



# OIL & GAS INDUSTRY

## Rating Methodology

The rating methodology for the oil and gas sector is similar in approach followed for rating industrial concerns outlined in our publication 'Industrial Corporates' in October 2003. The prime concern is the level and stability of cashflows which provide coverage to debt servicing requirements and to outstanding debt. As unique risk and

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The peculiar factor in rating the oil and gas industry is that the revenue generation capability depends upon the quantum and value of proven reserves of oil and gas which are finite resources with limited availability globally.

The oil and gas industry may be broadly divided into the upstream and downstream segments. The upstream operations comprise exploration and production (E&P) companies while the downstream operations comprise the value-added segment including refiners and marketers.

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of natural gas is in the power, fertilizer and household sectors while that of oil is in the power and transport sectors. Currently, the entire demand for natural gas is met locally. However, as gas is increasingly being substituted for oil as fuel in industrial concerns, negotiations are underway for laying of pipelines from Turkmenistan, Iran and Qatar. In case of oil, most of the demand is met from imports.

Global supply for crude oil is governed by the Organization of the Petroleum Exporting Countries (OPEC). It comprises ten developing, oil-exporting countries and it coordinates the petroleum policies of the member nations to ensure stability of oil prices in the international markets. OPEC's oil exports comprise about 55% of the oil traded internationally and hence, variations in the production levels impact global prices. Political shocks in any of the OPEC countries can seriously affect oil supply

and prices as has been observed during the Gulf Wars.

Globally governments support the oil and gas industry due to the strategic nature of the asset. In Pakistan, the sector falls

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under the Ministry of Petroleum & Natural Resources. The direction of regulatory policies has remained favorable through successive governments to promote local and foreign investment in order to accelerate production as an alternative to the high import bill of oil and for generating self-reliance. Also, this sector is a significant source of revenues to the government due to the high tax incidence arising from royalties on production and sales taxes at the retail level.

One instance of the favorable policy environment is that sales receipt for the international E&P companies is in US Dollars. This provides a hedging mechanism against exchange rate movements to some extent. The government has also reduced its initial holding in exploratory fields and is now privatizing its shares in producing fields.

The off take of oil and gas becomes assured for local producers due to the shortfall in supply. The Government of Pakistan has the right to purchase crude oil and natural gas from the producers at the well-head price offered under the prevalent Petroleum Policy. The base oil and gas prices are linked to a basket of Middle East crude oils according to a specified formula and are adjusted

accordingly down the value-added chain.

The gas prices move within a range as a floor and a cap is assigned while the oil prices move freely with adjustment for difference in quality. There is also exchange rate volatility risk for local companies.

The industry is capital intensive which is a significant barrier to entry. The E&P sector requires continuous investment in exploration and production activities. There is substantial initial cost for refiners and marketers to set up operations. Periodic outlay is also required for the plant maintenance activities essential for cost and quality control and safety assurance.

The sector is heavily subject to environmental regulations. For upstream companies, huge cost is incurred at the time of field abandonment in cleaning and clearing of the sites. For downstream companies, emissions control and safety measures at the storage and supply sites are important. We analyze such exposures on case-to-case basis to judge the level of potential outflow and the presence of sufficient liquidity to finance it.

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ity of cashflows generation projected each year to repay the outstanding debt of the company.

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An integrated company can sustain a riskier capital structure due to their diversified cash flows stream. However, overall none of the industry participants can support an elevated capital structure due to the risk of fluctuations in prices and large and relatively non-discretionary capital spending patterns.

Presence of off balance sheet financing is also factored into the analysis. In the case of securitization, off balance sheet debt is raised by committing a cashflows stream for debt servicing. For the purposes of analysis, the securitized receivables are isolated from the cashflows of the company being rated to calculate debt servicing ratios.

JCR-VIS rates the oil and gas industry through the cycle as temporary fluctuations in performance should not influence the ratings if long-term change in performance is not expected. Sensitivity to cyclical factors also varies along the rating spectrum and the ratings of companies at the lower end of the rating band tend to be more volatile.

The sustainability of ratings is tested in the worst-case scenario based on the stressed yearly cash-

flows position and the projected debt servicing requirements.

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However, integrated companies engaged in both upstream and downstream segments operate with greater stability in cashflows and could attain comparatively higher ratings.

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## RISK DRIVERS OF UPSTREAM OPERATIONS

The upstream segment is subject to the highest risk and return factors within the oil and gas industry. This segment receives the most benefit of the increasing trend in world oil prices as is exemplified in the current scenario brought about by the disruption of supply from Iraq in the OPEC cartel. On the other hand, it also carries the greatest risk from exploration activities. The company may be subject to serious cashflows strain due to declining reserves which may lead to declining production levels.

The generally higher gross margins in the segment allow the companies to build up cash reserves for conducting exploration activities that entail significant capital expenditure, as availability of external funding is scarce for this purpose.

For comparing the bottom line profitability of different E&P companies, JCR-VIS considers their policy to book exploration expenditure on the profit and loss

statement. A conservative view is to expense the costs in the year in which they occur. However, this leads to extremely volatile profitability.

Better matching of costs with expenses results with the 'successful efforts' approach which capitalize successful exploration against future production, and expense it in case of a dry hole when it becomes certain. Regardless of the expense policy, the expenditure will be reflected in the cashflows statement in the year in which it occurs.

The credit quality of E&P companies will be led by the returns being generated from operations, the size and quality of reserves which will go in production in the coming years and the company's history of investment and success in exploration activities.

The risk associated with the capital structure is assessed for the maximum stress based on the projected cashflows from proven developed and producing reserves, which can be estimated with reasonable certainty under current pricing assumption, and the exploration plans of the company.

Few E&P companies may attain a high rating band due to the price and reserve replacement risk. However, companies that show sufficient cashflows from proven producing reserves to mitigate these risks and fulfill financial obligations in a timely manner may be rated higher.

External funding may be possible for production and infrastructure development needs due to the comparatively low risk associated, however, it is scarce for exploration activities as they carry high risk. Internally generated funds are utilized for this purpose and the board of directors should formulate a judicious dividend policy to ensure sufficient retention of funds for the purpose.

### Reserves Position

The focal point of the analysis conducted by JCR-VIS for rating E&P companies is the reserve position of oil and gas. The reported financial statements of such companies are unique as these core assets are not reflected on the balance sheets.

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Reserve analysis involves measuring the quantum of reserves available to the company and the level of optimal yearly production versus the risk arising from price volatility, periodic need for workovers, high cost acquisitions or over-estimated reserves with potential for reserves write-downs.

E&P companies are dependent upon technology and expertise of manpower for effective interpretation of seismic surveys, reliability of reserves valuation and conduct of efficient production. Independent valuation of reserves by valuers of international repute using advanced technology increases the reliability of the assessed reserves position. Due to the fluctuations in prices, the actu-

al value of the proven reserves may also differ at different points of time apart from the impact of

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the ongoing production and sale of barrel equivalent of oil (BOE i.e. including natural gas and LPG converted into barrel terms).

Broadly, reserves may be classified as proved developed and producing, proved undeveloped and proved not producing. The proved developed and producing reserves are the cash generators for the company and are utilized for meeting operational and other capital expenditure needs. A balanced mix of oil and gas and the quality of the reserves i.e. higher or lower oils provides protection from adverse fluctuations in the level of demand or price in any commodity. Reserves from which production has been halted are termed as proved, not producing.

The proven, undeveloped reserves require significant capital expenditure to bring them into production. They carry higher risk as compared to the producing reserves as unforeseen problems may arise during production.

The annual production levels can be modeled with reasonable accuracy over the life of the reserves and the periodic capital outlay which may be required. These are evaluated against the company's yearly requirements for cashflows for meeting obligations.

The production curve is generally a parabola and the produc-

tion levels decline as the reserves fall below a certain level due to low pressure. Also technical problems may arise in production requiring significant expenditure to increase the production levels. There are a number of techniques including uplift techniques, secondary recovery techniques etc to resolve these situations.

A rough estimation of the life of the reserves may be made by calculating the reserve life index (RLI) by dividing the annual production volumes with the estimated reserves. A longer RLI will ensure a certain level of cashflows over that period even without new discoveries; however, the NPV of reserves may differ with price fluctuations.

A company should replace at least 100% of its production each year with new reserves to ensure future availability of reserves or its operations will

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decline. The company's scale of operations, the number of concessions held by it, geographical dispersion of fields, status of depletion of fields and a healthy mix of reserves mitigate the risk of gradual reserve depletion and production disruptions.

The reserve booking practices of companies being rated are analyzed for their degree of conservatism. If there have been frequent downward revisions of reserve estimates in the past then the management would appear to be optimistic in their estimations.

An important exercise is to analyze the source of reserve

increase over the last few years i.e. whether it has come from new discoveries, extension of fields or field acquisitions. Generally, it is seen that increases in reserves of E&P companies arise mainly from field extensions and enhanced recovery techniques. This may give comfort on the depth of the un-booked reserves for new fields to be realized in future.

In assessing the risk of exploration activities being conducted, certain factors should be considered. The geographical characteristics of the area in which exploration is being carried out is studied for probability of discovery, proximity of the exploratory areas to any existing reserves and the successful outcome of any study carried out in the past etc.

The country's historic success rate in exploratory activities has been 1:3 as compared to 1:10 internationally due to the low scale of operations and targeted exploration locally. The company's past success rate is evaluated by estimating the number of successful wells drilled by the company as a ratio of the total wells drilled. The management's expertise and credentials in this area are important including the credentials of the

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companies to which different functions are outsourced including geological and seismic surveys, drilling.

Finding and development costs per BOE of reserves i.e. total cost incurred to add and develop a barrel of new reserves to the point of production, are estimated

over a period. Cost efficiency is critical in cyclical companies as the low cost operators have a greater chance of survival during a downturn.

JCR-VIS stress tests the value of proven reserves and the yearly production projected for different price scenarios.

### The State of Production Facilities

Oil and gas production is a continuous process and the high degree of automation of the plant will provide the management with timely information

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on the production status. The state of production facilities and the adequacy of the maintenance practices will determine the current and future efficiency of the plant and hence, is looked into closely by JCR-VIS. A rough measure to determine adequate level of expenditure for maintenance of plant facilities is the capital expenditure to depreciation ratio.

The age of the plant and the expected life dictate when the company will have to incur large capital expenditure for replacement. Corrosion control in the equipment is also an important factor as the equipment is of long-life and is mostly installed underground.

Safety measures are of supreme importance in appraising plant facilities due to the inflammable nature of the product. Fire and other safety precautions at the plant should be clearly indicat-

ed and strictly enforced. Proper fire fighting systems should be installed at the production facilities, processing plants and storage facilities.

The control system should have early warning signals and alarms with remote emergency shut down switches for wells at various locations. Any past accidents are noted by JCR-VIS including the reason for the occurrence and the steps taken to avoid it.

The amount and extent of insurance coverage on plant and facilities are important cashflows protection factors examined by JCR-VIS. Some companies also take insurance for interruption in production along with damage to properties which safeguards against production loss in case of any disruptions.

### **RISK DRIVERS OF DOWNSTREAM OPERATIONS**

Downstream operations include refiners and marketers/retailers. While associated risks are comparatively less as compared to E&P companies, return margins are also narrower

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and vulnerable to price fluctuations. The cost efficiency of operations is the key success factor for the downstream industry.

### **Level of Technology**

JCR-VIS appraises the adequacy of technology employed by the company to be operationally competitive. The degree of plant

automation, plant efficiency, quality control systems, and the capability of MIS to integrate operations and support decision-making are appraised.

Marketing companies operate mostly on cash and / or with a large number of small accounts which have to be managed prudently. Therefore, the cash management and control systems are critical for these companies. have to be managed prudently.

The cost efficiency of the refineries depend largely upon the type of technology employed; hence, the refineries are vulnerable to technological changes. Refinery margin per barrel of output is considered to determine production efficiencies.

### **Refinery Size & Reliability**

Economies of scale in production are necessary to generate profits for refineries due to their high fixed costs. Since it is a volume driven business, the economic size of the plant coupled with plant reliability and capacity utilization are considered.

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Plant reliability depends upon the age of the plant, adequate maintenance and safety procedures. JCR-VIS analyzes the breakdown time of the plant which occurred during the year from regular maintenance activities and from technical problems or accidents to determine the reliability of the plant operations. Low reliability will increase production costs as well as hurt client relationships.

On the other hand, replacement costs are significant due to the capital intensive nature

The product slate i.e. the mix and grade of oils and gases produced are considered to evaluate the market demand and prices of the products. High production of low margin and low demand products will decrease the profitability of the refinery.

### **Retail Configuration for Marketers**

Investment in real estate for retail outlets typically forms the biggest outlay for marketing companies. On the other hand, it does not necessarily contribute to the profitability of the company. A cost-benefit analysis is required to determine the feasibility of establishing owner-operated stations as compared to dealer-operated outlets.

Branding is also an important aspect of marketing. Since the government regulates prices, the consumers differentiate between different brands on the basis of quality for increased mileage, low maintenance costs, environment impact and quality of service at the pumps.

High throughput per outlet i.e. volumes sold in each retail outlet will also drive profitability with consideration to the level of investment required in operations. The mix of products being provided at the outlets is also considered for this purpose. For instance, sale of lubricants carry higher gross margins and the prices are also not regulated. The retail market share of the mar-

eters is determined within its niche market and in the region of operations.

### **Geographical Diversification & Logistics**

Geographical diversification for marketers may decrease cost efficiencies. However, they are more vulnerable to the change of pace in economic activity which may impact demand in particular regions at particular times.

Presence in geographically diverse area guards them against both supply and demand shocks as re-location entails problems of developing new supplier relationships and generating customer loyalty from scratch.

### **Inventory Management**

Inventory management is most critical to the downstream oil and gas operations for two reasons. Firstly, the carrying cost of inventory tends to be substantial due to the nature of the asset. Secondly, there is price risk to the refiners and marketers in periods of decreasing prices.

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Proximity to suppliers and customers is important to reduce the inventory volume through periodic supply rather than bulk storage. However, run-out may significantly hurt business, especially for the marketers at the retail outlets. On the other hand, transportation costs can become high in case of periodic supply depending upon the location of the supplier and the mode of transportation. The run out costs and the transporta-

tions costs have to be considered to determine the optimal inventory levels to be maintained.

JCR-VIS also assesses the management's role and performance in managing the cashflows in cyclical companies. They have to

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understand and plan for the potential

magnitude and time frame for downturn for their company and manage finances accordingly. Their strategies for conducting operations and achieve business growth, financial policies and internal control systems are analyzed for reflection of the risk appetite. **JCR-VIS**

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**Faheem Ahmad**

President & CEO, JCR-VIS  
Founder, VIS Group

Faheem Ahmad has diverse experience with international consulting agencies in USA & Middle East. He has also held senior positions with local industrial and financial groups. In 1994, he established Vital Information Services (Pvt.) Limited, which is a leading capital market research house. VIS has the largest data bank of corporate Pakistan. His major research work includes copyrighted F&J financial strength rankings, Musharaka Variable Income Securities and stock market indices. VIS group includes JCR-VIS Credit Rating Company Limited and News-VIS Credit Information Services (Pvt.) Limited, the first private credit bureau of Pakistan. The majority of shareholders in group companies include the largest publication house in Pakistan and major financial institutions.

He obtained his B.S in Civil Engineering from NED University of Engineering and Technology, Karachi. He also has Masters degrees in Engineering and Business Administration from USA. His research work has been published in various international journals.



**Sadaf Aliuddin**

Unit Head - Corporates

Sadaf Aliuddin is involved in ratings in the industrial sector and in structured finance. Prior to joining JCR-VIS, she worked on several projects pertaining to strategic planning and organizational building as well.

She holds a Masters degree in Business Administration from the Institute of Business Administration, Karachi.

Jahangir Kothari Parade (Lady Lloyd Pier)

Inspired by Her Excellency, The Honorable Lady Lloyd, this promenade pier and pavillion was constructed at a cost of 3 Lakhs and donated to the public of Karachi by Jahangir Kothari to whose generosity and public spirit the gift is due. Foundation stone laid on January 5, 1920. Opened by Her Excellency, The Honorable Lady Lloyd on March 21, 1921.

*Dome: A roof or vault, usually hemispherical in form. Until the 19th century, domes were constructed of masonry, of wood, or of combinations of the two, frequently reinforced with iron chains around the base to counteract the outward thrust of the structure.*

*Origins: The dome seems to have developed as roofing for circular mud-brick huts in ancient Mesopotamia about 6000 years ago. In the 14th century B.C. the Mycenaean Greeks built tombs roofed with steep corbeled domes in the shape of pointed beehives (tholos tombs). Otherwise, the dome was not important in ancient Greek architecture. The Romans developed the masonry dome in its purest form, culminating in a temple built by the emperor Hadrian. Set on a massive circular drum the coffered dome forms a perfect hemisphere on the interior, with a large oculus (eye) in its center to admit light.*



Jahangir Kothari  
Parade

## National Excellence, International Reach

JCR-VIS Credit Rating Company Limited is committed to the protection of investors and offers a blend of local expertise and international experience to serve the domestic financial markets. With its international reach, JCR-VIS is positioned to aim for an international mark. In this regard, the global experience of our principal, Japan Credit Rating Agency, Ltd. has been invaluable towards adding depth to our ongoing research endeavors, enriching us in ways, that enable us to deliver our responsibilities to the satisfaction of all investors.

The edifice of the Jahangir Kothari Parade has stood proudly through the years and is a symbol of our heritage. Its 'Dome' as the most stable of building structures, exemplifies architectural perfection. Committed to excellence, JCR-VIS continues its endeavor to remain an emblem of trust.

## Credit Rating Company Limited

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Founder Shareholder of Islamic International Rating Agency, Bahrain  
JV Partner in CRISL, Bangladesh  
Member Association of Credit Rating Agencies in Asia

First Floor, PIDC House  
M.T. Khan Road, Karachi - Pakistan  
Tel: (92-21) 5680766, 5680996, 5671822, 5671833  
Fax: (92-21) 5681105, 5671600  
E-mail: vispk@cyber.net.pk  
Website: www.jcrvis.com.pk