

ADissertation Report On
“RISK MANAGEMENT IN OILTRADING”



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UNIVERSITY OF PETROLEUM & ENERGY STUDIES
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A Dissertation report submitted in partial fulfillment of requirements for
M.B.A (Energy Trading)

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BONAFIDE CERTIFICATE

This is to certify that the dissertation report on “RISK MANAGEMENT IN OIL TRADING” submitted by **Gagandeep Singh Batra**, to the University of Petroleum and Energy Studies (Dehradun Campus), in partial fulfillment of the requirement for the award of degree MBA Energy Trading, is a work carried out by him under my supervision and guidance. This work has not been submitted anywhere else for any other degree / diploma.

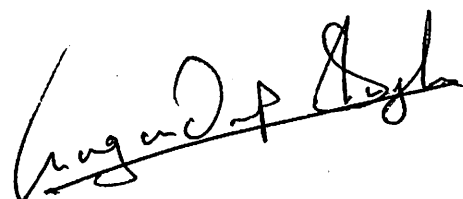

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CERTIFICATE OF ORIGINALITY

This is hereby state – with the intention of this report is very original in every sense of the terms and conditions and it carries a sense of honor and belief and that no shortcuts have been taken and I remain both meticulous and caring during the relevance of this research work. I have put in my point best to keep this work as informative and precise as possible.

It may be also stated here that during the preparation of this report some help has been taken from a scope of professionally shared information and knowledge, a comprehensive description has been mentioned in the reference chapter of this report.




(GAGANDEEP SINGH)

25th April 2014.

ACKNOWLEDGEMENT

I feel great pleasure in expressing my deep sense of gratitude and indebtedness to the management of University of petroleum & energy studies for giving me an opportunity to pursue my Dissertation Report and my very special thanks to **Dr. Sumeet Gupta & Miss Sonal Gupta** for their guidance and support in the successful completion of the project. I would also like to avail this opportunity to express my deep sense of gratitude to the University of Petroleum & Energy Studies for giving me an opportunity to carry on my research work.

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ABSTRACT

Oil is the most vulnerable commodity in the world amongst all. Oil is traded over the world in various exchanges. There are various risks involves in this business of oil trading. The major objective of my study is to identify the risk involved in the various steps in the trading procedure of oil. The various risk mitigating tools, derivatives and their application area along with different strategies.

This work also includes the mechanism of trading desk and how the trading desk helps to identify the risk and helps to mitigate the various risks.

Oil Trading: Crude & petroleum products are traded 24*7 globally in both physical and paper market. Paper trading oil has grown but with much greater growth on the OTC market, this is because oil companies are buying and trading on the spot market to meet their needs that was previously met by their own production, their involvement in paper trading has increased.

Due to the great price volatility in crude oil during the past decade, companies have adopted short term hedging tools, such as forward & future contract, instruments like price swap and OTC option to manage risk.

Risk management tool provide a degree of certainty for refinery, oil producer, shipping companies, airlines, manufacturer and others who use them to reduce financial risk. OTC options & swaps are also used to manage short- term price risk.

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CHAPTER 1: INTRODUCTION

INTRODUCTION TO OIL MARKET

Energy is very important for economic growth of a country. India is the fourth largest consumer of energy in the world, fourth in the list of top energy consuming nations and it is being projected that at this speed it will be left behind Japan by 2021 which is right now third in the world list (Source: EIA).

India has only 0.4% of the world's reserve of hydrocarbon. India, like other developing nations, imports more than 25 percent of primary energy needs for its uses in the form of crude oil & natural gas.

Crude Oil accounts for 34 % of total primary energy consumption in the year 2011-12 in India. India's per capita consumption of oil is amongst the lowest in the world:

- India consumes 277 Kg of oil equivalent per capita compare to World's average consumption is 1480 Kg of oil equivalent per capita

India had 5.5 billion barrels of proven oil reserves as of December 2011, the third-largest in the Asia-Pacific region. India's have light and sweet crude oil reserves, with specific gravity varying from 38° API in the offshore Bombay High field to 32° API at other onshore basins.

Much of India's crude oil reserves are located off the western coast (Mumbai High) and in the northeast of the country, although substantial undeveloped reserves are located in the offshore Bay of Bengal and in Rajasthan state.

India's oil import dependency is projected to increase from the current level of 73% to over 90% by 2030 (source: Integrated Energy Policy report, Planning Commission, 2006). International oil prices have a critical bearing on the domestic pricing of petroleum products.

Crude oil is by far the most influential commodity in the world and it has recently affected many countries around the world, India too. Rapid rise in crude oil prices hamper economic growth not only in India but also in many other countries as well. As crude prices in global markets touched \$145, adverse effects of it has also been realized by Indian economy and few days back double digits rate of inflation. A study by IMF has estimated that every \$10/bbl increase in oil prices results in a decrease of GDP by 0.5% in developed countries, 1% in developing countries like India and more than 3% for under developed countries. Furthermore, oil prices do not affect only countries but individuals also as crude oil prices have a direct impact on gasoline, gas and heating oil price.

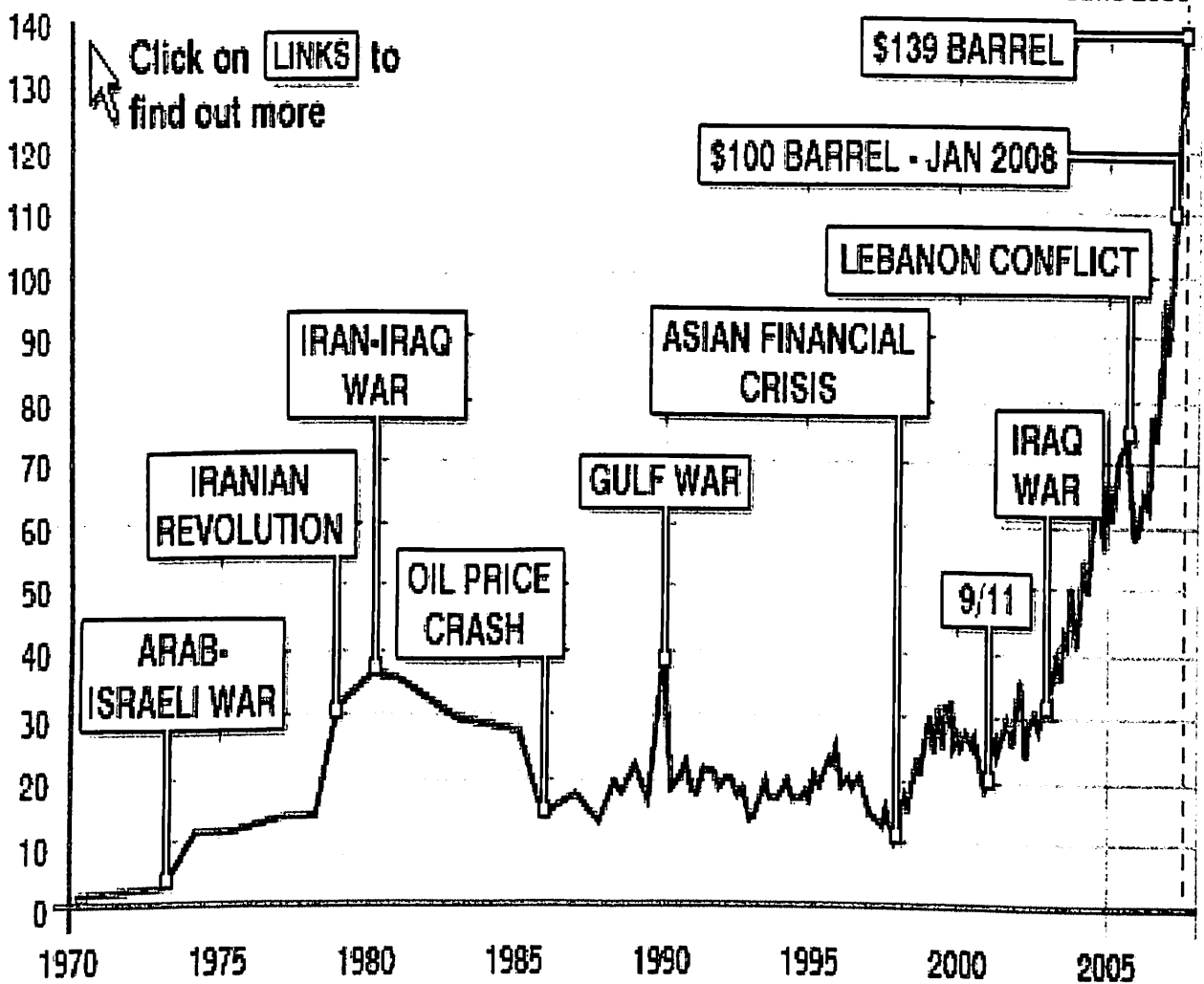
When designing an energy price risk management or trading program, it is essential to be aware of all the risks that are involved in the energy market and the ways in which they interrelate.

REASONS FOR VOLATILITY AND WHY RISK ARISES IN CRUDE OIL MARKET

- Decision taken by OPEC (production and supply).
- Global demand and supply imbalance. Global demand particularly from emerging nations
- Geopolitical factors that cause supply disruptions
- Weather/storms condition
- Terrorism, war and any other unforeseen
- Political tension between countries
- Comments from country leaders
- Shipping problem - transportation
- Changes to tax and duty structure
- Currency fluctuations- Foreign Exchange..
- DOLLAR IMPACT -weaker dollar drives crude oil prices higher
- Seasonality –US Summer driving, winter season and Hurricane season

CRUDE OIL PRICES 1970-2008

US\$ per barrel



Figures are not inflation adjusted

SOURCE: BP/Bloomberg

INTERNATIONAL POLITICS RELATED - OPEC & OTHER MAJOR PRODUCERS

The Organization of Petroleum Exporting Countries (OPEC), has 76% of total share of world oil reserves and accounts for 40% of the world oil production and other oil producing countries which have the maximum production influence the oil market by increasing or decreasing oil production. As this cartel is very effective, as they decide a price band of their crude basket. For example - The OPEC cartel to keep prices high in the 1970s and 1980s

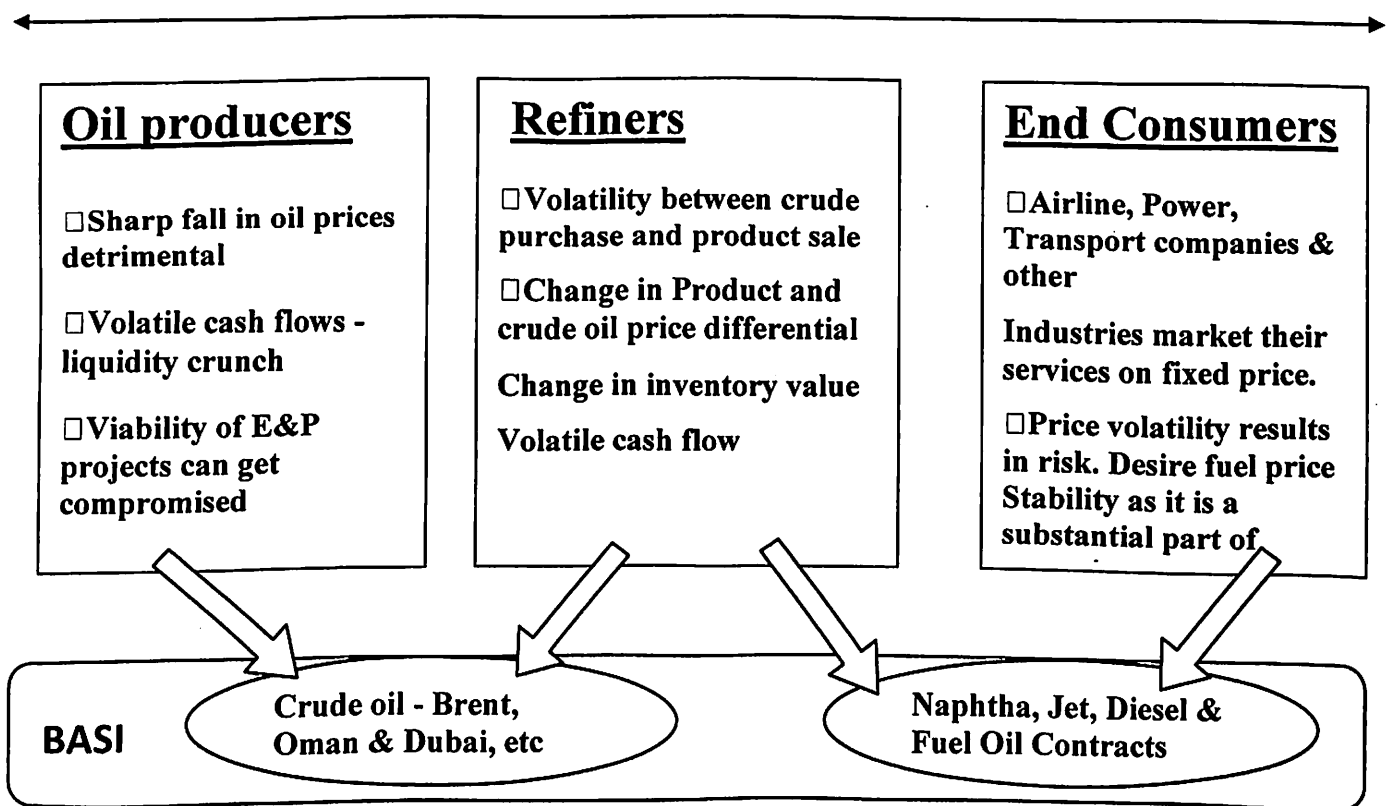
INVENTORY RESERVES

Inventories are needed to match supply & demand and uncertainty over price changes (volatility) depends on the gap between demand and supply. Changes in inventory levels can be used to reduce the difference between supply and demand and thus and control the price volatility.

RISKS FACED BY COMPANIES/END USERS

Due to crude oil price volatility

India imports about 75% of its oil demand -International oil price volatility cannot be wished away. All players exposed to price volatility.

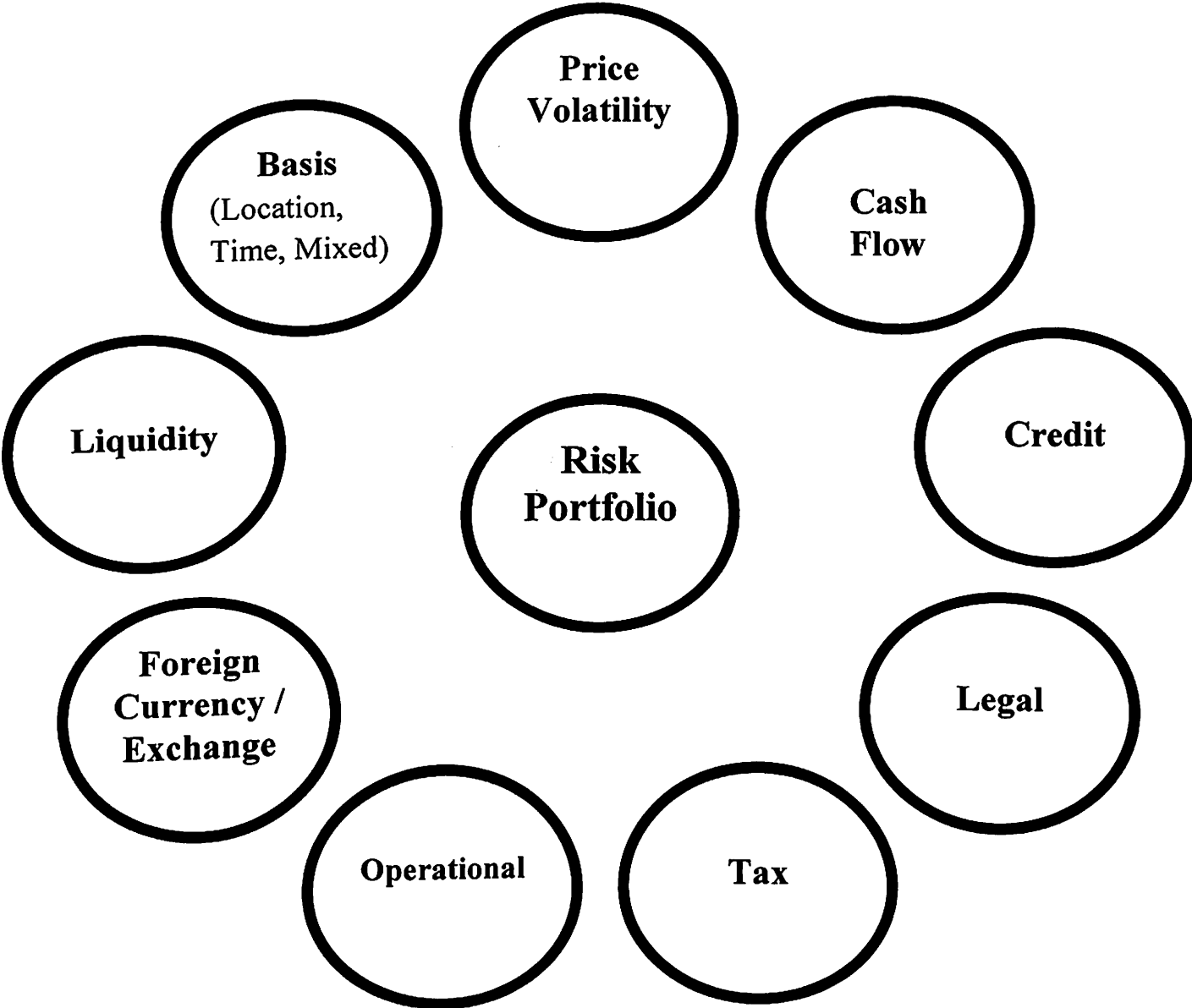


SECTORS DIRECTLY AFFECTED BY CRUDE PRICE VOLATILITY

- Oil Producing Companies
- Oil Marketing Companies
- Aviation - airlines business
- Manufacturing and Construction industry
- Besides the above sectors, other sectors like agriculture are also affected by volatility in crude prices as it let to the cost of irrigation and transportation.

To safeguard against this volatility a corporate needs to integrate the mechanism of hedging in order to lock in cash flows (both in and out).

RISKS IN CRUDE OIL TRADING



WHAT IS RISK?

Risk can be define as a chance or a probability of an occurrence from an actual outcome from an investment, it impact can be either ways positive opportunity or negative thread in trying to achieve a current objective.

In other words it is a likelihood that an undesirable scenario will occur of loss or less than excepted returns.

TYPES OF RISKS

PRICE RISK

This is the risk of loss financial in nature due to decline in price of physical commodity or security by the price movement in the energy market. It is also referred as market risk as based on market fluctuations and movement.

Due to it, if the prices rise end user will lose money, where as if prices fall producer lose money.

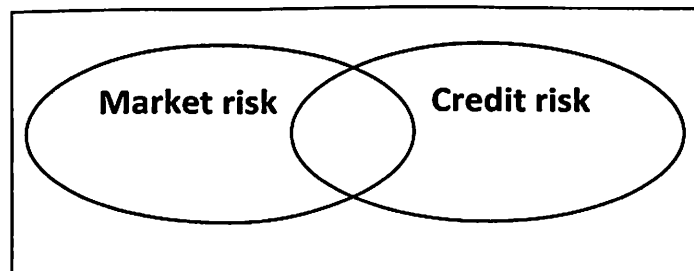
LIQUIDITY RISK

This risk of loss arises when a party who wants to trade in cannot do so because no other counters party is ready to do so in those assets with him. As derivatives market becomes illiquid. Liquidity is very important for the party who is holding an asset as it will affect its ability to trade. This happens due to high volatility in the market, it's possible that many banks and oil trader will not offer any bid or offer price. (As it happens during the gulf war) In this situation companies are not able to clear out their position and can only do so causing them great loss.

CREDIT RISK

It can be define as the financial loss due to the potential counter party to the contract defaulting and due to uncertainty in counterparty's ability to meet its obligations as per the terms and conditions agreed upon in the contract. The reliability of a hedging contract depends on the credit standing of the counterpart.

Intersection of market risk and credit risk



Market risk and credit risk are interrelated as credit worthiness of a country party also depends on market situation up to a certain limit.

CASH FLOW RISK

This is the risk that an organization will not be able to produce the cash to meet its derivatives obligations. Take a case Suppose an Indian Refinery had been hedging against movements in the gasoline price by using derivatives denominated in dollars. Suddenly rupee fell in value against the dollar; the company found that the cost of the dollars needed to service its derivatives contracts had soared. The company lost out because it had not hedged against the risk of a negative movement in the currency differential between the rupee and the US dollar.

BASIS RISK

In every market, price depends on delivery location, delivery period, and quality. Basis Risk is the risk that the price of the hedging instrument will not move exactly in line with that of the physical commodity. Anything less than perfect correlation between the hedging instrument and the physical commodity introduces basis risk.

Basis risk means risk of loss arise when setting off investments in a hedging experience a price change in entirely different direction from each other.

In price risk management, basis risk describes the risk that the value of a hedge (using a derivative contract or structure) may not move up or down in sync with the value of the price exposure that is being managed. (Tom James)

Basis risk is the risk of loss due to an adverse movement (upward or downward) of expected differentials between two prices (usually different products). In the context of price risk management, basis risk describes the risk that the value of a hedge (using derivative contract or structure) may not move up or down in sync with the value of the price exposure that is being managed (Hull 2006).

This imperfect correlation between the two investments brings excess gains or losses in a hedging strategy, thus adding risk to the position.

Some situations in which basis risk can occur are:

- Physical material at one place cannot be transported and delivered to another location having shortage.
- When there is not enough time to transport or produce an energy product to a market having shortage of that product.
- At the time of shortage energy product with different cannot be substituted by a product with different quality.

These situations may arise due to poor weather condition, change in regulations or political situations.

In the price risk management the lesser the basis risk, the more useful the derivative is for risk management purpose.

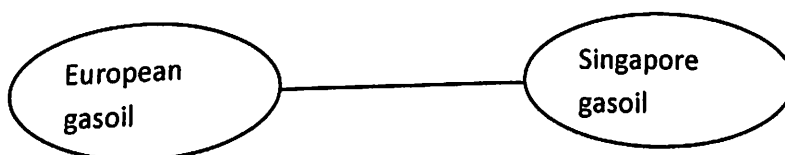
The advantage of OTC swaps and options over future contract is that basis risk can at times be zero in OTC swaps and option, as OTC contracts can often price against the same price reference as the physical oil. Whereas futures contracts traded on exchanges like ICE Futures, NYMEX or Tokyo Commodity Exchange all have their pricing references and terms fixed in the exchange's regulations.

This means that if their pricing reference does not match the underlying physical exposure, the basis risk must either be accepted or an OTC alternative needs to be sought.

Components of Basis Risk

Location Basis

One will have location risk if it utilizes a derivatives contract which prices against exactly the same specification of energy, we are hedging. However the derivatives contract is priced against the same energy contract but in a different geographic region. For e.g. European Gasoil and Singapore Gasoil using a derivative contract price against the same specification of energy (we are hedging price risk against) but in a different geographical region.



Time basis

In Energy markets a time basis risk occur when there is a sudden shift in demand or transportation problem is there. This can be cleared with an e.g. If we are expecting stronger heating oil prices in the winter time (as it is use for heating purpose due to extreme cold) and hedges our position by buying the December contract in NYMEX division New York harbor heating oil future. If a severe cold wave was to arrive early in winter, say in late October, then the price of November heating oil may become much stronger than the December price i.e. December heating oil futures may not give adequate price risk cover against the November heating oil requirement.

Mixed Basis risk

Mixed basis risk occurs when an underlying position is hedged with more than one type of mismatch between the energy that is the subject of the price risk management and the pricing index reference of the derivatives instrument that is being used. For example, if an January natural gas shipment is hedged with an march Jet Kerosene swap, it would leave both time and product basis exposures.

LEGAL RISK

This is the risk of loss if derivatives contracts may be not be enforceable due to certain circumstances. Some common reason in this area is clauses on netting of settlements, netting of trade, bankruptcy and the liquidation of contracts may be unenforceable. Example: - Failure to comply with regulations. It is also known as regulatory risk as it occurs due to changes in Governance policies and regulations and affects the trade.

TAX RISK

Tax risks are there when there are changes in tax laws and regulations that could affect payment under an agreement, either the derivatives market directly or the physical underlying energy market in some way and this can create additional costs to the trade. Example: - Tax noncompliance.

OPERATIONAL RISK

The risk which may occur through the errors or omissions in the operation of clearing, processing and settlement of derivatives is known as operational risk. For e.g. - misunderstood of date, quantity, specifications, wrong posting of figures or communication gap during a deal or over an operation, data entry error, Reporting error, Calculation error, incomplete legal document.

- Risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems of external events
- Excludes “Business Risk” and “Strategic Risk”

Operational Risk also includes -

Risk premium on inventory assets

This is a part of operational risk which occurs if there is a negative price as crude is store as a part of trading change. So it puts a question that to store it or not.

Foreign currency risk or Exchange rate risk

Risk of loss a business or an investment may suffer due to an adverse movement in foreign exchange rates. For example, if money must be converted into a different currency before making a certain payment or investment, changes in the value of the currency relative to the American dollar will have an effect on the gain or loss on the investment when the money is

converted back. This risk usually affects businesses, but it can also affect individual investors who make international investments. It is also called exchange rate risk.

In simple words Currency risk arises from the change in price of one currency against another. It occurs when investors or companies have business operations across country boundaries, they are at currency risk if their positions are not hedged.

EXCHANGE /TRANSACTION RISK

It is the risk that exchange rates will change unfavorably over time during the business deal or before settlement. It risk can be hedged against using forward currency contracts.

It's important because crude oil trading is affected by it:-

- Oil producing countries receive their oil payments in US \$ dollar.
- As US Dollar is the currency of choice in global crude oil market.
- Dollar depreciation reduces activities of investments in upstream due to increase in cost, lower ROI (return on investment) lower PP (purchasing power).
- Consumers use local currencies to buy petroleum products
- Decrease in value of US \$ led to high demand of oil, in oil importing countries as the value of their currency appreciated & increase in purchasing power.

Uncertainties or unforeseen like war (gulf war)

The crude oil trading is also effected by major events and unforeseen events like wars and tension between major oil producing country or traders like importers or exporter. Result in production loss and cut in supply of oil leading to high volatility in prices and oil crises. Such crises occur during the gulf war, when the oil prices rises more than anticipated and the market become very volatile.

CHAPTER 2: LITERATURE RIVIEW

PRICE RISK: A PRACTICAL EXAMPLE

A practical example to show what could be the effects on a refinery if it does not hedge its position appropriately.

In 1993 the German conglomerate Metallgesellschaft AG announced that its Refining and Marketing Group (MGRM) had been responsible for huge losses of around \$1.5 billion, which it had incurred by writing oil futures contracts on the New York Mercantile Exchange (NYMEX). The great irony of the situation was that its position had been perfectly sound from an economic point of view. The company's difficulties stemmed from the fact that it had ignored the perils of liquidity and cash flow risk.

In the early 1990s MGRM agreed to sell 160 million barrels of oil at a fixed price at regular intervals over a ten year period. At the time this kind of forward contract looked like a lucrative strategy; as long as the spot price for oil remained lower than the price that MGRM had fixed, the company was sure to make a profit. However, it was vulnerable to a rising oil price, so it hedged this risk using futures contracts. Now, if the oil price rose it would lose on its fixed price forward contracts, but gains on its futures. If the price fell, it gained on the forward contracts, but lost on the futures. This appeared to adequately hedge MGRM's price risk, but unfortunately failed to take account of its liquidity and cash flow risk.

One of MGRM's problems was the sheer size of the position it had taken. The 160 million barrels of oil that it had committed to sell were equivalent to Kuwait's entire production over an 83 day period. It has been estimated that the number of futures contracts needed to hedge the position would have been around 55,000. NYMEX was known to be a large and liquid market, but its trade in contracts relevant to MGRM's position averaged somewhere between 15,000 to 30,000 per day. There was thus a clear theoretical risk that MGRM could have problems liquidating its futures position. This risk created an imbalance in the market as many other

players realized the size of MGRM's position which became in it a factor in market pricing. Prices inevitably began to move against the company.

This liquidity risk was compounded by the cash flow risk which resulted from the way that MGRM's hedge had been structured. As was noted earlier, when oil prices went down, the value of the company's fixed rate forward contracts rose and the value of the futures fell. The problem arose because although the forward contracts increased in value, they did not generate the cash flow which was needed to fund the regular margin calls that were due on the futures contracts. The structure of the hedge had succeeded in dealing with price risk over the life of the hedge but had failed to deal with cash flow risk in the short term. This was probably the major factor in the staggering losses that the company suffered (Energy Price Risk 2003).

Legal Risk in the Oil and Gas Industry comparative analysis- An Example

Several aspects of the oil and gas industry—e.g. the capital-intensive nature of the industry, market price volatility, geographic scope of assets and operations, the high-risk nature of exploration and exploitation of natural resources, technology requirements, environmental concerns, downstream brand promotion and protection issues, political sensitivities, scale and diversity of employee base, etc.—give rise to particularly high levels of legal risk for international oil and gas companies.

The ability of a Chinese company in the oil and gas industry with operations or stock exchange listings outside of China to effectively manage its legal risk will increasingly be a factor in determining whether or not that company prospers or, in some cases, even survives. This is in large part due to the internationalization of Chinese companies following the government's recent directive to expand internationally ("走出国门"), and the increasing independence given to state-owned enterprises in this sector. The value of Chinese state-owned enterprises that are listed on foreign stock exchanges may be closely estimated by the number of shares listed multiplied by the per share stock price which is often referred to as the market capitalization of the stock. For example on September 25, 2005 SinoPec's New York Stock Exchange listing

(NYSE) reflected 72 million shares of stock issued and outstanding at a market price of US\$34.08 per share (market price) which results in a market capitalization of US\$2.45 billion. Should the market price per share decrease it may be said that the value of the state-owned portion of SinoPec also declines by the same amount. Accordingly the investors in SinoPec (including SASAC) have a very real interest in the management of the value of such listed companies.

As the widely reported legal problems faced by China Aviation Oil in Singapore demonstrate (see Case Study Four, page 20), as Chinese oil and gas companies expand outside of China, any deficiencies in internal management control systems in the company will render the company less able to address properly the heightened legal risks outside of China. This may result not only in potentially severe fines and penalties for the company, but also can seriously damage the company's image and reputation in the international industry, which can damage the overall business performance of the company. In addition, the value of a listed company as reflected in its market capitalization may be seriously reduced by such deficiencies.

Moreover, also as demonstrated by the China Aviation Oil case, senior managers inside and outside of China can face personal civil and even criminal liability.

Solution:

In order to survive and prosper in the international oil and gas industry, Chinese oil companies will need to invest in developing additional international-quality in-house legal resources and legal compliance systems. Specifically, investments must be made in the development and implementation of an appropriate legal affairs management infrastructure (know-how data bases, templates, checklists, training programs, audit functions, etc.), development of international-standard in-house legal professionals through internal and external practical legal training programs and related professional development incentive programs, and implementation of rigorous and comprehensive legal compliance systems for all critical

business operations of the company.

The traditional model of uncoordinated management of legal risks by overlapping in-house legal teams at different levels of Chinese group companies both increases costs and increases risk. Moreover, as demonstrated by the problems experienced by China Aviation Oil in Singapore, failure to implement appropriate internal control systems can lead to devastating consequences. Chinese oil companies thus should implement a centralized system of management of key legal matters, e.g. IPR, corporate securities regulatory compliance, international transactions, investment, dispute resolution, labor law compliance, etc. All inhouse lawyers in all group companies should report up through an independent reporting line ultimately to the general counsel at the HQ level, just as the finance function reports on an independent line up to the HQ CFO. Virtual teams of internal legal and non-legal personnel from both HQ and key subsidiaries can be set up to address key legal risk issues in a uniform manner with the support of appropriate external experts.

CHAPTER 3: PROBLEM IDENTIFICATION/OBJECTIVES

Risks are associated with every business or industry. Same is the case with oil trading. Identification of these risks and the way these risks can mitigate can help a trader or other market participants in the oil trading industry to accomplish their final goal. Thus the below mentioned are some of the objectives of the report:

- To study why risks arises in crude oil trading.
- To analyze the various risks faced by the companies or end users.
- To analyze the effect of price volatility on the market participants.
- To determine risk management process & tools.

CHAPTER 4: RESEARCH METHODOLOGY

The type of research that has been followed is DESCRIPTIVE RESEARCH because of the availability of data.

DATA COLLECTION:

With a specific end goal to achieve the targets of the study it is key to expressive the way in which it is to be led. That is the examination methodology is to be completed in a certain system. This undertaking requests a certain reasonable work. Consequently, it altogether dependent upon the SECONDARY DATA.

The gathering of the auxiliary information was by means of information accessible on the web, worldwide exploration papers, and sites of the heading trades, and so on in the wake of organizing the information and introducing it, the examination then need to move ahead towards conclusion by intelligent surmising. The crude information is then dissected.

- By bringing the raw data to measured data
- Summarizing the data.

CHAPTER 5: MANAGEMENT OF RISK & MITIGATING RISKS

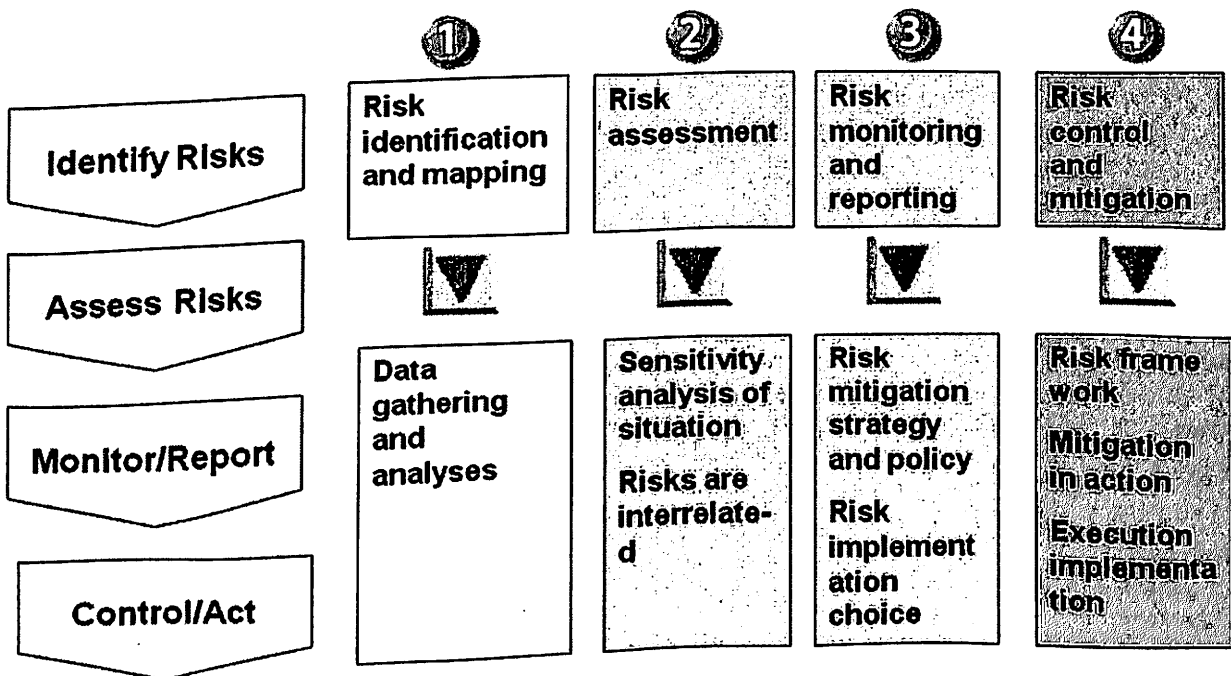
THE RISK MANAGEMENT

Hazard Management gives results of complex portfolios comprising of physical and budgetary, positions over all products, including unrefined petroleum, fills, coal, common gas, refined items, and force. Complete danger administration frameworks additionally give safe make preparations for the physical development, conveyance of products and the dangers connected with these exercises.

Hazard administration movement convey a solitary stage with the capability to view all uncover dangers, by completely coordinating all information and methods into one stage, and transparency over the front, center and back office.

THE RISK MANAGEMENT PROCESS

The risk management process



RISK IDENTIFICATION AND MAPPING

Risk is everywhere. Success in business depends upon recognizing and managing possible risks. The types of risks faced in most businesses are quite varied. Risks typically include both financial and physical categories. Types of risk include such as, counter party credit defaults, financial risks from exposures to market price volatility, legal liabilities and safety and health risks associated with operations. Risk categories include: Market, Credit, Political, Legal, Regulatory, Operational, Strategic, Event and Country Risks. So the first step is to identify possible risk. Identification is the most important part and must be carried out very carefully.

Mapping includes Data gathering and analyses – After risk identification next step is go for mapping that is to collect data regarding the risk factors in detail and then analysis it in a systematic manner.

Risk should be measured and aggregated across all derivatives activities to the full extent possible.

RISKS ASSESSMENT

Now the next step is to asses risk by **sensitivity analysis of situation** using the collected data and analysis report, as it risk must be calculated and the amount at risk must be find out .

Risks are interrelated - Risks are correlated so be aware in identifying and mitigating. For example, operational risks such as fraud may create legal risks, whereas exposure to credit risks may affect market price risks.

RISK MONITORING AND REPORTING

Risk monitoring and reporting is the third step which involves the full monitoring of the risk management process then making a report on the whole process focusing on the objective of risk mitigation and finding the solution for it. There should be a strong risk management information system for

- Controlling Risk
- Monitoring Risk
- Reporting Risk

It is carried out by taking the following step:

Risk mitigation strategy and policy – A risk mitigation strategy has to be formulated and design according to the situation which can be used for mitigation purpose; it must include all the relevant point required for the purpose. Two three strategy must be made so that there must be a choice at the time of implementation providing a variety and wider choice.

Risk implementation and choice- After risk mitigation strategy and policy is made and is ready for use with variety and choice now the correct strategy must be selected for the available once as there is a choice to select from different strategy before implementation for better result.

RISK CONTROL AND MITIGATION

Risk control and mitigation is the last and final step on risk mitigation process in which the policy and the strategy is implemented, it involves:-

Risk frame work- Risk frame work consisting of risk mitigation strategy and policy and the frame work plan for mitigation action and execution to be implemented.

Risk measurement strategy should be understood by concern persons- from individual traders to the Board of Directors - & it should provide a common framework for control and monitoring risk-taking activities.

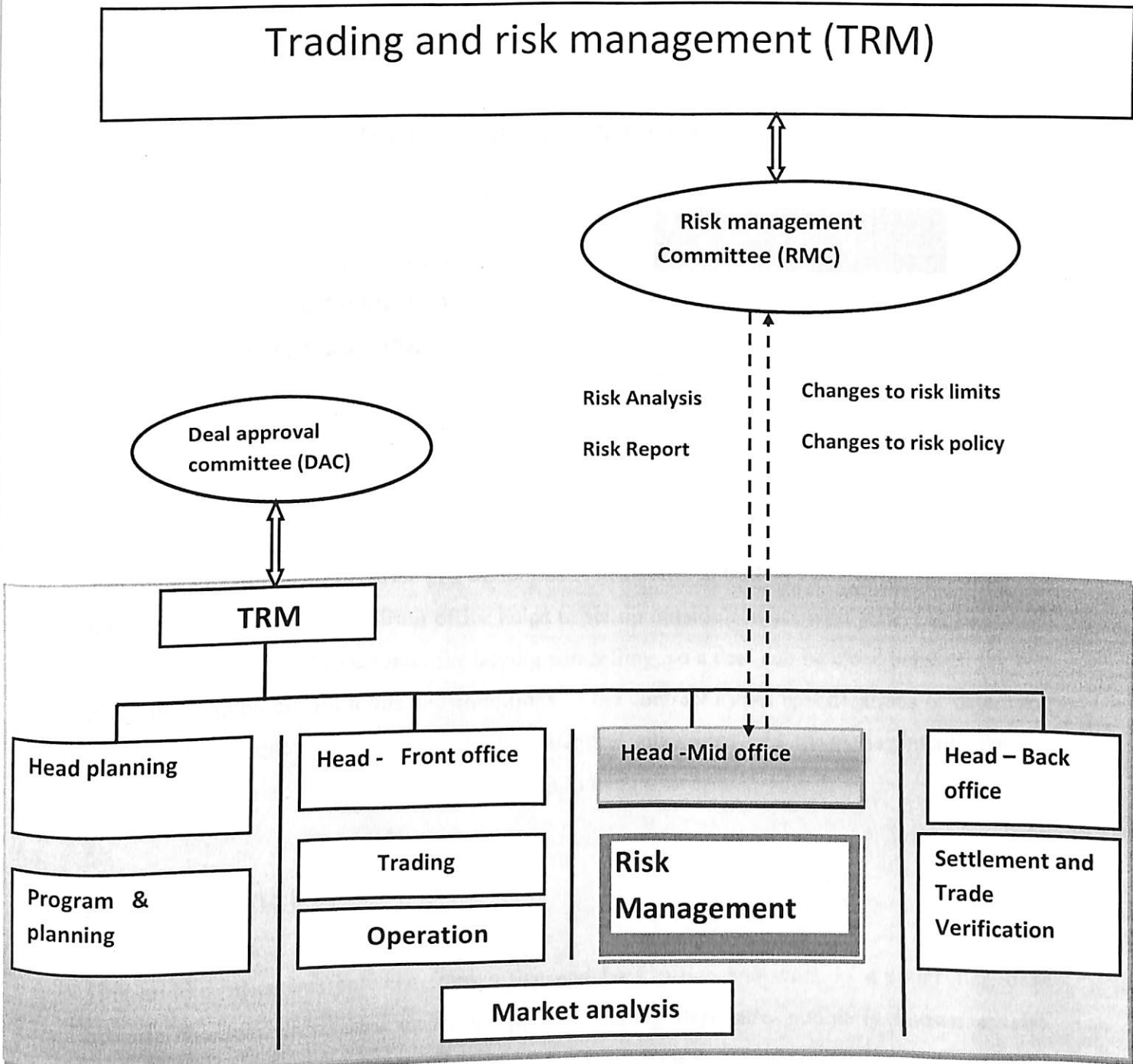
Mitigation in action- The plan is implemented the mitigation works starts here.

Execution implementation- Finally it is executed and implemented according to the risk framework.

REVIEW THE COST OF RISK MITIGATION

Transferring risks through hedging or other activities is often an effective & advisable risk management technique, but risk mitigation technique may largely depend on the hedge costs. Risk mitigation strategies also depend on the capacity of the firm to bear risks and possible losses. Trading activities like hedging should not be misunderstood as 'speculation'.

TRADING AND RISK MANAGEMENT



As we can make out from the typical layout of a trading desk and involvement of different offices like Front office, Middle office and Back office with risk management activity.

HOW TRADING AND RISK MANAGEMENT WORK.

Trading functions need to be separated into different functional units.

- Trading takes place in the **Front Office**
- Risk Control in the **Middle Office**
- Settlement in the **Back Office**

FRONT OFFICE

The main function of front office in a trading desk lies between trading and trading operation and how it is being done, as this front office helps to set up outside contact with sellers, it builds the relationship between the customer for buying and selling, so a deal can be close between the two party agreeing on certain terms and conditions of the contract as per specifications of date, time and delivery. Front office executes trade under the guidelines laid by management. Trading involves certain risk factors which are not dealt in front office.

MIDDLE OFFICE

This middle office lies between front office and back office and work as a connecting desk between the two. It is very important part of trading desk also popularly known as **risk management desk** because of its function of risk management activities.

Risk management is not about selling your product rather is about hedging your price risk which has nothing to do with marketing.

It consists of a risk management committee which is responsible for risk management work to be carried out in the trading process.

It takes the work of **risk analysis** technical and fundamental under RMC (risk management committee) through the Process of **indentifying** the risks involved in the process by expert analysis of committee members through their experience and knowledge and preparing a **risk report** of it which highlights the possible risks that can occur, by current **market analysis** of the situation.

After risk report is prepared it finds out the solutions to mitigate the risk involve by using various techniques as per requirement, hedging policy such as use of derivatives, tools and software's. It also decides upon changes to the risk limits and changes to the risk policy to be done. Middle office risk analysis activities help to guide front office desk.

BACK OFFICE

Back office is all about reporting on day-to day basis to management and keeps a check on trading activity of Front office.

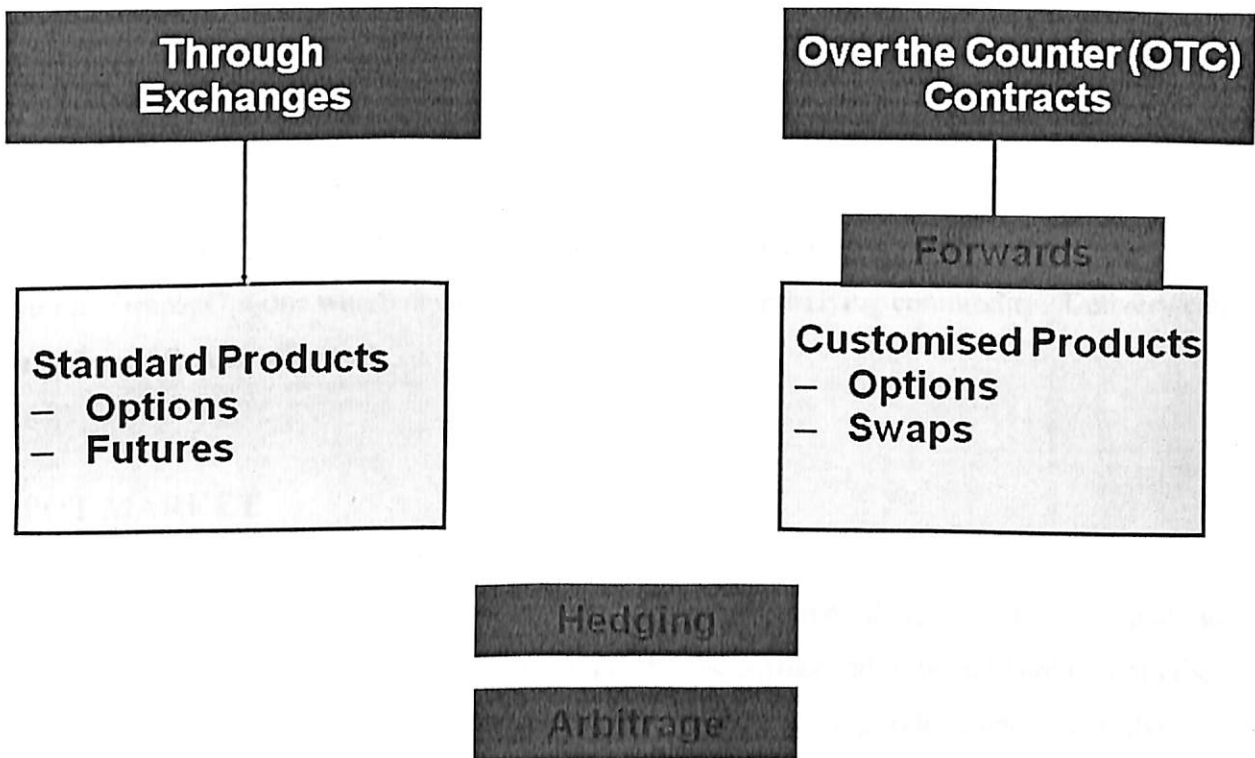
The back office carries out the work of settlement of deal and trade verification work. It mainly take up the financial activities involve in the whole trading process carrying out all the formalities and paper work to be done between the parties involve. It is headed by a finance director.

WHY AND WHEN DID WE BEGIN OIL RISK MANAGEMENT IN INDIA?

- De regulation phased during 1997 -2002.
- Exposure to price volatility, pressure on profit margin and inventory valuation.
- Domestic competition.
- Increasing crude imports and finished oil product exports.
- Reserve Bank permits Hedging in July 2002.
- Task force formed to develop policy framework in 2003.
- BPCL commenced Commodity crude oil and petroleum product hedging in 2004.

RISK MANAGEMENT TOOLS

Risk Management Tools



The use of risk management tool in energy trading have been slow to evolve in the energy market , but present state of affair is changing across in the energy complex, driven by energy market deregulation , globalization and privatization in many countries. As these countries are moving towards open markets, competitive forces that will led to much more active energy risk management.

There are many different kinds of risk management tools available for companies. Primarily, energy companies go for the following approaches to manage their risks.

PHYSICAL MARKETS

The physical markets trade both spot (current month) and forward (future months) contracts. Physical oil is sold and bought and the actual seller and actual buyer meet and enter into a contract to deliver and accept the cargo at a price agreed upon.

PAPER MARKET

Derivative market is an extension of physical market. Derivatives are instruments such as futures, swaps, Options which derive their value from an underlying commodity. Delivery can be enforced (but usually not)

SPOT MARKET

A **spot contract** is an agreement for buying and selling the commodity, at a price agreed at the time of the arrangement entering into the contract by the parties and to be delivered within the current month. Spot market prices show the volumes available for purchase and sale in the physical markets

For example, if an oil company has excess stock of it crude oil it can sell it in the spot, or near term, markets. Trading usually takes place between brokers over the phone.

FORWARD CONTRACTS

Forward contract allows the seller to lock-in a price today and guarantee the delivery of its product on the future date.

A forward contract is an agreement between two parties to buy or sell assets (i.e. energy product -oil, gas and power) at a pre agreed future date on the predetermined price while entering into the agreement. The terms and conditions of forward are customized based on negotiations between

the counter parties like specified quantity, other specifications like date, time, and delivery location are fixed in the contract. Physical delivery and actual payment occurs at maturity (on the future date agreed in the contract).

If the price at maturity (the spot price) is higher than the price in the forward contract, the seller suffers a loss and the buyer makes a profit, and. If, the spot price is lower, then it is the buyer who loses and the seller who gains. Advantage of forward contracts is that predetermined price will eliminates the risk of price changes for both the seller and the buyer.

Most forward trade is done over OTC, with transactions being made directly or through brokers on telephone, telex and fax.

Forward contracts are mostly used to hedge the risk of holding a certain energy product or of having the obligation of delivering it at a future date. This is called "forward cover" and it involves offsetting of transactions simultaneously in the spot and the forward markets.

The important features of the forward contract are:-

- No cash is paid when the contract is signed but paid at the time of maturity.
- The seller is obliged to deliver the commodity at the maturity of contract, but the buyer pays only transaction fees.
- The counterpart of the forward transaction may fail either to deliver the commodity or to pay.
- The initial position cannot be closed before maturity unless it is exchange traded.
- It is generally for one year.

OTC DERIVATIVES

Contracts that are traded directly between two eligible parties, with or without the use of an intermediary and without going through an exchange is OTC.

Over-The-Counter or OTC Market is where buyers and sellers of energy products generally execute transactions with each other, either by phone or electronically, by individually negotiating customized contracts to meet each party's specific needs. The vast majority of trading in physical energy products takes place in the OTC market.

In the simplest form OTC market means a direct interaction between two companies (counter parties), between a client and "intermediary" (the intermediary can either be a trading house, a bank or a brokerage firm). There is no involvement any exchange in it.

OTC derivatives are the customized transactions. OTC market is a popular option for price risk management purpose.

The OTC risk management instruments are forward contracts, non-standard swaps and OTC options in the OTC market. It is quite difficult to know much about OTC trade, because the market is not transparent, and intermediaries refuse to give any price quotes to those they do not know in the open market. Once a deal is done it is difficult to reverse it.

ENERGY DERIVATIVES

Derivatives contracts are financial instrument which derive their value from the underline asset or price like bond, equity or currency. Traders buy and sells derivatives to manage the risk involve in under lying asset, to protect against price fluctuations and to make profit from rise or fall in value. There are three main types of Derivatives futures contract, swaps contract and options.

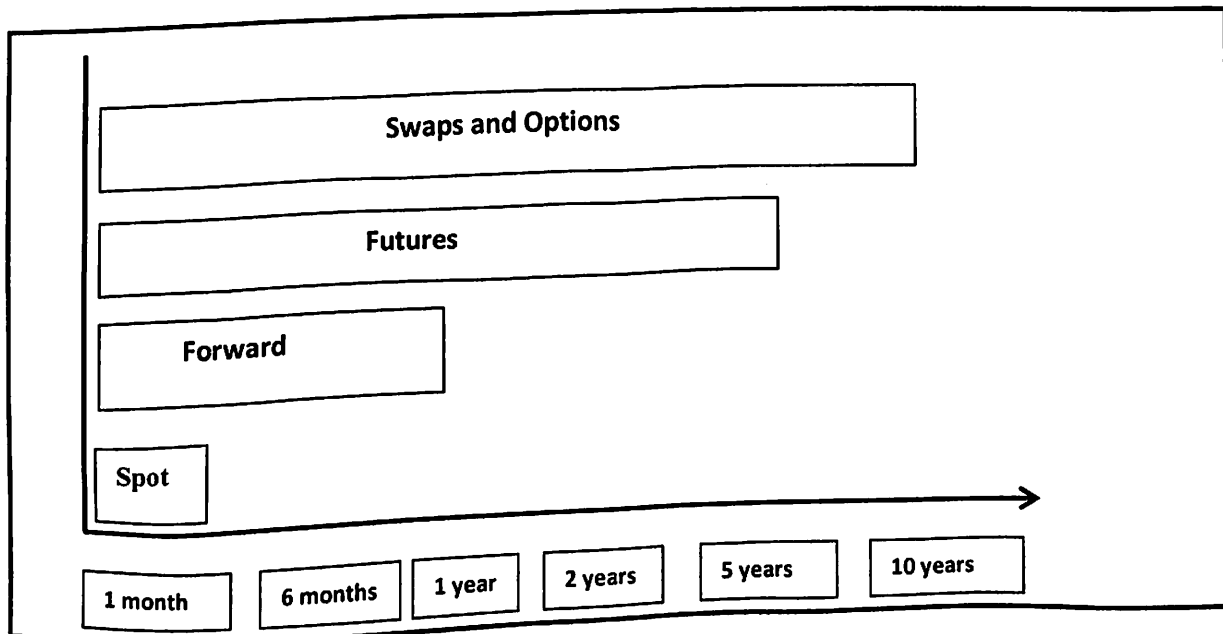
In a survey conducted in 2004 by the international swap derivatives (ISDA) www.isda.org. 100 of them agreed that *derivatives help companies manage financial risk more effectively*.

The key benefit of using derivatives is its helps companies to customize their risk profile and to assume only those risks that add value. They agree that by using derivatives as effective risk management tools, it enables companies to concentrate on their business operations.

FINANCIAL DERIVATIVES

The most frequently used financial risk management tools are futures, forward contracts, swaps, and options. Futures and options on futures contracts are financial derivatives that are standardized and traded on organized exchange. They are generally highly liquid and interchangeable. Swaps and forwards are customized agreements that are traded directly between counterparties in the OTC market.

OIL MARKET TRADING HORIZON



FUTURE CONTRACT

It is an exchange-traded legal contract, agreement to buy or sell an energy product (oil, gas, power) with standardized and specifications quality and quantity, at a certain date and time in future at a predetermined price agreed upon at the time of entering into the contract on a future exchange through clearing houses. On the contract date delivery of physical energy product take place unless it has been closed out.

Unlike forward contracts, a futures contract does not necessarily implies on physical delivery. The contract can be used to take physical delivery but the usual outcome is the offsetting of the contract on or before maturity (expire/closing date of the contract).

Advantages of using future contracts

- No need to negotiate as done through exchange
- Contract specifications are there by exchange
- Minimal counterparty risk involve, exchange is the guarantor.
- Initial position can easily be reversed.
- Delivery is not necessarily implied.
- Contract period mostly up to 18 months, sometimes 36 months
- Future contracts are used for speculation or hedging.
- This future contract is use to
 - Hedge price risk
 - Lock in the value of inventories

OPTIONS

An option gives the right but not the obligation to the option owner to buy or sell an underlying asset at a specific price at a specific time period in the future.

There are two types of option

- **Call options**, which give the holder the right to buy; and
- **Put options**, which give the holder the right to sell.

A **call option** is an option contract that gives the owner of the option the right but not the obligation to buy the underlying asset on or before a specific date & at specific price.

This specific price is called the **strike price** and buyer of the option pays a **premium** for the right to buy the commodity at the strike price.

The buyer of a call option has the right to buy the commodity at the strike price if the buyer wants to but the seller of the same call option has an obligation to sell it at the strike price.

The purchaser of a contract is known to “go long” the contract. A seller is referred to as “going short” the contract.

A **put option** is an option that gives the option owner the right, but not the obligation to sell the underlying assets on or before a specific date and at a specific price. This specific price is called the **strike price** and buyer of the option pays a **premium** for the right to buy the commodity at the strike price.

The buyer of a put option has the right to sell the commodity at the strike price if the buyer wants to do so the seller of the same put option has an obligation to buy the commodity at the strike price.

Benefits of options

- Limits the size of maximum loss but there is no limit on profit.
- When traded on Exchange it hedge price risk.

SWAPS

Swaps are negotiated agreements between two or more parties to exchange goods or cash flows over a period of time in the future.

Swaps are a relatively new form of OTC derivative trading instrument i.e. this instrument is not – trades in futures exchanges and has proved to be ideally suited to the complexities of the oil market. They were first introduced into financial markets in the early 1980s where they were used to hedge interest rate risks (Hull 2006).

Features of Swaps

- Physical delivery is not expected
- Purely financial instruments
- Lock in future price for long period

But it was soon realized that the same instrument could be used to transfer price risks for any asset, and swaps spread rapidly to the commodity markets, including oil. With them came new players such as the banks, who were seeking opportunities to diversify their investment activities and to apply their recently-acquired financial engineering skills.

CHAPTER 6: ANALYSIS; HOW TO HEDGE THE RISKS

HEDGING

Hedging is a risk reducing activity. It is done to minimize the risks arising out of business activities. Hedging involves equal and opposite price exposure in cash and derivatives markets simultaneous. It is done as a form of financial protection against adverse price movements in cash markets. Hedging can be used to lock in profits and to prevent losses from increasing or to minimize the risk in a portfolio.

Refineries, investing institutions, traders, banks & governments all use derivative products to hedge or reduce their exposures to market variables such as interest rates, bond prices, currency exchange rates and commodity prices such as oil and energy product.

An Example

A hedge involves establishing a position in the futures or options market that is equal and opposite of a position at risk in the physical market.

For instance, a **crude oil producer** who holds (is "long") 1,000 barrels of crude can hedge by selling (going "short") one crude oil futures contract. The principle behind establishing equal and opposite positions in the cash and futures or options markets is that a loss in one market should be offset by a gain in the other market.

The producer who sells futures contracts to lock into a price for delivering crude on a future date. The buyer is a refiner who wishes to fix a price for taking the delivery of crude in future.

Another case if a company is due to receive a payment in a foreign currency on a future date. It can enter into a forward agreement with a bank agreeing to sell the foreign currency and receive a predetermined quantity of domestic currency, or it can buy an option which gives it the right but not the obligation to sell the foreign currency at a set exchange rate.

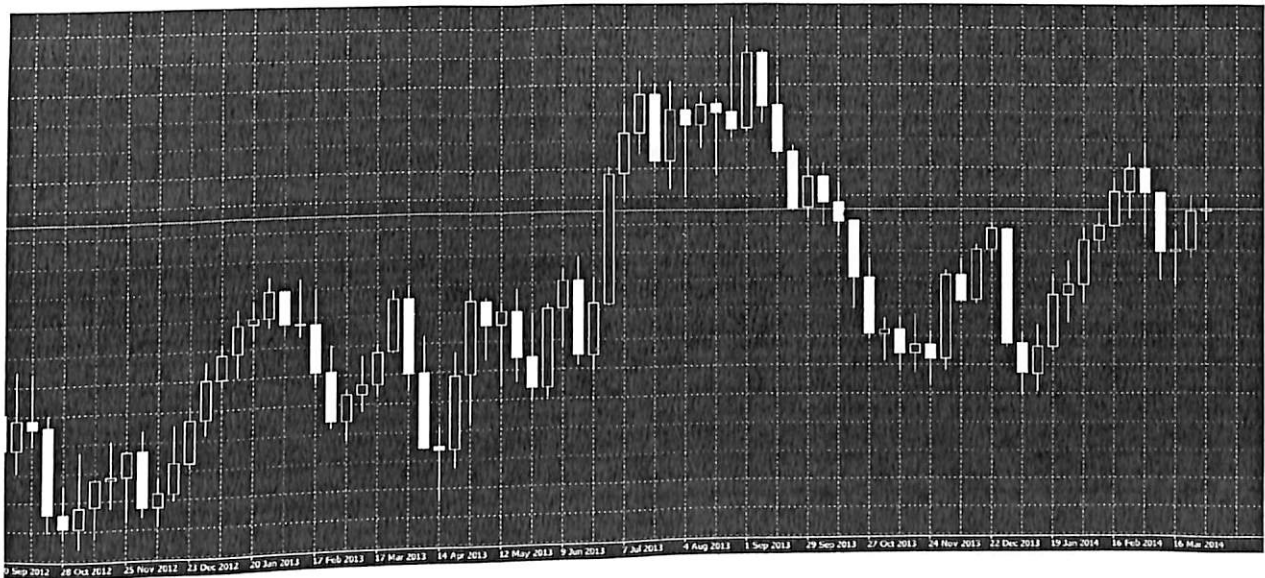
HEDGING THE PRICE RISKS

The price risks can be hedged and analyzed by the use of candle charts that are used to predict the future market position. A trader has to analyze this candle chart in order to be sure about the price movement of a commodity in a given or particular time period.

As in this report, our commodity is crude oil so we take our commodity as “crude oil” and see how different players seek to hedge the risk for this commodity.

Let us now consider the candle chart to demonstrate the price fluctuations in crude oil as a commodity. This candle stick bar is created on the standard software – GCI, that takes the data from the current market prices and post it to the chart forming a set of candles for each day.

STUDY OF THE CANDLE CHART



Each candle is formed in each day depending upon its prices fluctuations. There are various terminologies that are used in this candle stick chart that are explained below:

TOP CANDLE LINE

It denotes the highest price of the commodity that it has touched in a particular day.

BOTTOM CANDLE LINE

It denotes the lowest price of the commodity that it has gone through in that same day.

CATEGORISATION OF CANDLE

- FILLED CANDLE
- BLANK CANDLE

FILLED CANDLE

CANDLE TOP

It denotes the OPENING price of the commodity for a particular day.

CANDLE BASE

It denotes the CLOSING price of the commodity for the same day.

BLANK CANDLE

CANDLE TOP

It defines the CLOSING price of the commodity for the particular day.

CANDLE BASE

It defines the OPENING price of the commodity for the same day.

PREDICTION OF MARKET TREND

If the candles are formed above the neck line- **BULLISH MARKET**

If the candle are formed below the neck line- **BEARISH MARKET**

STRATIGIES OF DIFFERENT MARKET PARTICIPANTS

There are different market participants in the cude oil trading and the stratigies followed by them is also different as every market participants have their own interest to trade in the market. These different market participants and their statigirs are discussed below :

FOR A REFINER

Refiner will be facing risk or he will loss from the situation when

- If PRICE rise
- Then it will result in Rise in cost

Now to hedge this scenario, a refiner will may either go for

- Call option
- Futures

Call option will help the refiner in taking the decision of right to buy or not.

A refiner can also go for FUTURES but in this a refiner has to buy in the future price itself if the price falls.

For Example

BPCL hedges its refinery margins in the OTC swap market. The product cracks hedged are Naphtha, HSFO, Kerosene, and Gasoil. Counterparties involve are Banks, Traders and Majors oil companies.

All deals are done through tender. Tender invitations are only sent to counterparties who are registered with BPCL and have signed ISDA (International swaps and derivatives association).

Price volatility -Crude oil prices decline from \$147.27 and witness below of \$32.40 and currently hovering around \$50.00 levels

FOR A PRODUCER

- If MARKET falls
- It will result in loss

Thus he will always wish for higher prices.

A Situation on OVER THE COUNTER:

A **producer company** which wants to cover itself against the price risk decline for a quantity of oil it has can sell it on the forward market and buy back it when the physical transaction has taken place. If prices fall, the company will make a profit on the paper trading which will partially offset its losses on the physical trading. Thus a risk management comes into play.

When the banks, trading houses & brokerages offer OTC instruments they are risk-averse as they try to limit or even eliminate the risks, when they offer risk-management instruments for offsetting transactions either on OTC, on futures exchange or through physical trade.

Use of FORWARD CONTRACTS:

If a **trader** holds a position in the spot market of a certain commodity, he can safe guard himself against the adverse price movements by selling the same amount of that commodity in the forward market at forward price. In this case, he would be holding a “short position” in the forward market and when the forward contract matures, the trader sells the commodity at the specified price, avoiding the risk of a price decline in the during the contract period. This will enable him locking in the price, and, of course, his profit margin.

An **oil refiner** may go for forward contracts to secure crude oil for his refinery future operations, and avoiding both volatility in oil prices and the need to store oil.

(long position-when a person buys forward or futures contracts, that person is said to have gone “long” or to be holding a “long position “and when a person sells the forward or future contract he is said to have a short position)

Use of SWAPS in Crude Oil Spot Markets:

Company A owns both an oil field and a refinery, and these two assets are located approximately 100 miles from each other. Company B also owns an oil field and a refinery, located 50 miles apart. However, the distance between Company A’s oil field and Company B’s refinery is 25 miles and the distance between Company B’s oil field and company A’s refinery is 35 miles. Thus, it makes economic sense for both companies to swap their crude and send the oil to each other’s refinery, assuming they are of the same grade. If the grades are different, a pricing differential will be agreed upon between the parties.

Use of PUT OPTIONS in crude oil trading:

Company A (**producer**) buys a put option from Company B (**refiner**), to sell 10,000 barrels of crude oil at 60\$ per barrels which expire date of MAY 31. This gives Company A the right to sell the crude oil to company B at a known price of 60\$ per barrels. As long as the price of crude oil is greater than 60\$ per barrels Company A will not exercise the option to sell the crude oil to Company B as it can sell the crude at a higher price in the market, but when crude price falls below 60\$ per barrels. Company A will sell crude to company B at 60\$ per barrels.

If the price goes down to 55\$ per barrels it will bring a profit of 50,000 \$ for company A as it can sell it on 60\$ per barrels to company B.

This profit also represents Company B's loss means what the buyer of the put option gains, the seller of option loses.

Use of CALL OPTION:

Company A (**refiner**) buys a call option from Company B (**producer**), to buy 10,000 barrels of crude oil at 60\$ per barrels which expire date of MAY 31. This gives Company A the right to buy the crude oil from B at a known price of 60\$ per barrels. As long as the price of crude oil is less than 60\$ per barrels Company A will not exercise the option to buy the crude oil from Company B as it can purchase the crude at a lower price, but when crude price is greater than 60\$ per barrels. Company A will buy crude from company B at 60\$ per barrels.

If the price goes up to 65\$ per barrels it will bring a profit of 50,000 \$ for company A

This profit also represents Company B's loss means what the buyer of the call option gains, the seller loses.

Speculators

Speculators are person who participate in markets in order to make a profit from trading. They take price risk in order to get potential rewards that are profit. Speculators buy when they think prices will rise and sell when they think prices will fall.

Arbitrageurs

It is a combination of Wet and paper trading together. It is buying of Crude Oil from one market and selling it to another taking advantage of Price dislocation in different markets. It becomes possible because of inefficient price discovery, paper Market, and sudden changes in respective home market An arbitrage is a deal that produces risk-free profits by exploiting a mispricing in the market.

A simple example occurs when a trader can purchase an asset cheaply in one location and simultaneously arrange to sell it in another at a higher price.

CONCLUSION

Today risk management is an integral part of every business. The business like oil trading has huge volumes in term of quantity and monetary term also and is important source of energy. The oil market is very volatility and requires risk management activity through the help risk management process and various derivatives tools like future contracts, forward contracts, hedging, speculation, arbitrators, option and swaps in a great extent.

Various stakeholders and their role in mitigation risks in oil trading and the role of derivatives like option, swaps, and future contracts are used extensively. The massive volume of trade always puts the traders on the edge of huge financial losses. Those losses can only be mitigated through the use of those derivatives and by great risk managers.