project developer and the lender. Project developers take risks that are foreseeable and manageable or for which they are adequately rewarded. However, when developers are unable to provide guarantees adequate to satisfy lenders, the lenders will seek government guarantees. The ability of the parties to agree on how risks will be shared is often the key to initiating a successful project. These risks fall into one of three categories, namely, commercial risks, political or country risks, and force majeure risks.

2.15.1 Commercial Risks

Donaldson (1989) saw commercial risks arising during the construction phase of projects and indicated that commercial risks relate to variations in costs, schedule, and ability to meet completion requirements. Donaldson (1989) classified these variations as completion risks. He explained further that commercial risks could also arise during the operating phase, operating risks). Donaldson relate this to the project's ability to generate projected revenues or cash flow and meet the needs of the market, supply or market risks.

Donaldson et al also viewed country or political risks as those that are beyond the control of negotiating parties, such as foreign exchange or expropriation risks.

According to Brown et al, every project risk should be transferred or mitigated. Risk must be allocated properly among all parties through the various contracts, insurance policies, bonds, or letters of credit. Brown et al emphased that it is worthwhile sharing risk with local partners. This can involve equity participation in a joint venture project company or partnership or association with local construction or operating contractors. Brown concluded that such arrangements can also facilitate the negotiation of contracts, and can help to secure government commitments.

Smith Andrew (1988) in his article "Risk in Energy Exploration" published in the Oil and Gas journal volume 5, 1988 reiterated that the central contract in the oil and gas financing is the energy purchase agreement, and it is from the obligations set forth in this contract that the project generates revenues, and it is the sale of energy that provides the cash flow to meet debt service, operating costs, maintenance, and return on investment. For this reason the creditworthiness of the purchaser is a key factor in assessing commercial risk. So that the project needs to be structured around the purchaser that needs the energy, can fulfill payment obligations, and has demonstrated creditworthiness. What Smith (1988) implies is the uncreditworthiness of purchasers even state-owned utilities default in paying for supplies of energy. Typical of this situation is Tema Oil Refinery inability to pay for the oil purchase from Nigeria National petroleum Corporation for the whole of 1999 and 2000 financial year causing complete breakdown in the crude oil purchase agreement between Ghana National Petroleum Corporation and Tema Oil Refinery on one hand and Nigeria National Petroleum Corporation on the other hand. The researcher can conclude in this respect that this additional layer of risk can only be mitigated by sovereign government guarantee, multilateral support, or irrevocable letter of credit facility.

In addition to these mitigation arrangements, it must be possible of the purchaser to pass all purchase costs in the form of tariffs to the final consumer of the energy product. The government of Ghana was unable to do this in the year 2000 for political expediency.

Brown et al, outline plant downtime, machinery breakdown and fuel risk as serious major commercial risks that have to be managed in risk mitigation. He explained that plant

downtime can expose the project to interruption in cash flow and therefore can disrupt debt-service payments. Because the producer is responsible for all risk associated with the operation of the energy plant, adequate risk transfer and mitigation becomes necessary. The losses incurred because of scheduled maintenance should be covered by a well-funded sinking fund or reserve for maintenance. Brown et al indicated that machinery breakdown can cause extended downtime and substantial repair costs. This risk can be reduced by selection of experienced contractors and proven equipment, and it can be further mitigated by compressive insurance not only for repair of machinery but also for business interruption or loss of revenue.

Brown et al also suggested fuel risk mitigation through long term fuel supply agreement guaranteeing quality, quantity, and delivery. Fuel price changes should be reflected in the energy component of the purchase price.

Poor or inefficient operation and maintenance can cause plant performance to fall below levels stipulated. It can also cause premature wear and tear on plant components. The project company can mitigate this risk by entering into a longer-term operation and maintenance contract with a reputable operator. The guaranteed availability and minimum operating parameters stipulated in the agreement can be passed on to the operator. Their operation and maintenance contract should have incentives for encouraging good maintenance and high plant availability, and it should contain a significant penalty clause covering the operator's performance obligations.

Technical quality also affects performance (Smith 1988). He illustrated oil and gas plant producing at less than expected capacity, for example, can have severe effects on the producer's ability to meet obligations. Having a strong engineering, procurement, and construction contract, which must have a fixed price and a firm completion date, substantially mitigates this risk.

According to Fenecher (1992) in his book Energy Financing, commercial and operational risk can be reduced largely by the quality of construction contractors. Fenecher emphased that construction contractors can only reduce the risk if they possess the

technical, managerial and financial capabilities to assure completion of the project and its continuing operation. He indicated that the sponsors must pre-qualify the contractors carefully by reviewing there past experiences on similar projects and commitment during construction. Fenecher concluded that the project Company should minimize risks through the quality of its own management and technical resources and through its ability to manage the contractors and the project's financial and commercial agreements.

2.15.2 Country Risks

Country or political risks are inherent to the country in which the project is being implemented and are of greatest concern to lenders because such risks could adversely affect the development and operation of the project.

Donaldson et al, view country risks as a prerequisite of a successful project risk mitigation. He emphases that the commitment by government to reforms that will encourage investment, and developers will specifically assess the degree of the government's commitment and the risk that the government will lack the political will to reform. Donaldson stated that primary political risks project developers will consider to include availability of foreign exchange to service the project debt and to pay dividends to offshore investors; potential for default on the part of government or its agencies in meeting contractual obligations; risks of expropriation; and possibilities of political turmoil.

2.15.3 Force Majeure Risks

Force majeure risks are caused by natural disasters or accidents such as fire, flood, storms, or earthquakes. Brown et al indicated that force majeure risk should be mitigated through commercial insurance. The project company should be responsible for obtaining and paying for the necessary insurance cover, which should be comprehensive throughout the construction and operation phases of the project. Brown (1995) emphases that the commercial insurance should cover not only any asset loss such as construction risk but also business interruption, including loss of revenues for delays in plant operations caused by natural disasters. He concluded that the insurance should cover at least six months to one year of debt service and fixed costs.

Comments

The three broad categories of risk, commercial risks, political or country risks and force majeure risks are appropriate since all types of risks can be easily placed under at least one of the categories. Commercial risk is mainly business oriented. Without business, it will not arise, example of which as identified by Donaldson et al are the probability of the project to generate projected revenue or cash flow and to meet the needs of the market that is likely to exist for the products. Typical of every business, negotiation by parties involved in the business is necessary to facilitate smooth running of the business, so also is the commercial risks. Stakeholders in the oil and gas industry must haggle their positions in order to arrive at a compromise, which must be between both the local partners and the foreign partners. All the authors have ignored integrity of the stakeholders, which are one of the key issues in business negotiation and one of the determinants in risk assessment. The higher their integrity, the lower the levels of risks and vice visa.

Fenecher et al emphases that construction risks can be reduced drastically when the construction contractors have the necessary technical, managerial and financial capabilities to execute the project and ensure its continuity. Fenecher et al however ignored the commitment of the executors of the projects. In fact, if the executors are not committed, the project will not be undertaken according to specification.

The researcher is of the opinion that commercial risks are more of trust, commitment and integrity of the parties involved in the project execution, financing and operation every activity that relate to the project. Country risks primarily relate governments and the nationals of the country. Their attitude towards the project has been the concern of the authors. This is important since any change in attitude negatively is likely to affect the project. This all the authors did not ignore in their write outs. Force majeure on the other hand primarily relates to act of God. Act of God in the sense that all the parties involved have no control over such acts and therefore cannot be negotiated. Its impact can however be reduced through insurance and other measures. The researcher is of the opinion that proper feasibility studies to determine the possibility of occurrence of such acts and when they are likely to occur can reduce their risk levels.

2.16 RETURN AND RISK

The return and on an investment are basic concepts in financing decisions. The return on an investment refers to the financial outcome or reward on an investment made by the investor. For example, if someone invests ¢100 million in an asset and subsequently sells that asset for ¢111 million, the cedi return is ¢11 million. Usually, an investment's cedi return is converted to a rate of return by calculating the proportion or percentage represented by the cedi return. For example, a cedi return of ¢11 million on an investment of ¢100million represents a rate of return of ¢11 million/¢100 million, which is 0.11 or 11percent.

Risk on the other hand is present whenever investors are not certain about the outcomes that an investment will produce. Suppose an investor attaches a probability to each possible cedi return that may occur. (Sometimes a distinction is drawn between "risks" and "uncertainty" where this is done, risk refers to situations where a probability can be assigned to each of the possible outcomes, whereas uncertainty refers to situations where so little is known that the assignment of probabilities is impossible. However, we do not draw this distinction and the words risk and uncertainty will be used synonymously). Let us assume that the probability distribution in the table below represents an investor's assessment of the cedi returns, x, that may be received from holding a share in a company for one year.

Probability (p)	Cedi return (x)
0.1	9
0.2	10
0.4	11
0.2	12
0.1	13

Suppose the investor wishes to summaries this distribution by calculating two measures, one to represent the size of the cedis and the other to represent the risk involved. The obvious measure to represent the size of the cedi returns is the expected value of the

distribution. The expected value (x) of the cedi returns is given by the weighted average of all the possible cedi returns, using the probabilities as weights.

$$\text{That is } x = \sum_{} xi\ pi$$

$$= (¢9)\ (0.1) + (¢10)\ (0.2) + (¢11)\ (0.4) + (¢\ 12)\ (0.2) + (¢13)(0.1) = ¢11$$

The choice of a measure of risk is less obvious. In the above example, risk is present because any one of five outcomes (¢9, ¢10, ¢11, ¢12 or ¢13) might result from the investment. If the investor has perfect foresight, then only one possible outcome would be involved and there would to be a probability distribution to be considered. This suggests that risk is related to the dispersion of the distribution. The more disperse or widespread the distribution, the greater is the risk involved. Statisticians have developed a number of measures to represent dispersion. These measures include the range, the mean absolute deviation and the variance. However, it is generally accepted that in most instances the variance (or its square root, the standard deviation, σ) is the most useful. Accordingly, this measure of dispersion will be adopted to represent the risk of a single investment. The variance of a distribution of cedi returns is the weighted average of the square pf each cedi return's deviation from the expected cedi return, again using the probabilities as the weights.

$$\text{That is: } \sigma^2 = \sum_{i=1} (xi - x)^2\ pi$$

$$= (9-11)^2\ (0.1) + (10-11)^2\ (0.2) + (11-1)2\ (0.4) + (12-1)^2\ (0.2) + (13-11)^2\ (0.1) = 1.2$$

The standard deviation is therefore: $\sigma = \sqrt{1.20}$

$= ¢1.095$

In these circumstances we have used cedi returns rather than rates of return. This is because it is generally easier to visualize cedi rather than rates and because it avoids calculations with a large number of significant figures following the decimal point. However, there is no difference in substance, as may be seen from reworking the example using rates of return. If it is assumed that the sum invested is ¢100 million, than a cedi return of ¢9 million, for example, is a return of 0.09 when expressed as a rate. We can now use xi to mean, "return" rather than "cedi return".

Probability Pi	Return xi
0.1	0.09
0.2	0.10
0.4	0.11
0.2	0.12
0.1	0.13

The expected return, x, is :

$x = (0.09)(0.1)+(0.10)(0.2)+(0.11)(0.4) + (0.12)(0.2) + (0.13(0.1)$

$= 0.11$ or $= 11\%$

The variance of returns is:

$\sigma^2 = (0.09 - 0.11)^2(0.1)+(0.10 - 11)^2(0.2) + (0.11 - 0.11)^2(0.4)+(0.12 - 0.11)^2(0.2) +$

$(0.13 - 0.11)^2(0.1) = 0.00012$

The standard derivation is therefore: $\sigma \sqrt{0.00012} = 1.095\%$

2.17 PORTFOLIO THEORY

Portfolio theory was initially developed by Markowitz as a normative approach to investment choice under uncertainty. Two important assumptions of portfolio theory are:

1. The returns from investments are normally distributed. Therefore two parameters, the expected return and the standard deviation, are sufficient to describe the distribution of returns.

2. Investors are risk-averse. Therefore investors prefer the highest expected return for a given standard deviation and the lowest standard deviation for a given expected return.

Given these assumptions it can be shown that it is rational for a utility maximizing investor to hold a well-diversified portfolio of securities.

Let x be the expected return on the investment, and xp, be the expected return on a portfolio of securities. Then:

$$xp = \sum_{i=1}^{n} Xi\, Xi$$

Where xi = the proportion of the total current market value of the portfolio that the current market value of the ith securities constitutes.

n = the number of securities in the portfolio.

Let us assume there are only two securities (1 and 2) in a portfolio and $x_1 = 0.08$ and $x_2 = 0.12$. Also assume that the current market value of security 1 constitutes 60 percent of the total current market value of the portfolio (that is, $x_1 = 0.6$ and $x_2 = 0.4$. Then:

$$xp = (0.6)(0.08)+(0.4)(0.12)$$
$$= 0.096$$

The expected return on a portfolio, therefore, is simply the weighted average of the expected returns on the securities constituting the portfolio. However, the standard deviation of the return on the portfolio (σ_p) is not as simple to measure. This is because it depends not only on the riskiness of the individual securities but also on the relationship between those securities with respect to risk.

The variance of the return on a portfolio is given by:

$$\sigma^2_p = \sum_{i=1}^{n} \sum_{j=1}^{n} Xi\, Xj\, rij\sigma\, i\sigma j$$

where:

xi = the proportion of the current market value of the portfolio that the ith security constitutes.

xj = the proportion of the current market value of the portfolio that the jth security constitutes.

rij = the correlation coefficient between the returns on securities i and j and by definition, rij = rji and rii = 1

ri = the standard deviation of the possible returns on the ith security

rj = the standard deviation of the possible returns on the jth security.

n = the number of securities in the portfolio.

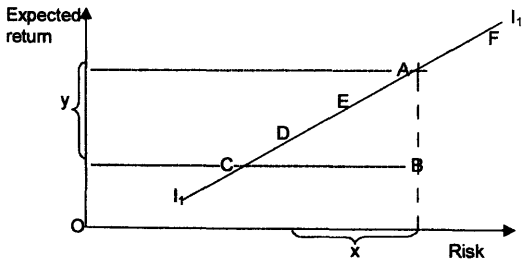
The correlation coefficient, rij, depends on the relationship between returns on two securities, i and j. A correlation coefficient can take on a value between + and – 1. If the correlation coefficient between the returns on two securities is +1, the returns are said to

be perfectly positive correlated. This means that if the return on security i is "high" (compared with its expected level), then the return on security j will, unfairly, also be "high" (compared with its expected level) to precisely the same degree. If the correlation coefficient is –1, the returns are perfectly negatively correlated; high (low) returns on security i will always be paired with low (high) returns on security j. A correlation coefficient of zero indicates the absence of a systematic relationship between the returns on the two securities.

The return-risk relationship has shown that investors do not only consider the returns on a project in isolation. The risk, which is the standard deviation, is also considered. The risk is calculated from the returns and compared with the level of returns. This is considered fundamental to decision-making concerning investments in projects. No single investment decision can take place without return-risk analysis even social projects take into account return- risk relationships.

2.17.1 Investors' Preferences

Investors must choose an investment alternative (portfolio), which gives them a satisfactory balance between the expected returns from the portfolio and the risk that actual returns from the portfolio will be higher or lower than expected. Some portfolios will be more risky than others. Traditional investment theory suggests that rational investors wish to maximize return and minimize risk. Thus if two portfolios have the same elements of risk, the investor will choose the one yielding the higher return. Similarly, if two portfolios offer the same return the investor will select the portfolio with the lesser risk. This is shown below:

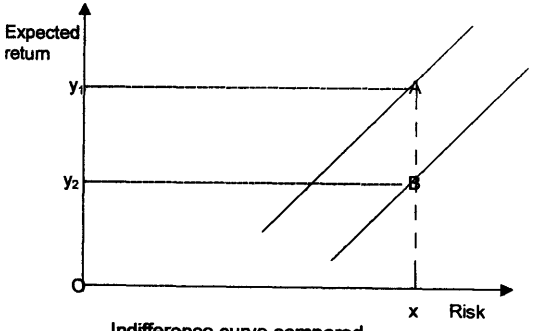


Investor's indifference curve

Portfolio A will be preferred to portfolio B because it offers a higher expected return for the same level of risk. Similarly, portfolio C will be preferred to portfolio B because it offers the same expected return for lower risk. A and C are said to dominate portfolio B. But whether an investor chooses portfolio A or portfolio C will depend on the individual's attitude to risk, whether he wishes to accept a greater risk for a greater expected return.

The curve I_1 is an investor's indifference curve. The investor will have no preference between any portfolios, which give a mix of risk, and expected return which lies on the curve, since he derives equal utility from each of them. Thus, to the investor the portfolios A, C, D, E and F are all just as good and each other, and all of them are better than portfolio B. Remembering that the risk of a portfolio can be measured as the standard deviation of expected returns this may be expressed by saying that portfolio B is preferred on grounds of mean-variance inefficiency.

An investor would prefer combinations of return and risks on indifference curve A to those on curve B in the figure below because curve A offers higher return for the same degree of risk (and less risk for the same expected returns). For example, for the same amount of risk x, the expected return on curve A is y_1, whereas on curve B it is only y_2.



Indifference curve compared

2.18 HEDGING OF FINANCIAL RISK

Hedging involves different parties come to an agreement to cancel one of the parties risk against the others. The different parties may be subject to similar but opposite risks which they wish to hedge. Alternatively, one party may wish to hedge a risk while the other may wish to speculate. Shapiro and Titman (1985) in their text "Integrated Approach to Corporate Risk Management" describe hedging as a risk reducing technique. They stated that hedging makes financial planning easier and reduces the odds of an embarrassing cash shortfall. A shortfall might only mean an unexpected trip to the bank but in extreme cases, it could trigger financial distress or even bankruptcy. Hedging can in fact, reduce these shortfalls.

The idea behind hedging is ideally to find two investments that are perfectly correlated, so that one investment is bought and the other sold for the net position to be safe in practice, the correlation is often not perfect, and therefore some residual risk remains despite the hedge. Shapiro and Titman et al contended that whether correlation is perfect or not, the techniques for setting up a hedge are the same.

2.18.1 Hedging in the Futures Markets

Concentrating on the price changes of the output of oil and gas product, hedging can be used to reduce this volatility. The futures contract is market-to-market in the sense that the product dealt in is valued at the closing price. If the price declines and the account goes below the prescribed minimum, additional margin is required in order to maintain the position. If the price rises, excess margin occurs and may be drawn out. The seller of the product also must maintain margin, again as a security deposit. If the price of the future contract declines, excess margin occurs for the seller if the price increases, the seller must put up additional margin. Thus, price movements of futures contracts affect the margin positions of the buyer and seller in opposite ways. Settlement occurs not at the end of the contract, but daily. In other words, the winners and losers make daily adjustments in cash.

Hedging takes two forms, namely, long and short hedge. A long hedge involves buying a future contract. It is generally employed to lock in an interest rate that is believed to be high. A short hedge involves the opposite sort of transactions. The idea is to sell a futures contract now because of a belief that interest rates will rise. The sale of the futures contract is to use a substitute for the sale of an actual security held.

2.18.2 Basis in Hedging

In hedging, market participants are concerned with fluctuations in the basis, which portrays the risk to the hedger. Breeden Douglas (1981) argued that the basis of hedging is simply the price of a security in the spot market minus its futures price adjusted by the appropriate conversion factor. Hedgers, of course, are concerned about their net positions at the closeout of a futures contract.

2.19 OPTION PRICING OF PRODUCTS

It is possible to establish a riskless hedge position by buying a stock and by writing options. The hedge ratio determines the portion of stock held long in relation to the options that are written. In efficient financial markets, the rate of return on a perfectly hedged position would be the risk-free rate. If this is the case, it is possible to determine the appropriate value of the option at the beginning of the period. If the actual value is above or below this value arbitrage should drive the price of the option toward the correct price.

Breeden Douglas et al contended that the Black-Scholes option-pricing model provides an exact formula for determining the value of an option based on the volatility of the stock, the price of the stock, the exercise price of the option, the time to expiration of the option, and the short-term interest rate. The model is based on the notion that investors are able to maintain reasonably hedged position over time and that arbitrage will drive the return on such positions to the risk-free rate. As a result, the option price will bear a precise relationship to the stock price. The Black -Scholes model provides considerable insight into the valuation of contingent claims.

Comments

The role of hedging in this study relates to the pricing of oil and gas project output. Oil and gas products fluctuates more frequently in the international market, hence, calls for protection in a form of hedging to lock in future prices in other to stabilize the market and reduce loses. The direction of movement in prices is uncertain and thereby become a risk for the cash flow of the project company. Hedging takes place within the futures and option contract markets. From the write outs of the literature, it can be observed that these financial instruments are equally sound measures of reducing risks just like the insurance against other uncertainties. Future and options contracts are major risk reduction instruments for financial and market risks rather than political and force majeure risks. Financial and market risk hedging with futures and option contracts demand high level technical expertise since the activities involved are complex and sophisticated. Thus, with such high level of expertise at the disposal of the project company and the financiers, they will be encouraged to invest their funds in oil and gas projects since they will be sure that the risk level associated with oil and gas business will be minimized

2.20 CONCEPTUAL FRAMEWORK

Upon reflection on the views of a number of scholars on the issue of risk management in general, the researcher came out with a conceptual framework for the study.

In the opinion of the researcher, there is a negative attitude towards African countries, hence a very high perceived political, commercial and force majeure risks in the events of wars, poor infrastructure and debt burden. In other words, Africa is seen as too high a risk to invest in its oil and gas projects, thus, the African oil and gas project risks are imagined and perceived negatively instead of being assessed assessing it scientifically.

There is also the fear of the undeveloped financial markets, which are not likely to serve as the expected strength for the security packages available for the mitigation of their perceived high risk. In other words, there is low quality security package for lenders to rely on the account of weak financial markets in Africa, hence they are unwillingness to invest in oil and gas projects, even if they did, the expected return is so high that the

project becomes unprofitable for the sponsors and the host government. The ultimate effect is that oil reserves sit underneath the grounds and the natural gas flare in the atmosphere of the continent of Africa.

The international financial institutions such as the World Bank, the International Monetary Fund, International finance Corporation, Export Credit Agency, United States Agency for International Development, Multilateral Investment Guarantee Agency and other huge international financial institutions must take up the mantle despite the unimaginable and un-quantifiable risks perceived by them to invest in oil and gas projects in Africa.

The strategy to be adopted by these international financial institutions is to try to develop the financial markets, reduce war, improve infrastructure and educate Africans to understand the agreements that can survive projects, and then, invest their funds in a less risky environment.

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CHAPTER THREE

PRESENTATION AND ANALYSIS

3.1 INTRODUCTION

Successful project finance structuring rests on the strength of the project. Identifying the project risks, analyzing, allocating and mitigating the major risks are the essentials of project financing. Generally project developers take risks that are foreseeable and manageable or for which they are adequately rewarded. However, when developers are unable to provide guarantees adequate to satisfy lenders, the lenders seek government guarantees. The ability of the parties to agree on how risks will be shared is often the key to initiating a successful project.

3.2 MAJOR PROJECT RISKS ASSESSMENT AND MITIGATION

There are commercial risks, political or country risks and nonpolitical or force majeure risks. Successful mitigation of these risks is critical to a project's financial feasibility. The agreements, contracts, and measures associated with projects are designed to maximize risk mitigation and a risk matrix should be prepared by potential investors as a tool to analyze the extent of mitigating the residual risk. That residual risk together with the financial rewards, will determine investor interest in participation in the project.

The severity of each risk also needs to be assessed. For example, sponsors and creditors may need to assess the government's macroeconomics record while creditors would need to evaluate the technical and manageable competence of the sponsors. The risks for long-term lenders are different from those for equity investors, which are different again from those faced by contractors or suppliers. In addition, risk has a subjective quality, what represents an unacceptable risk to one investor may be routine or manageable for another, depending on their prior experience and knowledge.

An effective mitigation of each risk is to identify the party that is in the best position to manage that risk, or whose actions have a bearing on its outcome. For instance, the project sponsor is the one best able to manage commercial risk. If the project will be

subject to significant government regulation, assurances will be sought from the government.

The next step is to allocate, price or mitigate each risk between the parties via contractual agreements. In a successful financing, the risks do not disappear but are borne by the parties able to manage them. Risks that cannot be allocated can still be ameliorated through the selection of proper credit enhancement and monitoring methods.

Data revealed that there is no wholesome risk mitigation arrangement for all the risks, but rather every risk has its own mitigation arrangement. In other worlds, each risk has each own mitigation profile.

3.3 OBJECTIVES

The first objective of this study is to evaluate the factors that are considered in determining the risk component of oil and gas investments in West Africa and how these risk factors can be mitigated to attract foreign private financial institutions to participate in financing the investments.

The following risk factors are found to be crucial in the oil and gas investment considerations.

- Construction risks
- Performance risks
- Market risks
- Economic risks
- Environmental risks
- Political risks

The above risk factors are analyzed and mitigated below.

3.4 CONSTRUCTION RISKS

An inquiry into what is construction risk and how it is assessed reveals that, it is the risk encountered during the construction stage of the project and includes the following: delays, and cost overrun and in assessing construction risk, it is helpful to look at the

various stages of the project separately, since each may have a different risk profile and financing requirement. Oil and gas projects consist of three main phases: development, construction and operation.

In the development phase, risk is usually very high, and only equity capital from the main sponsors is generally used because it has low risk. During construction and start-up, risk is high and large volumes of finance are required, typically in a mixture of equity, senior debt, subordinated debt, and guarantees. In the operational phase, risk is generally low in capital markets with cheaper, less restrictive because outlook is less uncertain, and it may be possible to refinance with senior bank debt.

Table 3.1 Data on construction risk level.

	Level of risk expected by institutions (%)				
Type of construction risk	IFC	World Bank	MIGA	USAID	NIB (Ghana)
Delays	2	2	2	2	2
Cost overrun	2	2	3	2	2
Total	3%	4%	5%	4%	6%

Source: Field Data, May 2000

From the table, MIGA has the highest construction risk of 5% among the international financial agencies while NIB (Ghana) top all with 6%. World Bank and the USAID revealed equal risk of 4% each and IFC has 3% as the lowest further enquiry revealed that IFC's lowest construction risk is due to its private sector orientation and therefore needs to be sympathetic to construction risk which is typical of private sector organisation especially the infant industries in the developing economies.

Construction risk differs from performance risk in the sense that former deals with actual development of physical structures whiles the later deals with the level of commitment to contracts and actually undertaking them to meet agreed specification.

3.4.1 DELAYS: Why delay in project construction a risk

In the development phase, the sponsor assesses the project's scope, seeks any necessary regulatory and concessional approvals from the government authorities, and attempt to attract financing. Risks sometimes arise because of unclear and arbitrary

government processes, which cause long delays and may even lead sponsors to abandon an otherwise sound project. In the construction phase, the major risk is that construction will not be completed on time or will not meet the specifications set for the project.

An incomplete project is unlikely to be able to generate cash flows to support the repayment of obligations to investors and creditors. Long delays in construction may fail to reach completion for any of a number of reasons, ranging from technical design flaws to difficulties with sponsor management, financial problems or changes in government regulation.

3.4.2 How delay in project construction can be mitigated.

Table 3.2 Delay risk arrangement

PROJECT COMPLETION RISK TO LENDERS	RISK MITIGATION ARRANGEMENT
Delays	Turnkey contract; construction equipment supply contracts. Specify performance obligations with penalty clauses. Project agreement to oversee construction on behalf of lenders and minority investors. Obtain early regulatory environment approvals.
Cost Overruns	Include contingency and escalation amount in original cost estimates. Sponsor support completion certified.

It was found that project companies hedge construction risk primarily by using fixed-price, certain-date construction contracts including turnkey contracts, with built-in provisions for liquidated damages if the contractor fails to perform, and bonuses for better than expected performance.

Project companies also take out business start-up and other kinds of standard insurance, including a construction contingency in some excess capacity to allow for technical failures that may prevent the project from reaching the required capacity. Because lenders cannot control the construction process they seldom assume completion risk, which is usually the responsibility of the project company, its sponsors, constructors, equipment suppliers, and insurers.

3.4.3 COST OVERRUNS

How cost overrun affect project construction and how it is mitigated.

The most common threat to project completion is cost overruns. If costs significantly exceed the initial financing plan, they will affect the project's financial rate of return and, if they cannot be financed, may even lead those involved abandoning the project. In 10% of the International Finance Corporation supported energy projects reviewed for this study, project costs exceeded initial estimated and committed financing.

To ensure that unexpected costs do not jeopardize project completion, most creditors and minority investors insist on a commitment for standby financing as part of the initial financing package. The sponsor usually provides this through contractual agreements, which is called project fund agreement facility.

3.5 PERFORMANCE RISK

3.5.1 Performance risk analysis

Most oil and gas projects lasts ten years or more. During this time, significant changes undermine the project's viability, such as unavailability of project inputs, failure of technical performance, failure of management of the project, and volatile market demand for the projects output.

Performance risk is therefore the uncertainty that project undertakers due to the above named bottlenecks will not perform some aspects of the project. The data revealed that following.

Table 3.3 Data on performance risk level

Type of performance risk	Level of risks expected by institutions (%)				
	IFC	World Bank	MIGA	USAID	NIB (Ghana)
Sponsors commitment	4	4	4	4	6
Technology	1	1	1	1	1
Equipment performance	1	1	1	1	1
Input availability	1	1	1	1	1
Management performance	2	2	3	2	2
Labour performance	1	1	2	2	2
Total	10%	10%	12%	11%	14%

Source: Field data May 2000

Table 3.3 reveals that level of risks of performance by undertakers due to the bottlenecks the undertakers face. It is apparent from the table that MIGA is most pessimistic among the international financial institutions about performance risk with as far as 12%. The researcher is of the opinion that MIGA is an insurance organisation, and typical of all insurance organisations, they are skeptical of risk more than all other organizations. IFC and the World Bank seem to have the same pattern of risk. Their attitude towards performance is practically the same, for oil and gas project financing. This is because IFC is an affiliate organisation of the World Bank and follows the same policies.

NIB risk level seems not to have followed any of the other four organizations. This is because it is a local financial institution and therefore varies its attitude towards performance risk. It is important to state that NIB (Ghana) have this risk attitude in theory and not in practice as it is yet to finance an oil and gas project, probably a stake in the propose gas pipeline for West Africa. USAID, which has been involved in financing oil, and gas feasibility and exploration work, seems to be on the borderline for performance risk assessment. On average, attitude towards performance risk is between the higher levels of MIGA and the lower levels of IFC and the World Bank. This exhibits the level of experience it has in oil and gas project financing.

3.5.2 Performance risk mitigation

All the institutions have some level of uncertainty towards performance risk except that the uncertainties vary from one institution to another. However, the risk arrangement for these institutions remains the same. Table 3.4 illustrates the various mitigation arrangements to the lenders for the various performance risks.

Table 3.4 Performance risk arrangement

PROJECT PERFORMANCE RISK TO LENDERS	RISK MANAGEMENT ARRANGEMENT
Sponsors commitment	Strong, experienced sponsors with significant quality stake share retention agreement to the sponsors of the project.
Technology assurance	Prefer tried and tested technologies. New technology can be used in oil and gas projects provided the obligation to repay debt is supported by a guarantee of technological performance from the participant that owns or licenses the technology.
Equipment performance	Performance guarantee from equipment suppliers on quantity and quality. Operation agreement linking completion.
Input availability	Supply contracts specifying quality, quantity and pricing, match term of supply contract to term-off take commitment.
Management performance	Experienced management. Team performance incentives and penalties.
Skilled labour and operators performance	Training provided by equipment suppliers and technical advisors.

In oil and gas projects, sponsors attempt to pre-arrange long term purchase contracts of important inputs, for instance, raw materials or energy suppliers to limit the impact of price volatility. The project company will also ask its suppliers for performance guarantees on technical components and may sub-contract the project's operation and maintenance to a specialist company, with penalty payments if performance is not up to standard. Renewable contract tenure subject to satisfactory performance can be agreed with management team. Also successful performance incentives can be agreed upon while unsatisfactory penalties are pre-determined. Equipment supplies can be linked with training of operators by the suppliers. This will ensure proper handling of equipment. Supply contract of inputs specifying quality and quantity can be made with manufacturers of inputs, standard of performance of the inputs be agreed upon and penalties pre-determined for failure to deliver according to specification and on time.

Tried and tested technologies are preferred to newly developed technologies had proven to be more reliable. New technologies can be used only if it is supported by manufacturers guarantee of performance and assumption of liability resulting from the failure of the new technology.

3.6 MARKET RISK

3.6.1 Market risk analysis

Market risk is the uncertainty of demand for the oil and gas output to meet the supply available. Changes in the demand for project output have been the leading cause of revenue and profitability problems in oil and gas projects. Often the appraisal of market demand is overoptimistic, perhaps because the strength of new trends is not fully appreciated, and project never achieves the sales and revenue volumes projected.

Table 3.5 Data on market risk level

Type of market risk	Level of risks expected by institutions (%)				
	IFC	World Bank	MIGA	USAID	NIB (Ghana)
Demand potentials	2	2	3	2	2
Payment	2	2	4	2	2
Total market risk	4%	4%	7%	4%	4%

Source: Field data, May 2000

The table reveals very low level of market risk as compared with other risks discussed earlier. It is important to emphasis that no single country can operate without Oil and gas. High market demand exists and actual shortage is a common phenomenon for Oil and gas products in many economics both developed and developing. It is therefore not surprising to fin very low level of uncertainty in market demands and payment for them. Payment is definitely made except that is deferred into the future, which is a common feature of business in recent times. MIGA have a highest market risk of 7% whiles all other financial agencies have the same risk level of 4%.

Market risk is difficult to hedge against specifically, unless there is a single buyer or small group of buyers for the output. Signing a purchase or sales agreement with the price and quantity clearly specified with a seller or buyer is an excellent way of hedging product price risk to ensure the project will generate revenues.

Market risk mitigation

Table 3.6 Market risk arrangement

MARKET RISK	RISK MANAGEMENT ARRANGEMENT
Demand potentials	Undertake independence market assessment. Off take contract specifying minimum quantities and prices. Conservative financing structure support low-cost producers.
Payment risk	Sell output where possible to creditworthy buyers. If buyer not creditworthy, consider credit enhancements such as (1) government guarantees of contractual performance if buyer is state-owned; (2) direct assignment of part of the buyer's revenue stream; (3) escrow account covering several months' debt service.

Sponsors of oil and gas projects have used several mechanisms to mitigate market risk notably Power Purchase Agreement (PPA), off-take agreements, call and out options, and forward contracts.

A power purchase agreement (PPA) is a form of off-take agreement commonly used in power projects in emerging markets. The purchasing entity is frequently a government agency. A PPA specifies the power purchasing price or the method of arriving at it. Although the price may not be fixed explicitly in the agreement, as long as the variables determining the price are clearly spelled out, the sales agreement mitigates one important project risk. The researcher discovered that the PPA is the central contract, in that it is from the obligations set forth in this contract that the project generates revenues.

The sale of energy provides the revenues or cash flows to meet debt service, operating costs, maintenance, and return on investment. For this reason the creditworthiness of the purchaser is a key factor in assessing commercial risk.

The researcher realized that an oil and gas project must first be structured around the purchasers (market) that need the energy, their ability to fulfi1l payment obligations, and their demonstrated creditworthiness. If purchasers have anything less than an impeccable

history of debt servicing and management as it is frequently the case with state owned utilities, for instance Ghana's Tema Oil Refinery (TOR) loss of three trillion cedis over the years to year 2000, then, a counter-guarantee must be required. This additional layer of risk mitigation can be provided through a sovereign guarantee of the purchaser's obligations, multilateral support, or irrevocable letter of credit facility.

Sovereign guarantees are often needed to assure the project company that certain events within the government's control will not occur. There should be the assurance that project companies and investors will be compensated or relieved from the consequences of the events if the assurance is breached. Most of these events are likely to be political, legal, regulatory and financial risk categories.

Availability of government guarantees depend on the host government's commitment to the project, which depends on factors such as the size of the project, the energy supply and demand and the ability of the investors to finance the project without government guarantees.

For the multilateral support, the perception of the host government about the project and its financial commitment will determine the extent and nature of financial commitment and guarantee to be pledged by the multilateral agencies.
The irrevocable letters of credit from a credible international financial institution give some encouragement to the lenders and sponsors of the projects.

3.7 ECONOMIC RISK

3.7.1 Economic risk analysis

A project's financial sustainability through all phases of its life can also be affected by broader risks arising from the economic and policy environment, particularly interest rate and foreign exchange risk.

Table 3.7 Data on economic risk level

Type of economic risk	Level of risks expected by institutions (%)				
	IFC	World Bank	MIGA	USAID	NIB (Ghana)
Current availability	3	3	3	4	5
Interest rates	2	2	2	2	4
Exchange rates	2	2	2	2	4
Inflation	3	3	3	3	5
Total	10%	10%	10%	11%	18%

Source: Field data, May 2000

Table 3.7 reveals the level of uncertainty associated with the various components of economic risk and the total economic risk for institutions under study. These risks are practically macro-economic parameters which affect the economics vis-a-vis the projects being financed.

NIB (Ghana) has the highest economic risk of 18% followed by USAID with 11%. The rest of the institutions have 10% each. NIB (Ghana) is a local financial institution which is affected by the unfavourable local macroeconomic environment hence their economic risk is the highest among the selected institutions. Conversely the other four institutions are international agencies that operate with currencies that are comparatively stable, interest rates that are extremely low, exchange rates that are very negligent and inflation rates that affect business in a friendly manner. These, however, does not mean that provision should not be made for these risks. Provision has to be made for their occurrences.

3.7.2 Economic risk mitigation

Table 3.8 Economic risk arrangement

ECONOMIC RISK	RISK MANAGEMENT ARRANGEMENT
Funds/currency availability	Limit share of short-term financing to project. Long term finance to match project tenure. Stand-by financial facility.
Interest rates	Fixed rate financing, interest rate swaps.
Exchange rates	Match currency of project loans to project revenues, swaps and guarantees.
Inflation	Long-term supply contracts for energy and other important inputs; output prices indexed to local inflation.

3.7.3 CURRENCY RISK EVALUATION

The question as to how currency risk and its component parts affect oil and gas investments and how it should be managed is analyzed below.

Currency risk arises whenever foreign exchange funds, in the form of equity or debt is used to finance the project. Such risks are associated in part with foreign exchange convertibility and foreign exchange rate. Macroeconomic stability, the balance of payments situation and foreign exchange rate policy in the project country are important factors to consider in assessing currency risks. Foreign exchange risk can be a major concern particularly if the project generates revenue only in local currency. A shortage of local long-term funds caused by weak local financial markets often leaves project in developing countries with a large amount of foreign currency funding.

Data from Multilateral Insurance Guarantee Agency (MIGA) and International Finance Corporation (IFC) revealed that foreign currency financing covered 77 percent of total project costs of energy projects. Such levels expose a project to foreign exchange and interest rate risks. It came to light that it is for this reason that most large project schemes that can generate revenues largely in hard currency, or a linked to a hard currency, or are taking place in countries where private investors and creditors are confident that convertibility will be maintained.

The table above depicts the risk management arrangement that IFC and the USAID have at hand to resolve economic risk. MIGA on the other hand have reclassified currency risk mitigation into the following strategies:

- ***Mix local currency and foreign currency loans.***

Oil and gas projects involve some local costs. Overall currency risk can be reduced by covering this cost with local funding to the extent possible, mixing local and foreign funds so that the project does not rely excessively on foreign funds.

- ***Index output prices to the exchange rate.***

Indexing can be used to shield an oil and gas project from exchange rate risk. Although currency conversion still poses a risk, being able to link project charges to the exchange rate can help limit project currency risks. Indexing is often used in infrastructure projects, where revenues are mostly in local currency and project cycle is especially long. This arrangement is vulnerable to dramatic changes in the exchange rate as demonstrated in Ghana by linking the price of petroleum products with the exchange rate (dollar).

However, it leaves the governments unwilling to honour indexing if it would mean passing significant local price increases on to customers or consumers as done by the government of Ghana in the last quarter of the year 2000 and the first quarter of 2001.

- ***Obtain contingency sponsor support.***

In some countries, foreign exchange may be available at project start-up but may not be guaranteed in the future, foreign sponsors should be made to pledge contingency foreign currency support in various ways. In one of IFC energy financing in Asia, a foreign sponsor has committed itself to the purchase, in US dollars, of enough cement to provide the local project company with sufficient dollars to service IFC's dollar-denominated loan if the project company is unable to purchase enough convertible hard currency in the local market. In West Africa, where foreign currency is scare, foreign currency support from the foreign sponsor is inevitable.

- ***Establish an escrow account.***

Export of the output of oil and gas project earns convertible hard currency, these foreign earnings can be deposited in a special escrow account. For IFC and USAID supported projects, the deposit required at any given time is the minimum amount needed for debt service over the next six-month period. In projects with foreign currency revenues, an escrow account can also help the borrower avoid potential repatriation difficulties.

- ***Obtain government guarantee of foreign exchange availability.***

Guarantees of convertibility are not routinely available for projects in developing counties, especially West African countries but may obtained in certain situation where foreign

exchange may be needed to import production materials, repay project debt, or repatriate the profits and dividends of foreign shareholders. A government guarantee is one way for a project company to help ensure that foreign exchange remains available.

- ***Interest Rate Risk.***

Long term loans at floating or variable interest rates are the norm for project debt in international project financing. The average maturity of IFC's own loans to energy projects is 10 years; a majority of these (75%) are floating rate loans. The international interest rate environment can change dramatically during this maturity period. If interest rate is not properly hedged, financial projections based on initial rate assumptions can be significantly affected negatively. Project sponsors can use a variety of measures to mitigate against interest rate risk.

MIGA's interest rate risk mitigation strategies are as follow:

- ***Negotiate a fixed interest rate.***

Fixed rate debt removes one source of risk from a project. Although commercial banks relying on short-term funding sources are reluctant to lend at a fixed interest rates for a long period, they may be able to arrange a mix of floating and fixed rate funding which would reduce a project's interest rate risk.

Some fixed-rate financing is also available from multilateral and bilateral lenders. For instance, IFC provided a fixed rate loan of $40 million for a power project costing about $350 million. The sponsor requested this arrangement because ECA financing, the principal source of support, was at floating interest rates. In a few cases, a lender may actually prefer to lend at fixed rates. In another power project, the IFC B-loan included a fixed interest rate portion that came from an institutional investor whose liabilities were also fixed.

- ***Convert the interest rate.***

Oil and gas project sponsors can borrow at a floating interest rate to take advantage of a later expected fall in interest rats. IFC, as a matter of policy, allows borrowers to

effectively convert their IFC loans from floating to fixed interest rate by entering into interest rate swaps with borrowers. A borrower's new fixed rate is equal to the market's swap rate plus the borrower's spread over the fixed-rate plus a small conversion fee. This conversion feature have proved useful for a number of project sponsors, hence it can be adopted by oil and gas projects.

- ***Swap Interest rate.***

Interest rate swaps are becoming a more and more popular hedge for projects. Although such swaps are readily available in the international risk management market, most developing markets projects do not have the necessary credit standing to be accepted as a counterpart in the market, at least at project start-up. IFC is frequently able to bridge a project company and the International market with the floating to fixed rate conversion of IFC Loans. In addition, IFC may be able to provide swaps for the clients' non-IFC loans and to obtain longer-term interest rate swaps up to 15 years than a project company is likely to get from the international market directly.

3.8 ENVIRONMENTAL RISKS

3.8.1 Environmental risk analysis

- ***The Need for Environmental due diligence.***

The inclusion of environmental risk factors into the project appraisal process is not a new discipline. Aware of the devalued collateral of contaminated land and possible lender liability for clean up, most large commercial banks factor basic environmental issues such as legal compliance, contamination, and outstanding compensation claims into their due-diligence process when lending to industries.

Research data indicates that environmental, health and safety, and social issues can have a negative impact on operating cash flow, divert management attention from other priorities, or generate adversarial relationships with employees, regulatory agencies, or the local community. In this sense, environmental due diligence for oil and gas projects is very much centered on seeking assurance that day-to-day operations will run smoothly during project design, construction and operation.

Depending on the country in which it is located, the same project with the same environmental issues may be subject to different regulatory standards. The degree of compliance monitoring and enforcement of regulatory standards may also vary widely from country to country. Sound financing of oil and gas project needs to be based on understanding the context in which the project must operate and ensuring that the right mechanisms are incorporated into the loan documentation in order that applicable environmental standards of performance are met. Data collected revealed that, without such mechanisms, attempts to verify smooth day-to-day operations might prove problematic.

It is interesting to note that while these environmental factors motivate the World Bank, MIGA, IFC and USAID there is a different dimension to their approach to environmental due diligence in energy project finance. As international organizations whose missions are to promote sustainable private sector development, they examine whether each project is faithful to the missions. The scope of their due diligence include issues such as consultation with affected parties, development and implementation of resettlement action plans, and efforts to avoid degradation of natural habitats.

These issues may well go beyond the legal requirements of the project country, or the traditional project boundary ending at the property line of a project. IFC and the World Bank will have failed in its goal of sustainable development if it does not address impacts to people and the environment whether inside or outside the traditional project boundaries. Upfront consideration of these issues could add value to the project's long-term viability by reducing the risk that the project will get overtaken by changing political or regulatory agendas in the host country. Project developers and their financiers therefore have clear incentives to assess potential environmental and social risks to find ways to minimize their exposure and improve the long-term viability of the project.

- ***The process of environmental due diligence.***

Most international financial institutions environmental risk assessments focus on the potential impacts of project construction and operation against standards provided by applicable local law. But where regulatory standards are either non-existent or uncertain, well-accepted international standards may be substituted.

Table 3.9 Data on environmental risk level

Types of environmental risk	Level of risks expected by institutions				
	IFC	World Bank	MIGA	USAID	NIB (Ghana)
Natural habitant destruction	1.0	1.0	1.0	1.0	1.0
Child labour	0.5	0.5	0.5	0.5	0.5
Involuntary resettlement	1.0	1.0	1.0	1.0	1.0
Forest destruction	1.5	1.5	1.5	1.5	1.5
Dams pollution	0.5	0.5	0.5	0.5	0.5
Environmental pollution	1.5	1.5	2.5	1.5	1.5
Total environmental	6.0%	6.0%	7.0%	7.0%	6.0%

Source: Field data, May 2000

The above risk data shows that there is similar reaction to environmental risk by the financing institutions. The differences are practically insignificance. This is due to common environmental and social policies adopted at the United Nations, which all institutions must follow in their industrialisation pursuit. Furthermore, environmentalists such as the Green Peace are always on the look out for breach of environmental policies by companies. Financing agencies therefore ensure that oil and gas project sponsors and undertakers comply with all environmental policies as a fundamental conditionality for financing. Environmental risk is however, very difficult and expensive to monitor by financing agencies, hence provision have to be made for them.

3.8.2 Environmental risk mitigation

The World Bank environmental guidelines are often used as the benchmark to measure environmental performance, as they represent widely accepted international standards. IFC, example, appraises each project to ascertain whether it could meet the applicable World Bank environmental guidelines. Furthermore, IFC gives consideration to whether the project could be implemented in accordance with its own environmental and social policies.

Table 3.10 IFC's environmental and social policies

POLICY	DESCRIPTION
Environmental Assessment	All IFC projects are assessed to ensure they are environmentally and socially sound and sustainable. This may include environmental impact assessments and an environmental action plan. Public consultation And disclosure may be required.
Natural Habitants	Promote and support all natural habitant conservation and improved land use, as well as the protection, maintenance, and rehabilitation of natural habitants and their functions. Views of affected stakeholders are considered in project design and implementation.
Harmful child labour and forced labour	It avoids the employment of children that is economically exploitative, or hazardous to, or interfere with the child's education, or to be harmful to the child's health, or physical, mental, spiritual, moral or social development.
Involuntary Resettlement	Minimise economic and physical displacement, provide, restore their former living standards, earning capacity and production levels, compensate at full market value for land and other assets affected by the project, and to involve resettles in resettlement activities..
Forestry	Reduce deforestation, enhance environmental contribution of forested areas, reduce poverty, and enhance economic development.
Safety of dams	Set out requirements for safety of dams, which must be designed by competent and experienced professionals. Reviews by a panel of independent experts, detailed plans, and periodic safety inspections of dams.

While both the IFC and the World Bank guidelines are in harmony, IFC policies are more closely aligned to the private sector participation in the oil and gas industry.

The above environmental and social policies of IFC ensure that the environment is not degraded by oil and gas projects. Importantly, it considers forestry, resettlement of affected people, water pollution and wildlife protection. These give a clearer guidance to its clients.

It can be concluded here that both the World Bank environmental guidelines and IFC environmental and social policies provide a framework for addressing broad, cross-sectoral development issues.

Data from IFC, the World Bank and MIGA indicates that project developers and other stakeholder's incorporate environmental issues in the project design stage. This approach factors the capital cost associated with the environmental upgrades into the financial appraisal of the project, and the risks of environmentalist actions affecting cash flow later in the project's life are minimized.

It was revealed that early efforts to establish and promote a transparent relationship and meaningful dialogue with affected people and communities frequently bring benefits of good community relationship and operation without disruptions. To this end, IFC and the World Bank required disclosure of key project information including environmental assessment reports and social reports, such as resettlement action plans. It is important to note that disclosure of information to local stakeholders and public consultation enhances the project ability to coexist with the surrounding community and to contribute to this social development.

Once the environmental and social risks associated with a project are identified, the risk must be allocated to the parties best suited to bear them. In the world of complex projects, with complex environmental and social impacts spilling over the traditional project boundary and into a wider area of influence, risk allocation becomes a difficult task, sometimes the parties capable of addressing such risks, such as the host government, remain outside the traditional contractual relationships between the financiers and the sponsor of the project. In these cases, IFC attempts to draw parties outside the project boundary to a multiparty discussion in an attempt to broker mitigation and management measures that are acceptable to all parties concerned. With its relationship with the host government and close ties with the World Bank and MIGA, IFC often delivers unique solution, to complex environmental and social problems.

3.9 POLITICAL RISKS

3.9.1 Political risk analysis and mitigation

One of the challenges passed by oil and gas projects in emerging markets lies in assessing and managing political risks over the long life that most projects have. Political risk arises from the fact that some unforeseen political events may change the project's prospects for profitability. This might be an act of government, for instance a change in a law, regulation, or administrative decision, or general instability in the political or social system as a result of war, strike or frequent changes in government.

Political risk insurance, the main way of directly protecting against potential political risks, is provided by Export Credit Agency (ECA) and MIGA. Although risk insurance and guarantees are available in private markets, the government backing of multilateral and bilateral agencies enables them to absorb risk not acceptable to private insurers or guarantors.

By far the largest of the multilateral agency programmes offered is by MIGA. Established in 1988 with capital of $1 billion, MIGA's role is to fill the gaps in political risk coverage for foreign investment in developing markets. MIGA's political risk guarantees cover primarily equity and related debt investments including shareholder loans and loan guarantees, as well as technical assistance and management contracts. MIGA generally insure investments in new energy projects, modernization, privatization or financial restructuring of existing oil and gas projects. The risks covered are expropriation, war and civil disturbance, currency transfer, and breach of contract, provided the claimant is denied appropriate judicial or arbitration relief. MIGA also has developed a Cooperative Underwriting Programme (CUP), under which it issues a contract for the entire amount of insurance requested by an investor but retains only a portion of the exposure for its own account, with the remainder underwritten by private insurers.

Through MIGA's guarantee programme, an investor in oil and gas contemplating investment in a MIGA member developing country can obtain long-term insurance coverage against specified political risks, which may arise in connection with the investment. The basic insured risks include:

- ***Currency Transfer:***

Protects against losses arising from the investor's ability to convert local currency returns (profits, principal, interest, royalties, capital and other remittance), into foreign exchange for transfer outside the host country. Currency transfer coverage insures against excessive delays in acquiring foreign exchange caused by host government action or failure to act, by adverse changes in exchange control laws or regulations, and by deterioration in conditions governing the conversion and transfer of local currency.

- ***Expropriation:***

Protects against partial or total loss of the insured investment as a result of acts by the host government, which may reduce or eliminate ownership of control over, or rights to the insured investment. In addition to outright nationalization and confiscation, expropriatory effect is also covered.

- ***War and Civil Disturbance:***

Protects against losses from damages to, or the destruction or disappearance of, tangible assets caused by politically motivated acts of war or civil disturbance in the host country, including revolution insurrection, coup d'tat, sabotage and terrorism. War and civil disturbance coverage also extends to such events that for a period of one year, result in an interruption of project operations essential to overall financial viability. The business interruption feature is effective when the investment is considered a total loss.

Table 3.11 Data on political risk level

Type of political risk	Level of risks expected by institutions (%)				
	IFC	World Bank	MIGA	USAID	NIB (Gh)
Currency transfer	2	2	2	2	1
Expropriation	3	3	3	3	2
War & civil disturbance	4	4	5	4	4
Total political risk	9%	9%	10%	9%	7%

Source: Field data, May 2000

Although political risk arises from several sources such as those discussed in the literature review (chapter 3), the study narrow down the risk mitigation to currency

transfer, expropriation of profit and war and civil disturbance by the community affected by the oil and gas facility. The risk numbers in the above table indicate that MIGA is so concerned about political risk with the highest risk factor of 10%. This means that MIGA insures up to 90% of loans and loans guarantees taken up, with the investor left with the 10% risk uninsured NIB (Ghana) has the lowest risk factor of 7% due to its local orientation and scope of operation.

For each risk category, MIGA insure equity investments for up to 90 percent of the investment contribution, plus an additional amount of up to 180 percent to cover earnings attributable to the investment.

For loans and loan guarantees, MIGA insure up to 90 percent if the principal as well as interest that will accrue over the term of the loan. For technical assistance contracts and similar agreements, MIGA insures up to 90 percent of the total value of payments due under the agreement. Regardless of the nature of the project the investor is required to remain at risk for at least 10 percent of any loss.

Although MIGA only insure new investments, it is not limited to new projects. The agency also considers application for coverage of new investments applied to the expansion, modernization or privatization of existing oil and gas projects. For any new investment, the investor must file an application for MIGA coverage before actually making or committing to make, the investment.

3.11 BENEFITS OF MIGA POLITICAL RISK INSURANCE

As to whether MIGA's political risk insurance benefits stakeholders in an oil and gas project investments revealed the following issues

Foremost amount them is a certain peace of mind. By purchasing insurance an investor exchanges the uncertainty of financial loss arising from the insured hazard for a certain cost in the form of insurance premium.

MIGA investment insurance not only provides the benefit of financial compensation, but some additional valuable services to both the investor and the host country of oil and gas projects. Through the risk transfer process, MIGA's coverage's encourage and facilitate productive private investment that contributes to the economic development of its member countries. With the pervasive negative image of Africa as a hostile business environment, MIGA's ability to ameliorate fears about political risks can be critical to many investor project decisions, especially oil and gas investments. An additional benefit to oil and gas investors is inherent in MIGA's multinational ownership.

MIGA has the ability to act as an honest broker in the early stages of an investment disagreement between an investor and a host government. MIGA's positive relationship with both the contending parties of an investment disagreement will hopefully contribute to its reconciliation rather then its escalation into a more serious dispute or claims situation.

The availability of MIGA investment insurance gives a skilled financial engineer assembling a non-recourse finance package a remarkably flexible instrument, which can be wielded, in a variety of fashions.

For instance:

- MIGA coverage of oil and gas investor's equity investment can be used to bring in a necessary, but somewhat reluctant partner, who is concerned about political risks;

- MIGA is uniquely capable of covering, with a standard policy, a group of equity investor who come from multiple countries. This avoids conflicting policy language or 'gaps' in coverage under different policies;

- MIGA covers shareholder loans to the project or parent company loan guarantees;

- MIGA covers bank loans to projects, provided that some equity in the project is also concurrently insured;

- MIGA also covers other forms of investment, including technical assistance and management contracts, and franchising and licensing agreements;

- Finally, MIGA has broad flexibility under its convention to write other forms of political risk coverage, on a case by case basis, to suit an investor's needs, this is particularly important and valuable to investors in the oil and gas projects.

3.10 Expected Aggregate Risk Profile and Returns on Investments.

Putting the expected risk data collected from the field of all the areas concerned together, we can generate an expected risk profile of the international financial agencies as follows:

Table 3.12 Data on aggregate risk factor and returns

	IFC	World Bank	MIGA	USAID	NIB (Ghana)
	%	%	%	%	%
Construction risk	3	4	5	4	6
Performance risk	10	10	12	11	14
Market risk	4	4	7	4	4
Economic risk	10	10	10	11	18
Environmental risk	6	6	7	6	6
Political risk	9	9	10	9	7
Other risks	2	2	2	2	2
Aggregate risk factor	44%	45%	53%	46%	57%
Expected return	60%	60%	70%	55%	75%
Margin of safety of returns over risks	16%	15%	17%	9%	18%

It can be seen form the above table that expected returns exceed the aggregate risk factors for the various agencies. The point to not is that, it is economically unsound to invest in a project that have expected return exceeded by aggregate risk factor, such that all oil and gas projects must have their expected returns higher than their aggregate risk factors for the financing to take place. This is evident in the analysis above where there is a margin of safety, which is the difference between the expected return and the aggregate risk factor for all financing agencies. The wider the margin of safety the higher the probability of the financier to invest in the project. This means that NIB (Ghana) will be more willing to invest its resources in an oil and gas projects than USAID. It is important to state that the absolute risk and return figures do not matter so much but the spread

between the risk and return numbers profile theory can be used to estimate the level of risk from the expected returns by the agencies. The questionnaire revealed the following figures.

IFC

Probability	Returns (%)
0.4	15
0.4	45
0.2	75

World Bank

Probability	Returns (%)
0.4	20
0.4	25
0.2	60

MIGA

Probability	Returns (%)
0.4	20
0.4	25
0.2	75

World Bank

Probability	Returns (%)
0.4	18
0.4	30
0.2	72

NIB (Ghana)

Probability	Returns (%)
0.4	20
0.4	30
0.2	65

Using the risk–return equation, we can derive the expected return and risk factor (standard deviation) from the above data.

IFC

p	x	px	$x-\bar{x}$	$p(x-\bar{x})^2$
0.4	15	6	(24)	230.4
0.4	45	18	6	14.4
0.2	75	15	36	259.2
		$\bar{x}$ = 39	variance =	504.0

Risk = standard deviation = 22.45%.

Expected return = 39% with a risk factor of 22.45%.

World Bank

p	x	px	$\bar{x}$	$p(x-\bar{x})^2$
0.4	20	8	(10)	40
0.4	25	10	(5)	10
0.2	60	12	30	180
		$\bar{x}$ = 30	variance =	230

Risk = standard deviation = 15.17%.

Expected return = 30% with a risk factor of 15.17%.

MIGA

p	x	px	$\bar{x}$	$p(x-\bar{x})^2$
0.4	20	8	(13)	67.6
0.4	25	10	(8)	25.6
0.2	75	15	42	352.8
		x = 33	variance =	446.0

Risk = standard deviation = 21.19%.

Expected return = 33% with a risk factor of 21.1%.

USAID

p	x	px	$\bar{x}$	$p(x-\bar{x})^2$
0.4	18	7.2	(15.6)	97.344
0.4	30	12.0	(3.6)	5.184
0.2	72	14.4	38.4	94.912
		x =33.6	variance =	397.440

Risk = standard deviation = 19.94%.

Expected return = 33.6% with a risk factor of 19.94%.

NIB (Ghana)

p	x	px	$\bar{x}$	$p(x-\bar{x})^2$
0.4	20	8	(13)	67.6
0.4	30	12	(3)	3.6
0.2	65	13	32	204.8
		x = 33	variance =	276.0

Risk = standard deviation = 16.6%.

Expected return = 33% with a risk factor of 16.6%.

The above financial figures manipulations revealed that no investor or sponsor will have anything to do with the project that have its risk (standard deviation) higher or equal to the expected returns. All the agencies have returns on their investments higher than the risk factor. However, it is the difference between the expected returns and the risk that is taken into account in making investment decision. This means that the risk factor can be high but if the expected return is proportionately higher, then the project can be considered for investment.

Summary of portfolio theory figures

Table 3.13 Data on spread determination

	IFC	World Bank	MIGA	USAID	NIB (Ghana)
	%	%	%	%	%
Expected returns	39.00	30.00	33.00	33.60	33.00
Risk factors	22.45	15.17	21.19	19.94	16.60
Spread	6.55	14.83	11.81	13.40	16.40

It can be seen from the table that the spread determined using portfolio theory is similar to the spread derived from the empirical data in table 3.13 above. This emphasized the fact that irrespective of the method used to analyze risk, the result will not be different, except that the same figures will not be arrived at, the variances in figures will be purely due to data collection errors.

Table 3.14 PROPOSED RISK MITIGATION MATRIX

RISK MITIGATION ANALYSIS

RISK	REASON	REMEDY	CONSEQUENCES FOR THE LENDER	CONSEQUENCES FOR THE INVESTORS
CONSTRUCTION PERIOD				
Cost Overrun	Insured event	Proceeds of insurance policy including business interruption insurance	Draw on standby finance if insurance policy exhausted. Debt cover factors reduced if standby debt used	Return eroded by servicing of standby finance
	Uninsured force majeure	Draw on standby finance	Debt cover factors reduced if standby debt used	Return eroded by servicing of standby finance
	Ground conditions	Draw on standby finance		Return eroded by servicing of standby finance
	Owner variations orders	Draw on standby finance and limit scope of variations by owner	Debt cover factors reduced if standby debt used	Return eroded by serving of standby finance
	Changes of law, delays in obtaining approvals or permit	Standby finance drawn pending tariff adjustment	Debt cover factors reduced if standby debt used	Return might be reduced because of timing effects
Delays in completion	Within construction consortium control	Penalties on a daily basis, sufficient to cover interest due to lenders and fixed operating cost	Debt cover factors reduced if standby debt drawn	No effect, except loss of opportunity to earn bonuses, unless penalty fully spent
	Insured force majeure	Process from business interruption insurance policy	Standby finance drawn if insurance policy exhausted, debt cover factors reduced if standby debt finance used	To extent ability to pay dividend is postponed, return eroded

Failure of plant to meet performance specification at completion	Capacity shortfall	Penalties payable by construction consortium supplemented insurance	No effect	Return reduced if penalties from construction consortium exhausted
	Heat rate shortfalls	Penalties from construction consortium	Debt cover factors reduced if construction consortium fails to remedy defect	Return reduced by cost of addition residual fuel oil less penalties receipts
Operating costs overrun	Costs exceed original estimates not insured or force majeure event	Standby finance drawn	Debt cover factors slightly reduced depending on timing effects	Return reduced by serving of standby finance
	Insurance costs exceed original estimates	Standby finance drawn pending tariff adjustment	Debt cover factors slightly reduced depending on timing effect	No effect
Increased financing costs	Interest rate increase	Standby finance drawn pending tariff reopened	Debt cover factors slightly reduced depending on timing effect	No effect
	Adverse exchange rate change	Standby finance drawn pending tariff reopened	Debt cover factors slightly reduced depending on timing effect	No effect
Government	Minor changes in tax, law, customs, legal requirements environmental standards	Tariff adjustment, if during construction period, standby finance drawn	Standby finance could be required.	No effect on debt service factor
	Expropriation, nationalisation, consents withdrawn interference causing severe prejudice	Owner entitled to terminates as government defaults	If owner terminates loan repayment	If government defaults and owner terminates, compensation paid for termination
	Fundamental breach by government	Owner entitled to terminates as government defaults	If owner terminates, loan repayment	If government defaults and owner terminates, compensation paid for termination

OPERATION PERIOD				
Operating costs overrun	As a result of changes in regulations	Tariff adjustment	No effect	No effect
	At owner's request	No adjustment to tariff	Debt cover factors reduced	Return reduced
	As a result of failure by the operator	No adjustment to tariff, penalties payable by the operator	Debt cover factors reduced if penalties exhausted	Return reduced if penalties exhausted
	Inflation, adverse changes in cost of finance, exchange rate interest rate	Tariff adjusted by indices. Small possibility that movements in indices do not exactly match changes in actual costs	Debt cover factors could be reduced or increase	Possibility of erosion or increase in return
	Foreign exchange/ non convertibility	Government guarantees available foreign exchange. If government defaults, owner can terminates	Loan repaid or assumed as compensated	No effect except loss of opportunity to earn bonuses if government paid under guarantee. If government defaults under guarantee, then owner terminates and compensation paid for termination
Demand fall	Failure of purchaser of energy to perform obligation	Government guarantee demand. Government defaults under guarantee, then owner can terminate	No effect if government pays under guarantee. If government defaults under guarantee and owner terminates, loan repaid	No effect except loss of opportunity to earn bonuses if government paid under guarantee. If government defaults under guarantee, then owner terminates and compensation paid for termination
Temporal energy shortfall	Owner fault	Penalties payable by owner	If penalties completely erode shareholders return fall	Any penalty paid will erode return for investors
Increase fuel costs	Increase in price of energy for operation	Tariff adjustment	No effect	No effect

Failure of operator to perform obligation	Operator 'breach of operations and maintenance agreement	Penalties payable by the operator	Debt cover factors reduced if the operator's penalties exhausted and standby debt finance used up	Return reduced
Environmental incidents caused by operator	Operator 'breach of operations and maintenance agreement	Indemnity from the operator	Debt cover factors reduced if the operator's penalties exhausted and standby debt finance used up	Return reduced

CHAPTER FOUR

SECURITY PACKAGES ANALYSIS FOR LENDERS AND INVESTORS

4.1 OBJECTIVE

The second objective of this study is to examine the security packages financial institutions use to secure oil and gas investments from high risks and propose ways to strengthen these security packages for West African oil and gas investments. This, it is believed will encourage private financial institutions to participate in the financing of these projects.

This chapter examines the security packages available for lenders and investors in oil and gas projects. A security package (SP) for oil and gas projects is established through the various contractual arrangements, and comprises the key agreements, contracts, and government undertakings. These seek to reduce lenders' and investors' risk by establishing legally binding obligations, financial structures, and operational procedures.

Before loan fund can be disbursed, the lenders will wish to be satisfied that all main agreements meet their requirements and have been executed. Lenders may want legal opinions, independent engineering reports, and copies of government approvals. In addition, they will want to confirm that the parties to each agreement are creditworthy and capable of performing under the terms of their respective contracts. Lenders therefore look to the SP to provide security for the loan, and in the event of a breach of the agreements they may seek the right to take over the company and install their own managers within the framework of the agreements.

It therefore implies that the quality of the security package is particularly important to passive investors, who normally provide much of the financing but do not have the capacity to bear significant operating risks. Once their money is disbursed, they usually have little control over the project. It can be agreed that if the type and quality of security available are strong, the project becomes creditworthier, and a greater share of project costs can be funded through borrowings.

The main agreements that contain the security packages according to the World Bank and USAID documentation and working papers are:

- Implementation Agreement
- Energy Purchase Agreement
- Land Conveyance Agreement
- Ownership Structure Agreement
- Supply Agreements
- Construction Contract
- Operations and Maintenance Agreement

4.2 IMPLEMENTATION AGREEMENT

The major problem with project in West Africa is the implementation process. The question is whether there is any implementation agreement and how committed are the parties to the agreement

For a secured commitment, the World Bank and the USAID ensures that there is an implementation agreement between the project company and the government agencies that have the authority to provide the guarantees, assurances, and support necessary for energy power development and oil development. The implementation agreement (IA) may contain a variety of commitments, inducements, and guarantees that can be given only by the recognized governmental authority.

As to the content of the list of commitments, the World Bank and USAID put forward the following:

Government Commitments

- Authorization to do business in the country is a basic provision that recognizes and authorizes the project company to implement an energy generating facility.

- Authorization to generate, transmits, and distributes energy.

- Authority to obtain permits allows Project Company to secure construction permits, operating permits, if in compliance with related laws and regulations.

- Guarantee of performance of Project Company, fuel supplier, or other public sector entity that are party to the implementation and operation of the project. This means that the government, via a sovereign guarantee compensates the project company for failure of one or more of the public sectors entities to perform per agreements.

- Currency protection to the energy supplier for a variety of currency issues; including convertibility, availability of foreign exchange, devaluation and repatriation.

- Tax and duty incentives lowering tax rates exemption from tax and duty obligation.

- Legislative protection against changes in the law and regulations, which would adversely affect or potentially affect the participants in the project.

- Financial protection against certain force majeure events such as war insurrection, and general strikes.

- Work permit authorizing import and use of specified foreign work force.

Oil and Gas Provider Commitments

- Comply with laws and regulations;

- Undertake project development;

- Obtain project financing and achieve financial close within specified parameters including time;

- Describes form of company, ownership registration, terms of ownership;

- Project insurance to be obtained.

Mutual Obligation/Commitments

- Termination defines under what conditions one party or the other can terminate the implementation agreement and recourse should termination occur.

- Penalties define type, form, value of penalties imposed should a party fail to perform;

- Governing law and arbitration;

- The government and Project Company will mutually secure the other party against loss and damage arising from the performance of contractual obligations within certain limitation.

It is clear that a typical implementation agreement covers issues ranging from authorization to do business to granting of certain tax benefits or exemptions from customs duty. If government policy has not been established in areas that could affect the project company, lenders will require that government make appropriate commitments.

Often, the IA should contain terms and conditions necessary to ensure the effectiveness of other key project agreements such as Energy Purchase Agreement (EPA). In effect, the IA seeks to guarantee the performance of government entities involved in the project.

All of these agreements have interlocking terms and conditions and need to be supported by the IA, since lenders are particularly concerned about government actions that might jeopardize their loans or investments. Moreover, in projects with long payback periods, this concern is compounded in host countries that lack a record of strong support for political regulatory, economical, and financial reforms.

It is important to indicate that in a country where the legal, institutional, political, and regulatory environment is conducive to private energy development, the IA may be relatively simple and straightforward.

Moreover, if the public sector were not a party directly involved in the obligations to private energy developers, an IA would not be required. However, in such a case the risks that would have been transferred to the public sector must be shared, in some form, between the private producer and the purchaser. Even if the government purchases a portion of the power generated, a well-structured project with the private sector as a purchaser may not require an IA.

4.3 ENERGY PURCHASE AGREEMENT

There is the risk and uncertainty that energy produced will not be purchased and also, that demand will not be met. The question thus arises whether there is an agreement relating to supply, demand, pricing, penalties and bonuses.

The Energy purchase agreement (EPA) establishes the energy sales obligations between the producer and the purchaser and identifies the type of transaction, for instance, BOST. This agreement commits the producer to specified conditions, (for example, maximum output, kilowatt hours) over a defined period and commits the purchaser to compensate the producer by an established amount and tariff rates whenever the facility is available and capable of generating energy.

Because the EPA provides the revenue stream for repayment of debt and return to investors, it is important to the lender. Consequently the terms and conditions of this agreement will be heavily influenced by the lender's desire to enhance potential revenue and minimize risk. In this case, the risk to be avoided is the reduction or termination of the revenue stream, regardless of the cause. The greater the real or perceived risk to the oil and gas producer, the higher the price the producer can expect to pay.

In reality, the producer can reduce or even terminate the revenue stream under some conditions. For example, if the purchase has fulfilled all obligations and oil or gas is not being provided, the purchase has the right to decrease or suspend payment until the situation is remedied. However, depending on the insurance carried by the producer, debt service may be maintained for some period. The EPA should therefore provides for the

producer to compensate the purchaser should production cease or fall below a specified level agreed in the EPA.

The task of establishing specific performance guarantees, future adjustments to the tariff, and penalties or bonuses for exceeding or failing to meet performance guarantees are the heart of the EPA and usually require lengthy discussions. These discussions should include the purchaser, producer, and lending institutions but also the construction contractor, equipment supplier and operations and maintenance organizations. Each participant which activity affects the facility's performance should provide an acceptable undertaking with respect to its respective obligations.

For example, the construction contractor may offer a turnkey project. The price and construction period effect will be fixed and constructor's performance guaranteed. Each of these items affects the cost of production and the purchase price. Even though the producer may have obtained certain preliminary commitments and guarantees from the contractor modifications should be required based on negotiations between the producer and the purchaser.

4.4 LAND CONVEYANCE AGREEMENT

The land tenure problem in Africa is aggravated when it comes to oil and gas project development. A case in point is the Ogoni lands in the Niger Delta of Nigeria. The question is whether there is an agreement and measures put in place to forestall the risk of local people blocking the development and operation of the project.

The land conveyance agreement (LCA) transfers land ownership to the project company, which purchases the land or executes a long-term lease. The LCA covers the land required for the plant and those required for the pipelines.

Land use must be exclusive to project purposes and must be assignable to the lenders so that they can take over the facility in case of default by the producer. The LCA term

commences no later than the start of construction, and the duration should be at least commensurate with the term of the EPA.

The LCA generally divides the responsibilities for the installation of water, sewer, gas, electricity services, fuel transmission and fuel storage. Existing or newly required covenants, easements, or other restriction are identified, along with the responsibility to conform to applicable zoning laws, buildings codes, regulations, and other requirements. In addition, the parameters and procedures for access to the site by personnel other than the project owner and operator are agreed upon.

The LCA also identifies the party responsible for payment of government charges or taxes levied on the site, equipment, structures or other personal property. Responsibilities for existing and future conditions at the site such as suitability of soil conditions, environmental contamination, are agreed upon in the LCA. Finally, arrangements for disposition at the termination of the LCA, of the land, energy generation facilities, and other related constructions are specified.

4.5 OWNERSHIP STRUCTURE AND AGREEMENTS

The ownership structure should be a limited liability company with equity and debt finance. The question is what ownership structure is commendable and what are its obligation and consequences.

Ownership agreements describe the structure and obligations among the owners comprising an entity, often referred to as the project company. This company is separate from its sponsor so that liability and risk to the project are limited. Project ownership can be structured in a number of ways, depending on host-and home country tax laws, customs duties, and liability environments.

In a typical project finance structure, the entity formed by the ownership agreement is the central point to which all project documents connect and is where the ultimate recourse to the lenders and other parties lies. Consequently, the entity is limited in all matters relating to its business and is referred to as a single purpose.

The project company is obliged to cause all other parties to perform under the project agreement, limit other parties' indebtedness and investments, and furnish documentation required by the company or lenders.

Similarly, the operational limitations imposed on the company; on its financial, tax and liability structure; and on its ability to continue its obligations under the project documents are designed to protect assets from the actions of any of the project parties.

Equity investment in a project can be protected using appropriate all-risk, machinery breakdown, general liability, and political insurance in the market. All risk and machinery breakdown coverage should be slightly more than the value of the asset to account for legal and other indirect expensed related to the adjustment of a claim.

Political risk insurance usually covers less than the full value of assets to provide a parallel incentive for project parties to prevent insurable events and commit to their resolution.

The unique advantages of a project finance structure are not without substantial risk in allocation and mitigation, all of which are embodies in the structure and obligations of the project company to protect the assets and the resulting cash flows.

4.6 FUEL SUPPLY AND TRANSPORTATION AGREEMENT

Energy conveyance is expensive in recent times and failure to deliver on time could bring a whole nation to standstill. The question is how this can be dealt with

Investors and lenders will require firm and reliable long-term fuel supply and transportation agreements before financing is provided and construction commences. They also will request evidence of the existence and dedication of fuel reserves sufficient to meet the project's needs for the duration of the contract.

If the supplier or transporter is government entities, additional sovereign guarantees of their obligations may be required.

Table 4.1 Key provision of fuel supply agreement

Delivery	Supplier must guarantee fuel availability. If delivery delays result in noncompliance in providing energy, the supplier must pay penalties to cover lost revenues and / or the price difference of substitute fuel.
Take	Supplier and purchaser must agree on the amount of fuel to be purchased and determine whose responsibility it is to redirect fuel if the purchaser's need is reduced.
Price	Because of the purchaser's limited risk-bearing abilities, fuel price increases are passed to the purchasers in the energy component of the EPA tariff. Long-term supply contracts include a pre-specified indexation principal to regulate periodic price adjustment to reflect changes in supplier cost.
Quality	Change in fuel quality could cause substantial losses to the purchaser because of early degradation of equipment, outages, or reduced performance. Therefore, it is paramount to have a guaranteed fuel quality, heat rate etc. enforceable by penalties for noncompliance.
Transportation	Transportation availability and cost must be agreed on.

4.7 CONSTRUCTION CONTRACT AGREEMENT

The risk of sub-standard design and poor construction are high and expensive in oil and gas project development. The question is what measures are put in place to forestall this problem

The project company usually enters into a contract with a reputable contractor for design, equipment procurement, and construction in accordance with the energy supply requirements of the EPA. This is usually written as a turnkey contract for complete supply, erection and commissioning. The turnkey contract provides a single source for all responsibilities and guarantees associated with plant performance, project schedule, plant warranty and project completion. Depending on the financing arrangements, schedule, and technical specifications, larger projects may require a construction consortium or award of a number of separate contracts with contractors and equipment suppliers.

The terms, conditions, and obligations of the construction contract support those contained in the EPA unless the project company has other means to limit risk. Consequently, although discursions between the project company and the construction contractor establish cost schedule, performance, and other standards and criteria the construction contract cannot be finalized until after the EPA has been negotiated.

The construction contractor should try to limit risk by obtaining favourable terms and passing along as much risk as possible to material and equipment suppliers and subcontractors. Generally, for a project to be finance, the construction contractor will need a fixed – price contract with a specified completion date and a guarantee of performance. Failure of the contractor to meet obligations results in substantial financial penalties.

4.8 OPERATIONS AND MAINTENANCE AGREEMENT

For a long-term project of oil and gas nature, there will be the need for a permanent maintenance and operations contractor.

The project company may choose to enter into an operations and maintenance (O & M) agreement with a reputable operations and maintenance contractor to run and maintain the facility. This arrangement has the advantages of a single responsibility of professional personnel and experience with required spare parts and consumables. Because of the importance of operations management and maintenance practices to the long-term performance of the facility, the energy purchaser also has a keen interest in the ability of the O & M contractor. Reserving in the EPA a right to approve the contractor may protect that interest.

Whether the O & M contractor is affiliated with the developer or Project Company, the agreement should:

- Reflect the obligations of the developer under the IA and EPA
- Specify price components tied to the tariff under the EPA and provide an explanation and adequate information for future adjustments.
- Be specific in regard to spare parts and consumables, responsibilities and requirements.

- Establish commitments necessary to commission and operate the plant.
- Address future improvements and additions.
- Provide for operations during emergencies.
- Specify that operations and maintenance will be consistent with the standards set forth in the PPA. In the event of failure to do so, the O & M contractor will be required to pay damages sufficient to cover a percentage of the liquidated damages assessed under the EPA.
- Establish standards for plant availability, heat rate, and performance efficiency.
- Establish requirements for maintenance, outage management, and necessary equipment overhaul.
- Clarify whether a performance bond should guarantee the O & M contractor's performance or whether a corporate guarantee is sufficient.
- Reflect lines of communications with the energy purchaser for plant dispatch and operation.

4.9 STRENGTHENING PROJECT SECURITY PACKAGES

4.9.1 INTRODUCTION

The first step to encouraging the lender and the investor of oil and gas investment is to ensure clear contractual arrangements between all parties involved in the project performance, which serve as a memorandum of understanding. Technically, the security packages are merely contractual agreements and assurances provided by the various parties involved in the project to mitigate risk.

The second step is to strengthen the security packages provided in the framework of agreements so that the project becomes creditworthier, and a greeter's hare of project cost can be funded through borrowings if the type and quality of security packages available are strong and attractive to the lender.

The above analysis of security packages and agreements are healthy for the survival of an oil and gas investments. But these security packages alone hardly work. In the opinion of the researcher, there, is the need for these security packages to be strengthened for then to work effectively. It is believed that the strengthening of these packages will

reduce the political, commercial and force majeure risks associated with oil and gas investments and encourage financial institutes to put their funds at the disposal of the sponsor.

There are several ways to strengthen the security packages of oil and gas projects, which make these investments not only attractive but also less risky. These are presented and analyses below.

4.9.2 SECURING OIL AND GAS PROJECT ASSETS

Oil and gas Project debt is should be secured by a first mortgage lien on project assets, as well as the direct assignment to lenders of the project's right to receive payments under various contracts, such as purchase and sale contract or a financial support agreement. Security could also include covenants restricting the project company's scope of activity to protect creditors' interests, for instance, by limiting their ability to pay dividends to equity investors, or their ability to expand the project without permission.

Data from IFC revealed that, about 67% of all IFC loans are secured by a mortgage on the project assets. The value of this mortgage depends, however, on the nature of the project and the project's financial structure. For an oil and gas project, the value of the mortgaged land, plant, and equipment can generally secure a substantial amount of the project loan. In general creditors try to assure themselves that the expected realizable value of the assets secured by a mortgage comfortably exceed their loans.

In practice, IFC frequently requires that the value of the mortgage assets equal 150 percent of the loan's principal value. This increases the quality and strength of security package arrange for the loan.

4.9.3 WEAK MORTGAGE FRAMEWORK

Some countries perhaps for historical reasons prevent project lenders from creating adequate mortgages for their loans. Under Indonesian law, land cannot be mortgaged to foreigners. In other countries where land belongs to the state and no private land

ownership is allowed, project sponsors can then only lease land user rights for a specific period of time, and a mortgage on the land user right may also not be legal.

In other countries, restrictions may exist that may affect the structuring of project security. In Sri Lanka, for instance, the law stipulates that once a lender takes a company's fixed assets as security, it will only have recourse against such assets. The lender with security on the fixed assets will have no recourse against any of the company's other assets, even if the value of secured fixed assets is not sufficient to repay the secured debt, in addition, security on such other assets is not enforceable.

In 1996, IFC helped finance Sri Lanka first independent power projects, a new $63 million project to build, own, and operate a medium-size diesel power plant. Since the company's fixed or immovable assets such as land and plant were not adequate to provide loan security for all lenders and since the most important assets of the company were in fact the arrangements with the government and the power purchase, the senior lenders, including IFC, took the following loan security.

- First mortgage over the movable assets of the company.
- First assignment of all insurance policies
- First pledge of sponsors' and other key shareholders' shares in the company.
- First assignment by way of security of government approvals and agreements, including the energy purchase agreement, the implementation agreement, the fuel supply agreement, and the government undertaking.
- First assignment by way of security of the company's rights under project agreements such as project funds agreement, retention agreement, and shareholder agreement.
- First charge on the company's bank account, including offshore accounts.

To ensure that the company will not crate security on its fixed assets in favour of third parties, the lenders, IFC and USAID required that the company's articles of incorporation be amended to require the prior approval of a qualified majority of shareholders for the company to be able to create security on its fixed assets. This allows the senior lender, in

their capacity as shareholder, to ensure that if they enforce the security the fixed assets of the company remain available.

4.9.4 ASSIGNING PROJECT RECEIVABLE AND PROJECT AGREEMENTS

Another common way to achieve loan security for oil and gas projects is to obtain an assignment of project receivables. This enables creditors to determine how project funds are used if the project runs into difficulty. A project usually has many other kinds of agreements covering such matters as government concession, management, and supply. Premature termination of any of these agreements could adversely affect the project. As a common business practice, the party terminating an agreement prematurely has to pay for the damages caused to the other parties. In view of the harm to the project, lenders will make sure that they are assigned the damage payments. This again enhances the various agreements signed between lenders and project companies and attracts investors to finance the project.

4.9.5 ESCROW ACCOUNTS

Escrow accounts can be used not only to mitigate foreign currency risks but also to ensure that contract obligations can be met. In particular, they can help control project expenditure. Although a project may generate sufficient cash flows to pay its debt, sponsors could divert these flows to serve other purposes within or outside the project. To make sure that the project's free cash flows are used first of all for debt service or other pre-agreed expenses, lender often require that an escrow account be established with a reputable bank. An escrow account collects all or part of the project cash flow to be used for expenditures as agreed. If the escrow account is also pledged to lenders, it has the added advantage of improving the project's overall security package.

4.9.6 SPONSOR'S ROLE

A project's best support usually comes from its sponsors, namely, the parties who have developed and designed the project and also are the primary beneficiaries of its success. Sponsors play a central role even in non-course and limited-recourse financing, where they may cover only a relatively small portion of a project's overall cost and may rely on other creditors and investors to finance the project. Their experience, commitment, and

energy will still be crucial to the success of the project in all its dimensions and through all its stages.

Strong sponsors typically provide a sound equity base at the outset of the project, additional funding or other support as needed during the construction period and on going technical and managerial support during project operations. Even more importantly, sponsors must be able to provide effective support whenever it is needed. Frequently, sponsor support extends beyond direct financial assistance to supplying inputs or purchasing project outputs to help ensure operational and financial viability. It has been uncovered that recourse to the main sponsors is frequently the preferred means of mitigating risk.

4.9.7 SPONSOR EQUITY COMMITMENT

Every project needs a strong a equity base. The largest equity share, typically held by the majority sponsor, is frequently a majority share. In 64 percent of IFC's Greenfield projects, the sponsor held 51 percent or more of the equity.

For all the projects, sponsor equity represented 26 percent of total project cost at the time of commitment. A substantial commitment by the main sponsor can helps ensure project success by:

a) Making it expensive for the sponsors to abandon the project, thus encouraging them to take a strong and lasting interest in the project and to seek to remedy difficulties that will arise.
b) Expediting decision making, particularly where the sponsor holds a majority share, and
c) Increasing the confidence of other parties in the project.

As a project lender, IFC almost without exception requires that sponsors maintain a certain level of project ownership. This requirement typically lasts for the entire period of the loan agreement. The specific level and duration of share ownership are usually specified in a share retention agreement between major creditors and investors and the main sponsor.

4.9.8 SECURITY FROM SPONSORS' SHARES

Lenders can require sponsor to pledge their shares in the project company as part of the loan security package. This is particularly important if lenders fell that the value of the mortgaged assets is insufficient or that there is uncertainty about the enforceability of the mortgage. Effecting a pledge of shares is usually a relatively simple procedure and, once obtained, can be a useful negotiating tool for lenders. When sponsors pledge their shares to lenders, lenders can take control of the company in the event of default and can also take whatever steps necessary to protect their investment. A pledge of sponsor shares to improve security is used in about half of all of IFC's projects.

4.9.9 DEFERRING PAYMENTS TO SPONSORS

It is not uncommon for a sponsor to enter into supplier relations with a project. For example, the sponsor may purchase part of the project's output or supply raw materials or service. In one of IFC projects in Algeria to increase hydrocarbon production for existing oil and gas wells, the local sponsor guaranteed to provide a certain number of oil wells for the company to operate on. Deferring raw material payments or services fees to the sponsor in the case of project cash shortages helped strengthen the project's financial robustness.

> ***Reducing repayment risk.*** *In another example, IFC supported a $330 million project to produce methanol for export, an important element in the government's programme to reduce dependency on crude oil exports. The project raw material, natural gas, is supplied by the local sponsors, while export sales are handled by the foreign sponsors. IFC helped provide loans and equity funds of about $130 million. Loan security was in the form of a mortgage, insurance, and sponsor support for project completion. In addition IFC required that two other conditions be met from the time of the project completion until the IFC senior loan was fully repaid. First, the local sponsors would, if needed defer a portion of the payment due to it for gas supplied to the project. Any such deferral would be structured as subordinated debt to the project company so that the project company could first use cash flows to service its senior debt.*

Second, the foreign sponsors, if needed, would defer a portion of sales commissions, also in the form of subordinated debt to the project company, so that the project company could first service its senior debts. The project has been performing well since it began production. The IFC loan is current and is not expected to face repayment difficulties.

4.9.10 SPONSOR GUARANTEES

Project finance is normally structured without direct recourse or guarantees from the sponsor, they may be necessary on occasion, especially when some aspect of the project risk cannot be mitigated or is considered beyond the creditors ability to absorb. The most common form of this arrangement is a precompletion guarantee. Because project risk is usually very high before project completion and difficult to assess or control in certain respects, sponsor guarantees may be extended to creditors before the completion of the project. In most oil and gas projects, they take the form of a partial loan guarantee, which guarantees only a portion of the loan, principal and interest payment. This reduces the lender's exposure somewhat but still leaves them with a share of the risks. The main purpose of partial guarantees give lenders an additional inducement to finance a project. Partial guarantees vary greatly in form and can be adapted to suit many situations. Occasionally, a full guarantee may be needed before financing can be attracted.

A Full Sponsor Guarantee. When Project Risk Was Too High

A pipeline project planned in 1992 to enable Colombia to expand its crude oil exports illustrates that standard loan security arrangements may not always provide sufficient protection for lenders. A state-owned oil company held 49 percent of the project and a group of major international oil companies 51 percent. IFC was the main project lender. The economics of the project seemed sound at the time of loan negotiation but the project was exposed to the risk of guerrilla attacks. Although the Colombia army had agreed to provide protection, attacks occurred even during the loan negotiation. IFC was prepared to accept any political risk except guerrilla attacks. During loan negotiation, IFC and the sponsors could not come to an agreement

on how to separate the risk from general political risks. Because the sponsors wanted to move forward with the project and because other sources of reasonably priced long-term debt were not available at that time, a full sponsor loan guarantee was given to IFC. Despite the guerrilla problems, the project has performed well financially. The company without any problems has serviced IFC's loans. Consequently, the guarantee has never been invoked.

4.9.11 PROJECT INSURANCE

Of the numerous risks, that oil and gas project are likely to face, many can be allocated to parties willing to accept them via contracts but force majeure risks cannot be contractually allocated. These risks are associated with fire and natural disasters, and they have to be dealt with by the purchase of insurance. IFC and USAID require that all its projects have adequate insurance to cover such risks. Data revealed that there is no oil and gas projects that IFC and USAID have finance without adequate insurance cover for force majeure risks.

Broadly, there are two types of force majeure risks. One affects the project directly, as in the case of an earthquake or fire; the other indirectly, as in the case of a natural calamity that prevents a supplier from fulfilling its commitments to the project. Market insurance can usually be purchased to mitigate against these risk. The insurance proceeds are used to restore production or repay loans that are bad as a result of the force majeure.

4.9.12 GOVERNMENT GUARANTEES

Government can directly guarantee the default risk of a state entity, that is, party to a project. This form of guarantee is most often seen in countries where the economy of the country depends heavily on the import of oil and gas and the crude oil for refined fuel is imported by a state-owned distributor through EPA, example Tema Oil Refinery (TOR) in Ghana purchasing crude oil from Nigeria National Petroleum Corporation (NNPC) and it is crucial that Tema Oil refinery be able to pay for the supply. This agreement between NNPC and TOR is supported by Ghana government guarantee. The extent of guarantee

will be full payment for debts that may arise from non-payment of supply and penalty that may arise.

4.9.13 SECURITY FOR EQUITY INVESTMENTS

The principal objective of project security is to protect project debt, because debt generally constitutes the largest share of the financing package from passive investors and bears a fixed return, with no potential for higher returns if the project is very successful. But minorities investors with equity or quasi-equity investments in the project will also seek some form of exist. For projects that are not publicity listed on any exchange, this frequently includes a put option for their shares.

In view of IFC's and USAID minority shareholders status in many projects, most of which are not listed on a stock exchange at the time of its investment, the agencies need to ensure an appropriate exist strategy from the investment. The purpose of IFC and USAID and the World Bank investment in equity is primarily to ensure that the company has a solid start. In principle, IFC and the World Bank consider their developmental role fulfilled when a project reaches the stage of mature and profitable operation, at which point it will usually try to exist the project as soon as possible. With a put option IFC and the World Bank exist without difficulty and use its funds in other new projects. Indeed at times a properly structured put option may be critical to limiting the downside risk of an equity investment. In other cases, IFC and the World Bank may seek a best-effort commitment from the main sponsor to list the project on the local exchange within a certain number of years. This form of commitment, while not having the same force as a legal agreement, helps further IFC's and World Bank's developmental objective by strengthening local capital markets.

CHAPTER FIVE

FINDINGS

5.1 INTRODUCTION

This chapter focuses on the main findings from the study. Specially, it outlines the major issues that came up in the analysis stage of the research.

It identifies the major risk factors in oil and gas's projects that financiers face, the magnitude of such risk factors and the various mitigation arrangements in place to minimize them.

5.2 MAIN FINDINGS

5.2.1 Construction risk

It has been discovered that risk is very high at the development phase, which can be financed by equity capital from the main sponsors. Construction phase has a high risk, as more finance is required, hence a mixture of equity and debt is appropriate. Operational phase has a low risk with less restrictive covenant hence bank loan is appropriate. There is a positive correlation coefficient between the risk of delay and cost overrun. This means that, the higher the risk of delay in constructing the project, the higher the cost overrun. The level of uncertainty of construction is not as high as that of performance risk. This is because performance risk is broader in scope than construction risk. The theoretical contention that construction risk is part of performance risk is not true as a clear distinction is easily drawn between them. Uncertainty is found to be relatively low ranging from 4% to 6%. Major mitigation arrangements include fixed price for materials and equipment, certain date construction contracts such as turnkey contracts with built-in provisions for liquidated damages and contingency allocation is made for uncontrolled price escalations.

5.2.2 Performance risk

The long-term nature of oil and gas project permits it to be disrupted by performance factors such as failure of equipment, management, market demand and many others. The study revealed that the level of uncertainty of performance in oil and gas projects is

between the range of 10% and 14%. The lowest for the World Bank and its affiliate IFC and the highest for a local financial institution, NIB (Ghana). In fact, there is no absolute certainty of performance in oil and gas projects. Mitigation arrangements include relying on tried and tested technologies rather than newly developed technologies. Also, performance guarantee from equipment suppliers on quantity and quality are sought and equipment suppliers and technical advisors provide training.

5.2.3 Market risk

Fluctuations in the demand for oil and gas project output have been the leading cause of revenue and profitability problems. Cartels make decision to cut supply or increase supply affect market price and prediction significantly. Nevertheless, market risk is found to be the lowest among the various risks encountered in financing oil and gas project because there is ample market demand for the products and demand also exceed supply especially when there is a threat of war against a major supplying country. Market risk is difficult to hedge against specifically, unless there is a single buyer or small group of buyers for the output. However, signing a purchases or sales agreement with the price and quantity clearly specified with the seller or buyer is one way of hedging product price risk. Power Purchases Agreement (PPA), off take agreements, call and put options and forward contracts are equally appropriate means of mitigating market risks. Sovereign guarantees are no longer workable as new governments openly declare their unwillingness to pay the accrued by the previous governments; irrevocable letters of credit from credible international financial institutions give some encouragements to the lenders and sponsors of the oil and gas projects.

5.2.4 Economic risk

Macroeconomic stability balance of payment situation and foreign exchange rate policy in the project country are of concern to economic risk. Foreign exchange risk particularly can be a major concern if the project generates revenue only in local currency. Analysis revealed that international financial agencies that finance oil and gas projects are not significantly affected by economic risks because of the strength of the currencies in which they operate, the stable exchange rate of their currencies, the low inflation rates in their economics which are not affected by the inflation levels unfavourably in the economics in

which they operate, and the relatively low interest rates at which they source finance for their operations. Mitigation arrangements such as mixing local with foreign funding so that the project does not rely excessively on foreign funds, index output prices to the exchange rate especially in a situation where revenue is mostly in local currency and project cycle is long, this is vulnerable to dramatic changes in prices of oil and gas product in line with the exchange rate. This is however a very difficult for any government to undertake as it will mean pushing price increases on to consumers anytime there is a significant change in the exchange rate. Government guarantee to obtain foreign exchange for the project company is one way to ensure that foreign exchange is always available. Escrow accounts in which foreign currency revenues can be deposited will help the borrower avoid potential repatriation difficulties. Interest rate risks can be managed when they borrow at fixed interest rates even though commercial banks are reluctant to borrow at fixed rates on long-term basis. Converting floating interest rates to fixed interest rates and swapping the same are equally good mitigation arrangements for interest rate risks.

5.2.5 Environmental risk

Environmental risk assessment is as important as economic risk. Health safety and other issues can have negative impact on oil and gas projects, particularly its cash flow. Environmental assessment is to give the optimum assurance that day-to-day operations will run smoothly during project design, construction and operation. Environmentalists and other pressure groups such as Green Peace and Friends of the Earth consistently monitors oil and gas companies to ensure that the environment is not affected by their activities. Financing agencies therefore considers environmental due diligence as a fundamental conditionality for financing their projects. They ensure that development and implementation of resettlement action plans and efforts to avoid degradation of natural habitats. In many cases, public consultation and disclosure is required for harmonious co-existence of all parties, importantly, the views of affected stakeholders are considered in project design and implementation to avoid excessive economic and physical displacement of natural habitats.

A case in point is the consideration of forestry, resettlement affected people, water pollution and wildlife protection in the course of constructing the West Africa Gas Pipeline project. Early efforts to establish and promote a transparent relationship and meaningful dialogue with affected people and communities frequently bring benefits of excellent community relationship and operation without disruptions.

5.2.6 Political risk

Political risk arises from unforeseen political events that may change the project's prospects from profitability. It might be the act of government to change the natural resource exploration law, regulation or general instability in the political or social system as a result of war, strike or frequent changes in government. Currency transfer and expropriation difficulties are typical examples of political risks. War, civil disturbances, coup d' tat, terrorism are frequent and typical of developing economics. Political risk is of paramount importance to investors such that adequate undertakings supported by international Co-operative Underwriting Programme (CUP) is taken to back it. Empirical evidence suggests that political risk can be very high in the developing economics than in the developed economics. This is evident in the Ogoni State of Nigeria where several interruptions took place in the operation of oil companies by the local people in the 2000 and 2001. Several hundreds of lives were lost in attempts to maintain law and order. The battle between oil companies, governments and the local people are on the increase which raises the risk factor demanded by the financiers of oil and gas projects in developing economics particularly, Africa.

5.2.7 Margin of safety

Significantly, oil and gas project financiers consider the difference between the expected returns and the aggregate risk factor, known as the margin of safety or spread. This forms the basis of their decision to invest or not to invest. The absolute risks and returns numbers do not count as much as the magnitude of spread between the risks and return.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 INTRODUCTION

Over the past decade, oil and gas financing has entered the mainstream of investments in developing markets. It has gained new impetus in the dynamic environment created by the increasing globalisation and sophistication in financial markets, on the one hand and by policy reforms that have stimulated private sectors investment, on the other.

As a result, the volume of flows related to oil and gas investments project finance expanded dramatically during the 1990's and formed a large part of the overall increase in developing markets. This growth was matched by greater competition in financial markets, which reduced funding costs and lengthened the periods of support, while the gradual convergence of the debt markets for bonds, syndicated loans, and private placements enabled projects to gain access to finance through a broader spectrum of instruments.

The growing use of securitisation techniques also increased the liquidity and attractiveness of projects debt to a wider range of investors in developed countries, and to a more limited extent in developing markets. A relatively long period of macroeconomic stability and policy reform in major developing markets increased investors' willingness to support more complex projects and broader range of country and market-related risks.

The crisis that began in East Asia in mid-1997 has brought about a significant pause in the oil and gas investment market. The crisis has dampened growth and investment opportunities in most countries, causing sponsors, investors and governments to reassess the financial and economic viability of proposed projects, and investors to re-evaluate the risks, particularly with regard to foreign exchange, market demand, and contract enforcement. Liquidity in the commercial bank and broader securities markets also contracted significantly, reducing access dramatically for most borrowers, including those seeking finance for and gas investments.

6.2 FUTURE OF OIL AND GAS INVESTMENTS FINANCING IN DEVELOPING MARKETS

The problems created by the financial crisis teach a valuable lesson: greater care must be exercised in structuring projects and assessing their risks. The investment needs in many developing markets remain enormous. World Bank estimates for new oil and gas investments alone over the next decade are in excess of $250 billion per year- and pursuing them is essential to development. Yet few companies in the sector have sufficient financial resources in developing markets to undertake these projects e.g the West Africa Gas pipeline project. Sharing the risks through project finance will get these projects off the ground.

But for these risks to be shared among the interested parties, credit analysis has to be done. Credit analysis by lenders required assessment of the risk of the project, commercial, technical and political, as opposed to balance sheet risk analysis, which is based on the assets and finances of the utility as a whole rather than of the project alone. Credit analysis requires a complex and time-consuming assessment by lenders and credit rating agencies. Often, lenders will require a developer to contribute a certain level of equity.

This equity is usually not contributed until the construction phase is completed so that at least initial financing of the construction costs must be secured through borrowing. The exact level of equity required would depend on the lender's perceived risk for the project in the country where it is to be implemented. In general, equity requirements for projects in developing countries tend to be in the range of 20 to 25 percent. The remaining 75 to 80 percent must then be provided by borrowings that can be raised from a mix of sources, both commercial and official. In practice developers have experienced few problems in obtaining equity financing but have found access to commercial bank funding very limited.

6.3 INVESTOR APPETITE FOR DEVELOPING MARKET RISK

Globalization and the liberalization of financial markets during the 1990s encouraged many investors to enter developing markets. These forces also helped created the instruments to mitigate or control the risks inherent in oil and gas projects, such as

interest rate changes or price movements in products and currencies, although these hedging instruments have had limited availability to date in developing markets.

In IFC, the World Bank and MIGA experience, the success of oil and gas investment financing depends in large measure on good risk management. Though time-consuming and complex, this strategy offers enormous benefits. For projects in which the risks have been identified, clarified, and appropriately mitigated up front, private financiers are frequently willing to provide significant amounts of funding and will bear project-specific commercial risks. In more stable country environments, private financiers have also borne some nonspecific commercial risks, including inflation or currency risks. At times, however, such risks can have serious repercussions.

The major commercial risk underlying most oil and gas projects is that of non-completion. All financing packages should contain rigorous standards and obligations to ensure that the relevant parties will help bring the project to completion. After completion, market risk is the main concern of most projects. This is often difficult to assess accurately, yet critical to the outcome of the project. Projects need to be able to withstand adverse developments such as new competitors or overall declines in demand if they are to be successful.

The sponsor provides support or guarantee to ensure project completion and will seek contractual marketing arrangements or other means by which to hedge market risk. Even in projects that have no financial recourse to the sponsor, strong, experienced, and committed technical and financial partners can be critical to a projects success, not only during the construction period but also during ongoing operations. In addition, conservative financial structuring can help a project withstand a wide variety of risks, both expected and unexpected.

Continued innovation in the packaging and diversification of oil and gas investment risk for example, through securitisation and the pooling of risks-will also help expand sponsor and investor awareness. Because of the current risk-averse environment, a number of sponsors are combining several projects into one financing pool to help diversify risk.

6.4 STRONGER LOCAL FINANCIAL MARKETS

The extent to which project finance can be used in individual countries also depends on the depth of local financial market. In recent years project finance techniques have been used mainly to attract international financing to developing markets. With the growing popularity of project finance, these techniques have helped finance Oil and gas projects that have no obvious way to earn hard currency to repay foreign loans.

Although instruments for hedging foreign currency are available in financial markets, they are difficult to obtain against long-term obligations or are often very expensive. That is why many projects failed to have protection against the substantial depreciation in a number of local currencies, including the Ghanaian cedi, in the late 2000.

Project finance techniques and structures can be equally appropriate for raising local financing for local oil and gas investment projects. Local funding can help mitigate the significant interest rate and foreign currency risks many projects face. The local market must have some depth, however, and lenders must be able to invest over the long-term. Such conditions currently exist in only a few developing markets, especially in Africa.

Financial markets, both local bond and equity markets, both need to be well developed, and reforms directed at creating a transparent and efficient local banking network must be in place before project finance can be widely used in individual markets to support new oil and gas investment. Governments can help meet these prerequisites by encouraging the deepening and broadening of local financial markets.

6.5 MITIGATING OIL AND GAS RISK

For Oil and gas investment financing, there is bound to be risks, ranging from the development, exploration and distribution stages of oil and gas. Typical are construction, performance, market, and economic, environmental and political risks.

It is important that construction risks be analyzed carefully to determine the extent of associated delay in construction and its related cost overrun. The danger is that, if these

risks are not anticipated and factor into the initial agreement by the sponsors, investors and lenders, there will be serious difficulties during the project development; typically, there will be shortage of funds.

Mitigating construction risk through turnkey contracts, specifying performance obligations with penalty clauses are very essential for a successful oil and gas investment operation. Including contingency and escalation cost into project estimates are very important to a successful completion of projects. IFC usually incorporate not less than 10% of original cost into oil and gas project cost to take care of cost overrun. This is to ensure that unexpected cost rise do not jeopardize project completion, and this is normally taken care of by a standby financing as part of the initial financing package.

Another important risk factor encountered is performance risk. This is the failure of management of the project to perform according to specification, causes of which are unavailable project inputs and failure of technical expertise to function effectively. To mitigate this risk, there is the need to hire strong, experienced sponsors with significant quality of past performance with remuneration tied to performance, and bonus paid according to output. In other words, team performance incentives and penalties be attached to their positions. Also, tried and tested technologies are preferred to new technologies that are yet to prove their resistance to time.

Market risk is another uncertainty about oil and gas investments financing. It is a risk because of the uncertainty of demand for the supply or vice versa. Market risk is difficulty to hedge against specifically, but for oil and gas products, the situation is quite mild in the international market where demand is always pulling supply. Signing a sales or purchase agreement with price and quantity clearly specified with the seller or buyer is an excellent way of militating against market risk, hence the cash flow expectations.

Economic risk is another important problem facing oil and gas investments. This includes foreign currency availability; interest rates fluctuations, exchange rate fluctuations and inflation. It has be advocated that currency unavailability should be managed through long term finance to match project turner and provision be made for a standby financial

facility. Interest rates risks be managed through fixed rate financing and interest rate swaps. Exchange rates risk is managed by matching currency of the project loans to project revenues; and inflation risk be mitigated by indexing energy output prices to local inflation rates.

There is a need for environmental risk analysis to ascertain the environmental impact of oil and gas project; specifically on the natural habitants, child labour resettlements, and forestry and water bodies. Cost-benefit analysis of the environmental impact and benefits of the projects is an essential element of project assessment. Social cost of projects is in recent times a key factor considered by lenders for investment. Resettlements of human beings, animals, and other wildlife are the key mitigation arrangement for environment risk management.

Political risk is the unforeseen political events that are likely to change oil and gas project's prospects for profitability. Example, a change in law, regulation or general instability in the political system. Mitigation arrangements concluded on are that of MIGA political risk guarantee to cover primarily equity and related debts. MIGA also provides Cooperative Underwriting Programmes to take care of political risks. There is also an avenue for political risk to be mitigated at the WTO under arbitration relief.

It can be concluded that the above risk factors and their mitigation arrangements are crucial for a successful development and operation of oil and gas projects.

6.6 TEST OF HYPOTHESIS

Hypothesis 1: *The key to a sound financial structure in oil and gas investment financing is risk management.*

Test It is shown from the analysis that without an adequate mitigation arrangements for oil and gas project risks, no single lender will be prepared to release its funds to the project company. That, the financial structure of the project will be a blend of equity and debt capital from both international financial institutions such as the World

Bank, International Finance corporation and the United States Agency for International Development. Of course, every financial analyst will attest to the fact that a mixture of equity and debt capital to an oil and gas project company is the most appropriate under every circumstance.

Hypothesis 2: *Successful mitigation of risks of commercial, political, technical and force majeure events are critical to a project's financial feasibility.*

Test: It has been shown that commercial, political, technical and force majeure risks are critical to the survival of oil and gas projects development, and operation. The test is that, any of these risks being significant without any serious mitigation arrangement causes the lender to withhold its financing. The good news is that, international financial institutions such as Multilateral Investment Guarantee Agency, the World Bank and International Finance Corporation's involvement give some encouragement to the private investors and bilateral lenders. It can be concluded that the existence of the international financial institutions in oil and gas projects attracts laudable private finance into the project and that their presence reduces political risk significantly.

Hypothesis 3: *Multilateral Investment Guarantee Agency (MIGA) improves risk factors of oil and gas projects in less developing countries.*

Test: MIGA's political risk insurance for oil and gas projects in developing countries where country risk is high alleviates the fear of private financial participants. The pervasive negative image of Africa as a hostile business environment is ameliorated by the MIGA. MIGA's skilled financial engineers ensure that they're a remarkably flexible financial tool for all fashions of risks in the developing countries.

It can be summed up that this huge insurance investment company (MIGA) improves risks of oil and gas projects.

Hypothesis 4: *The structures of security package help mitigate risk in oil and gas projects for lenders.*

Test: These security packages commit the parties to contracts under the project to perform and incentives and penalties are specified and legally enforced. It can be concluded that a weak security package increases the risk of non-performance while a strong security package strengthened with financial instrument will definitely help mitigate risks in the oil and gas projects for lenders interested in investing in oil and gas projects.

6.7 IMPROVING SECURITY PACKAGES

Security packages are sets of contractual agreements and memorandum of understanding between interested parties to a contract stating the implementation criteria, incentives and penalties. Sets of security packages include implementation agreement, energy purchase agreement, land conveyance agreement, ownership structure agreement, supply agreement, construction agreement, and operation and maintenance agreement.

Implementation agreement ensures that there is a secured commitment from all parties that are undertaking the development and operation of the project. This includes government commitments to authorization of the project company to do business in the host country, license to generate, transmit and distribute energy.

Energy purchase agreement ensures that there is an arrangement relating to supply, demand, pricing, penalties and bonuses. It also ensures that energy supply meet energy demand, prices are within the limit of the pockets of the host government, bonus accredited to higher performance than expected and penalties inflicted on the poor performance.

Land conveyance agreements transfers land ownership from the owners to the project company. This agreement ensures that there is no litigation about the land occupying the project and forestall the risk of local people blocking the development and operation of the project. Strengthening agreement could include employing the local people into the project. It will be sad for employees of projects to litigate project land for possible abandonment of the project.

The ownership structure concluded on is the combination of equity and debt finance. This mixture of ownership interest and debt finance holders who are interest in the security of their funds. Otherwise, project finance is appropriate since the financiers look at the cash flow from the project and the sponsors or project company's assets. Since oil and gas project are full of risks, it is advisable project financing is preferred.

Fuel supply for the plant are equally important as transporting the energy products to the refinery or end users. Fuel supply must be regular otherwise; the plant workflow will be erratic. The mitigation arrangement is that of supplies guaranteed fuel availability. If delivery delays result in noncompliance in providing energy, the supplier must pay penalties to cover the lost revenues or the price difference of substitute fuel. Transporting energy could also be contracted and similar mitigation arrangements apply.

Construction contract agreement is a major problem in the oil and gas project development. The design, equipment procurement and the quality of construction are the main risk areas. The mitigation arrangement available is that of turnkey contracts which has the sole responsibility of guarantee plant performance, project schedule, plant warranty and project completion. The contractors will do all within their powers to ensure quality construction if penalties and incentives are attached to the agreements. Operations and maintenance agreement could also be subcontracted to responsible professional personnel who can install durable spare parts and consumable.

With the security packages in place there is bound to be alertness by all parties involve in the project development and operation. Risks will therefore be reduced if not completely

eliminated. This will entice financiers both international and private to fund the projects. For a complete elimination of risks, the security packages must be strengthened. Strengthening security packages in the oil and gas investment implies that the various agreements be protected with financial tool to make the project more creditworthy.

Typical of strengthening security packages are securing project assets with first mortgage lien as well as direct assignment to lenders of the project right to receive payments. Also, there can be assignment of project receivable which will enable project creditors to determine how project funds will be used if the project runs into difficulty. Escrow account is another way to strengthen security packages.

A percentage of the revenues from the sale of energy will be paid into an offshore account to take care of emergencies and unforeseen situations. Project insurance, government guarantees, sponsor guarantees and deferment of payment are all additional methods of strengthening security packages.

It is the believe of the researcher that risk if not eliminated completely through strengthening security packages, will at least reduce to the bearest minimum to attract all financiers even local financial institutions.

In conclusion, the issue of risk mitigation of oil and gas projects is no easy task since risk itself is an uncertainty which in truth and in fact cannot be foreseen prior to its occurrence. But the way out is to make sufficient provision for its occurrence. This will protect huge sums invested in projects.

It important to mitigate risk in financing projects but for oil and gas investments, it is a difficult task that needs expert financial engineers to manage. Most risks are transferred but there exist some residual risk, which attract the return on the investment. A lower return can be welcome by lenders if this residual risk can be managed through strengthening the security packages and agreements.

More importantly MIGA is confident and prepared to assist large energy projects in Africa, it has the demonstrated ability to help African countries to become oil and gas investment giants through its investment insurance programmes. It is hope and believed that risk by its very nature will not scare financial institutions to invest in African oil and gas projects.

6.8 RECOMMENDATIONS

Africa's energy sector is entering a determinant phase of its development, which, if the new and evolving ground rules are mastered and taken into account, should provide it with an opportunity for recovery. This implies that conditions conducive to private investments must be created.

The African Development Bank (ADB) Group could participate significantly in the sector's restructuring by causing efficient management to the sector while preserving its developmental aspect.

Resumption of growth is indeed crucial in attracting capital from project finance source. Therefore, there must be support for the structural adjustment programme. In this regard rehabilitation and restructuring of the energy sector must be given priority in terms of:

a) Re-definition of the structures of the sector where necessary with due regard for solutions of integration or sectioning off activities.
b) Establishment of regulatory bodies
c) Determination of the extent of private capital involvement,
d) Improvement of management systems and performance, and
e) Establishment of legal, economic and financial framework conducive to private investment so as to win the confidence of investors.

ADB Group and other African institutions should pilot decision-makers without prejudice, through the major stages of the process and prepare sound terms of reference for project finance in broad terms. Stakeholders' interests should be meticulously safeguarded to avoid serious consequences of failures. These stages are:

a) Study the feasibility of the common projects to harness and supply energy resources;
b) Study the viability of networks interconnections and execution of regional biased or inter-regional facilities;

c) Determine the most suitable inter-country institutional and organizational frameworks for energy resources development;
d) Assistance in mounting appropriate financing packages and concurrently establishing mechanisms for mobilizing local savings and more concessional financing institutions for the corporations.
e) Progressive definition of common standards in the sector to facilitate trade between bilateral and multilateral organizations and developing countries.

A prerequisite for finance from the private sector is the need for the legal, institutional and regulatory structures to be in place to define the economies of an oil and gas project at the outset. Early involvement in multilateral agencies (MLA's) and Export credit agencies (ECA) tends to provide private sector financial institutions with comfort that there will be no unreasonable interference from government. MLAs and ECAs can play an especially important role when a project crosses national boundaries. It is important to say that when a project crosses an international boundary the political risk is not doubled, but curbed. It therefore, makes much sense when we involve the MLA's and ECA's in oil and gas project financing from the onset to help curb the risks.

In this new world the preposition is that, it is wise for sponsors to keep all doors open with regard to financing options for as long as possible. They should consider utilizing a financial advisor early in the process to assist with factoring in all the necessary provisions for a successful financing before key commercial agreements are finalized. The massive investment requirement of oil and gas pipeline and power projects will undoubtedly require a non-traditional approach and will challenge historical financing yardsticks. Experienced advisors bringing skills learned in the trenches for other groundbreaking transaction can provide invaluable assistance to sponsors.

International oil companies need to feel that they are working in close long-term partnership with governments and not just "under contract." If companies believe that governments understand the need for long-term stability in energy policy and are committed to providing a supportive regulatory, legal and economic framework, then those companies could continue to invest in this resource rich region.

Governments of developing countries need to provide an environment of confidence and security for financial investors. This is where financial intermediaries such as Chase Manhattan's investment Bank can work both with oil companies and with host governments to overcome the painful legacy of the past. All too often, poorly structured and understood deals have collapsed prematurely, leaving bitterness on all sides. The result has been for the cutting off of countries from the international markets and banks and non-bank investors staying away from African deals, seeing them as being too complicated or too difficult.

It will be better if oil and gas projects financing are structured to be equal in security, documentation and legal protection to similar deals in other parts of the world. The vast hydrocarbon developments in Former Soviet Union, Latin America and the Middle East make tremendous demands for private capital. For Africa to compete effectively for these funds, investors in Los Angeles, London or Tokyo must see the same quality of financing, legal and security structures and risk reward ratios.

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