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Global Integrated Oil & Gas Industry

Summary

The purpose of this methodology is to provide investors and other interested parties with a clear understanding of how Moody's assigns ratings to issuers and their obligations in the global Integrated Oil & Gas sector. Our goal is to assist the market in understanding the qualitative and quantitative factors that we consider most important for this sector and how they map to specific rating outcomes.

This methodology is not an exhaustive treatment of all the factors reflected in Moody's ratings of the Integrated Oil & Gas sector, but should enable the reader to understand the key considerations and financial ratios used by Moody's in determining a rating in this sector.

We believe that this methodology will enable the reader to gain insight into Moody's rating criteria. However, we caution that our rating process involves a degree of judgment that from time to time will cause a rating outcome to fall outside the expected range of outcomes based on strict application of the factors presented herein. In such situations, we will outline the differences and rationale in our Credit Opinions and company-specific Analyses.

Moody's analysis of the Integrated Oil & Gas Sector focuses on six main rating areas. These are:

1. Reserve and production characteristics
2. Re-investment risk
3. Operating & capital efficiency
4. Downstream rating factors
5. Financial metrics
6. Geographical/Geopolitical Risk Diversification

In addition to the above areas, Moody's also analyzes other factors that are common across all industries such as liquidity, corporate governance, and political/institutional risk.[1]

1. *Please refer to Moody's Special Comment "The Application of Joint Default Analysis to Government-Related Issuers" (April 2005).*

Industry Overview

ABOUT THE RATED UNIVERSE

Moody's rates 22 companies that are classified as integrated oil and/or gas companies. These are companies which have integrated operations from upstream (exploration and production) to downstream (refining and marketing), and occasionally midstream (pipelines and transportation, including LNG and oil shipping). We have included 16 of the 22 issuers in our universe of global integrated oil & gas companies for the purposes of this Methodology.[2] While the average rating is A2, this largely reflects the distorting effect of the presence of companies from developing markets, whose ratings are constrained by various factors.

More broadly, the universe is made up of (1) the large majors and super-majors, which are rated in the Aaa and Aa rating categories; (2) smaller and/or more aggressively leveraged players with some regional concentration, whose ratings commonly fall into the A and sometimes Baa rating categories; and (3) regionally concentrated companies, often with significant scale and political clout, whose ratings are primarily driven by geopolitical or sovereign-linked factors and therefore range from the A to B rating categories, depending on the region.

Integrated Oil & Gas Industry-Rated Companies

Company	Senior Unsecured or Corporate Family Rating	Outlook	Domicile	Total Proved Reserves (million boe)	Total Production (million boe p.a.)	Reported Total Debt (in $ millions)
ExxonMobil	Aaa	Stable	US	20,954	1,570	8,293
BP	Aa1	Stable	UK	18,019	1,452	23,091
Total	Aa1	Stable	France	10,801	920	19,972
Royal Dutch Shell	Aa1	Negative	NL/UK	11,649	1,330	14,422
Chevron	Aa2	Stable	US	11,252	868	11,272
ENI	2 (Aa2)*	Stable	Italy	7,081	585	17,295
Statoil	3 (Aa2)*	Stable	Norway	4,289	402	5,513
Norsk Hydro	3 (A1)*	Stable	Norway	2,076	209	3,651
Petrobras	4 (A2)*	Stable	Brazil	11,820	698	20,938
ConocoPhillips	A3	Review Up	US	8,488	605	15,002
Marathon Oil	Baa1	Stable	US	1,139	121	4,073
Repsol YPF	Baa1	Stable	Spain	4,718	413	12,866
PEMEX	4 (Baa1)*	Stable	Mexico	17,271	1,579	39,292
Rosneft	6 (Baa3)*	Review Up	Russia	9,996	148	13,697
LUKOIL	Ba1	Stable	Russia	20,094	666	3,874
PDVSA (a)	6 (B1)*	Developing	Venezuela	102,147	1,269	7,015

* *Numerical rating reflects baseline credit assessment per Moody's Methodology for Government-Related Issuers. Rating in parentheses is Global Local Currency rating or Foreign Currency rating in cases where there is no Global Local Currency rating. For an explanation of baseline credit assessment please refer to Moody's Special Comment entitled "The Application of Joint Default Analysis to Government-Related Issuers" (April 2005).*

(a) *Data for PDVSA at December 31, 2003.*

CURRENT INDUSTRY RATING TRENDS AND RISK FACTORS

High Oil and Gas Prices

Currently, oil and gas prices are at their highest levels since the oil shocks of the 1970s. Our expectation is that prices will remain at high levels for the foreseeable future due to continued growth in demand, particularly in Asia, combined with a relatively small cushion of spare production capacity among members of OPEC, the organization that acts as a global swing producer. This situation is further impacted by a relatively tight refining capacity situation around the world, particularly for the conversion of heavier crudes. (See Sidebar for discussion on how we factor prices into our methodology.)

The sharp rise in oil and gas prices has led to a windfall increase in earnings and cash flow for integrated oil firms and independent Exploration & Production (E&P) companies. As a result, most companies are showing robust credit metrics, with reduced financial leverage and a build-up of cash on their balance sheets. The excess cash flow requires managements to make important decisions as to how to best deal with the surplus. Many are returning cash to their shareholders through increased dividends and more aggressive stock repurchase programs.

2. *Moody's rates the following integrated companies but does not include them in the universe of this Global Methodology because they are part of a wider group or part of the State; or because they do not provide sufficient financial and operational information to be evaluated in our model: Petronas (rated A1, stable, Malaysia), TNK-BP (rated Ba1, stable, Russia), Gazprom (debt ratings Baa2, Review Up, foreign currency rating Baa3, Review Up, Russia), Sibneft (Ba2 / Ba3, Review Up, Russia), YPF (Baa2, stable domestic currency, B3, stable Corporate Family Rating, Argentina) and Yukos (rated Ca, stable, Russia).*

Robust Refining Margins

Global economic growth over recent years has increased the demand for refined products to historically high levels, but refining capacity has not kept pace. Although refiners have continued to invest in expansions and upgrades of existing refineries, few new refineries have been built. Since the most recent cyclical trough in refining margins in 2002, average annual margins have been trending up, exceeding in each year the average for the previous five years.

In addition, as oil and gas prices have risen, the spread between light and heavy crudes has widened considerably. This is due to the relative scarcity of lighter versus heavier oils as the world's oil production becomes heavier. It is also a function of refining capacity, because the world lacks sufficient conversion capacity to convert the heavier oils into light products such as gasoline. This has resulted in higher refining crack spreads for those refiners able to process heavy sour crudes, a situation likely to persist until new conversion capacity is added.

Rising Cost Structures

The fundamental issue driving record oil and gas prices is the increasing difficulty and expense in replacing oil and gas reserves around the globe. As a result, finding and development costs are rising, and with them, the value of oil and gas properties. The prices paid for property acquisitions have risen sharply in the past several years, with typical transactions now exceeding $10 per barrel-of-oil-equivalent (BOE) reserve added (vs. $6 - $7 per barrel in 2000).

At the same time, operating costs are rising, driven by higher drilling charges and oil field services costs. The net result is that, despite higher oil and gas prices, the projected return on investment - as measured by the leveraged full cycle ratio - has not meaningfully increased for the sector as a whole. Furthermore, rising cost structures create the risk that an unforeseen reversal of high energy prices will result in reduced financial flexibility for some companies, particularly those that have relied on debt to fund their expansion.

Political Risk

Tight supply/demand conditions not only result in record high oil and gas prices but they also tend to increase global political risk for integrated and independent producers. Producing countries, many of which are in the developing world, attribute greater value to their properties and push for an increased share in the windfall (e.g. Venezuela). In some cases, access to future properties is curtailed or denied altogether (e.g. Russia). Countries with large and growing energy needs (e.g. China and India) undertake strategic decisions to acquire properties and thus have become formidable competitors for the integrated oil companies. In the extreme case that a physical shortage develops, the specter of nationalism and expropriation could appear.

Event Risk

Event risk is the risk that the occurrence of an unforeseen or unquantifiable event will result in a rating change that would fall outside what could be reasonably expected through the analysis of a company's key rating factors. We believe that event risk remains high for the oil and gas industry.

Incorporating Commodity Price Risk

In analyzing the global integrated oil and gas industry, Moody's looks to maintain some consistency of ratings during periods of both high and low oil and gas prices. Therefore, we need to take into account commodity price volatility and incorporate an expected range of oil and gas price fluctuations. We do not, however, seek to forecast energy prices precisely. Rather, our price assumptions are derived through: an examination of macroeconomic trends, including oil and gas supply and demand factors; discussions with issuers and market participants across the full spectrum of the industry; and our own element of pragmatism and conservatism.

Our current price assumptions are as follows:

- **Oil**: Using West Texas Intermediate (WTI) as the benchmark, we expect that for the next twelve months oil will average in the high U.S. $40's per barrel range. Over the medium term (a three year view), we expect that oil will average in the low U.S. $30's range. Our stress test case uses the low U.S. $20's range.
- **North American Natural Gas**: Using Henry Hub as the benchmark, we expect that for the next twelve months North American natural gas will average in the U.S. $5-$7 per million Btu range. Over the medium term (a three year view), we expect that it will average in the U.S. $4-$6 range. Our stress test case uses the U.S. $3-$3.50 range.

Our price assumptions are used to help us project a company's earnings, cash flow and base level capital spending over the medium term. We ask companies to give us their plan using our base case assumptions. They are free to use other assumptions as well, but if they do not use our price deck we will sensitize their numbers. We look at the one year projection to help us analyze a company's liquidity, which we incorporate into our Liquidity Risk Assessments (LRA) for investment grade companies and into our Speculative Grade Liquidity Ratings (SGL) for non-investment grade companies.

We use the stress test analysis to examine whether companies can remain profitable at the stressed price levels, what levels of cash flow they can be expected to generate, and whether they would be able to reinvest sufficient capital to replace and/or grow production.

The key driver of today's high oil and gas prices, namely the relative lack of re-investment opportunities at low costs, creates the problem of how to deploy the excess cash being generated. While we expect stock repurchases to be a core activity for most companies in the near term, companies that cannot grow production at a level that satisfies the stock market will come under pressure to make very large stock repurchases or to undertake recapitalizations that negatively impact their credit profiles. Moreover, if oil and gas prices retreat to more moderate levels, we could see a wave of consolidation as companies feel pressure to maintain their returns.

KEY RATING ISSUES GOING INTO THE NEXT DECADE

Sustainability of High Oil and Natural Gas Prices

The oil and gas industry is currently experiencing record commodity prices, leading to strong, often record, earnings and cash flow. Oil doubled in price between the end of 2003 and August 2005, while natural gas, which began rising before oil, has increased from the mid-single digits (US$ per million Btu) to the high single digits. More significantly, it is not only near-term prices that have moved up but the entire forward curve, with oil and gas prices remaining high through the end of the decade.

Historically, oil and gas prices have been cyclical, rising and falling with economic activity as well as shifting supply and demand. In spite of these cycles, prices have tended to revert to mean levels over time. The key question is whether we are observing another cyclical high with prices likely to return to historical averages, or whether there has been a structural change in the price level. As noted in the previous section, we are evaluating companies using somewhat higher prices than we have historically used; however, it is not clear whether the industry's fundamental credit quality has improved.

Ability to Replace Reserves and Grow Production

Global integrated oil & gas companies are finding it increasingly challenging to replace their reserves and grow production, especially organically or through the drill-bit. They also face the dilemma that the larger they become, the more difficult it is to replace existing reserves organically. The oil and gas industry, particularly in North America and the North Sea, is becoming more mature, with virtually all major basins in decline. As conventional oil and gas opportunities become scarcer, companies are drilling in ever deeper waters offshore, conducting more exploration and development operations internationally, and putting more focus on unconventional natural gas reservoirs, gas-to-liquids (GTL) and oil sands, which introduces geological, technology and execution risk. Another reserves replacement challenge is that national oil companies control most potential international oil and gas acreage.

Increasing Costs

As commodity prices have increased, companies' cost structures, both capital and operating, have come under considerable pressure. Capital costs are rising because of acquisitions, many at historically high prices. In addition, capital costs have been rising because of increased competition among producers for drilling rigs, workover and completion rigs, and other oilfield services.

As noted above, oil & gas companies are challenged to replace production and therefore are drilling in ever deeper waters, drilling deeper and longer wells, often horizontally, and employing more technically complex completion techniques, all of which are adding to higher capital costs.

In addition to the higher capital expenses, higher commodity prices are also directly affecting cash operating costs, including production and severance taxes, electricity, gas compression and supplemental recovery such as thermal and carbon dioxide flooding. If commodity prices decline significantly, companies with higher cost structures will be challenged and their ratings could be pressured. Finally, decommissioning costs are likely to add to industry cost pressures, as companies will be faced with larger bills when exiting mature or depleted basins.

Industry Consolidation

Despite the mega-mergers that have taken place over the past decade (e.g. Exxon and Mobil, BP and Amoco, Total, Fina and Elf, Chevron and Texaco), we expect to see continued consolidation in the industry, driven primarily by reserve replacement pressures and the need to diversify geographically. Recent significant activity among the major oil companies included Chevron's acquisition of Unocal, as well as Norsk Hydro's acquisition of Spinnaker Exploration Company. Event risk, particularly around acquisitions, will continue to be a ratings consideration. Furthermore, we may see greater forms of co-operation between international and national oil companies.

About This Methodology

To explain our approach to rating the global Integrated Oil & Gas sector, we will proceed through the following key steps:

1. IDENTIFICATION OF KEY RATING FACTORS

We identify six key rating factors that are critical for the credit analysis for Integrated Oil & Gas companies. These factors are:

1. Reserve and production characteristics
2. Re-investment risk
3. Operating & capital efficiency
4. Downstream rating factors
5. Financial strength, measured in key credit metrics
6. Geographical/Geopolitical risk diversification

These factors can be quantified and benchmarked across the Integrated Oil & Gas industry globally.

2. MEASUREMENT OF THE SIX KEY RATING FACTORS

We present a set of metrics that can be used to quantify each of the six key rating factors. Our metrics comprise both financial statement measurements (e.g. retained cash flows relative to net debt) and operational measurements, which are derived from the reports of most rated companies.

For each rating factor, we describe more than one measurement. In total, this rating methodology incorporates 15 separate measurement criteria spanning the six key rating factors. In considering these 15 factors, note that one factor may carry greater weighting than another, as it may - in our view - represent a particular strength or weakness for a particular company.

3. MAPPING TO THE RATING CATEGORIES

For each of the 15 measurement criteria, we describe "appropriate" ranges for Moody's broad rating categories (Aaa, Aa, Aa, Baa, Ba, B, etc.). For example, we identify what level of retained cash flow (RCF) to net debt is generally acceptable for a 'Aa'-rated company versus a 'Baa'-rated company, as well as the level of reserve replacement we would expect for a 'Aa'-rated company vis-à-vis an 'A'-rated company.

At the same time, we attempt to take account of company-specific factors including, for instance, the tension between "scale" and "reserve replacement," given that the larger a company's reserve base, the more challenging it is to fully replace that reserve base (i.e. by 100% or more) every year. We also point out the limitations of mapping measurement criteria to rating categories, particularly where a specific factor takes an overwhelmingly greater weighting.

4. THE RATING METHODOLOGY APPLIED: COMPANY MAPPING FOR EACH FACTOR

To illustrate the global rating methodology, we have applied it to the Integrated Oil & Gas universe, as defined above, demonstrating each of the 15 measurement criteria that describe the key rating factors, and the indicated rating for each measurement.

We also identify "favorable" and "unfavorable" outliers, i.e. companies whose metrics would appear to argue for a rating that is two or more rating categories higher or lower than their actual rating (e.g. a Baa-rated company with a metric more appropriate for a Aa-rated company or vice versa). In the vast majority of circumstances, these divergences occur as a result of one particularly highly weighted overriding credit factor, which is often found in asset concentration.

Integrated Oil & Gas - Mapping Grid

	Aaa	Aa	A	Baa	Ba	B	Caa	Sub-factor Weighting
Factor 1: Reserve & Production Characteristics (25% weighting)								
Total Proved Reserves (billion boe)	> 10	5 - 10	2 - 5	1 - 3	0.5 - 1	0.25 - 0.5	< 0.25	12%
Total Production (million boe p.a.)	> 1,000	400 - 1,000	200 - 400	100 - 200	50 - 100	25 - 50	< 25	8%
Total Proved Reserve Life (Yrs)	> 12	10 - 12	8 - 10	6 - 8	4 - 6	2 - 4	0 - 2	5%
Factor 2: Re-investment Risk (10% weighting)								
3-Year All-Sources Reserve Replacement	> 150%	130% - 150%	110% - 130%	100% - 110%	80% - 100%	60% - 80%	< 60%	5%
3-Year All-Sources F&D Cost	< $5	$5 - $6	$6 - $7	$7 - $10	$10 - $12	$12 - $15	> $15	5%
Factor 3: Operating & Capital Efficiency (10% weighting)								
Return on Capital Employed (ROCE)*	> 18%	16% - 18%	14% - 16%	12% - 14%	10% - 12%	7% - 10%	< 7%	5%
Leveraged Full-Cycle Ratio on 3-Year All-Sources F&D	> 2.0x	1.5x - 2.0x	1.25x - 1.5x	1.0x - 1.25x	0.5x - 1.0x	0.25x - 0.5x	< 0.25x	5 %
Factor 4: Downstream Rating Factors (15% weighting)								
Total Crude Distillation Capacity (000'bpd)	> 3,000	2,000 - 3,000	1,000 - 2,000	500 - 1,000	250 - 500	50 - 250	< 50	5 %
# Refineries with Capacity > 100 M bpd	> 15	9 -15	6 - 8	3 - 5	2	1	0	5 %
Segment ROCE**	> 25%	20% - 25%	15% - 20%	12% - 15%	7% - 12%	5% - 7%	< 7%	5 %
Factor 5: Financial Metrics (30% weighting)								
Retained Cash Flow / Net Debt	> 50%	40% - 50%	30% - 40%	20% - 30%	10% - 20%	5% - 10%	< 5%	7.5 %
EBIT/ Interest Expense	> 20x	15x - 20x	8x - 15x	3x - 8x	2x - 3x	1x - 2x	< 1x	7.5 %
Gross Debt / Total Proved Reserves	< $2.50	$2.50 - $3.50	$3.50 - $4.50	$4.50 - $5.50	$5.50 - $6.50	$6.50 - $9.50	> $9.50	7.5 %
Gross Debt / Total Capital	< 30%	30% - 35%	35% - 45%	45% - 55%	55% - 65%	65% - 75%	> 75%	7.5 %
Factor 6: Geographical/Geopolitical Risk Diversification (10% weighting)								
Geographical/Geopolitical Diversification	High			Medium		Low		10%

**EBIT / Average Capitalization (incl. debt) on 3-year average*
*** Downstream EBIT / Average Downstream Capital Employed (3-year average)*

The Six Key Rating Factors

FACTOR 1: RESERVE & PRODUCTION CHARACTERISTICS

Why it Matters

An integrated oil company's petroleum reserves and production are its primary source of cash flow and usually generate its highest capital returns. The reserve base drives most key credit metrics and is the company's greatest source of exposure to commodity price risk, capital re-investment, and market valuation. While financial results and ratios are important to credit rankings, reserves and production generally provide a better measure of a company's size, scale and competitive position than financial metrics such as assets, revenues and cash flow. Moreover, under GAAP accounting, the capitalized balance sheet values of oil and gas production assets capture only the invested cost in finding and developing reserves, not the current market value or replacement cost of reserves in the ground.

Reserve analysis focuses on the quantity and quality, or economic value, of the reserves, portfolio balance, cost structure, and on the cash flow and value of production. It provides a company snapshot and helps pinpoint future production and cash flow trends, sensitivity to price declines, sources of poor returns, high cost acquisitions, and exposure to future writedowns of over-valued reserves. Analysis of reserves and production also points up significant company and industry trends, and provides the basis for further analysis of a company's operations.

Positive Rating Indicators

- A large and stable-to-growing portfolio of oil and gas reserves
- A large base of mature core production and stable-to-increasing production volumes
- Identified sources of future production growth

- Balance of oil and gas assets and diversification by geography, geological basins, and political regime
- Durable reserve portfolio with total proved reserve life in 10-12 year range

Measurement Criteria

- Total Proved Reserves
- Total Production
- Total Proved Reserve Life Index

Notes on Measurement Criteria

Size and Diversification: In mapping reserves and production, we are implicitly promoting size as a major rating factor for evaluating the integrated companies and their reserve bases. It should be clear from our ratings that larger companies tend to be rated higher than smaller companies. Larger companies benefit from greater asset diversification, financial resources and liquidity, and economies of scale. They can withstand shocks or downturns better than smaller firms. Size can also be strongly correlated with other positive characteristics such as operating success and longevity, and diversification, whether it is geographic, by commodity, by price realizations, etc.

The large integrated companies tend to operate in more geographic areas and geologic basins, providing significant protection from a range of industry events such as weaker commodity prices, downstream margin squeezes, unexpected internal or political disruptions to operations, quality or basis (location) differentials that affect realized prices, rising oil field service or other cost inputs, and so on.

Large companies are usually the product of many years of successful organic growth and, as has been seen in the past decade, have often been aided by mergers and acquisitions. In fact, much of the impetus behind industry consolidation is that the largest companies have a competitive advantage and ability to partner and compete with host governments and national oil companies, with a larger capital base to support expensive multi-year projects. For the major oil companies, we explicitly look at and map diversification with reference to a broad range of characteristics, which will be discussed later. However, in analyzing reserves and production, size implicitly incorporates a degree of diversification.

Proved Reserves: Proved reserves represent a store of current and future value that can be quantified and compared among companies. For credit purposes, we rely only on proved reserves, an approach consistent with industry lending practices and conservatism in evaluating debt protection (as opposed to equity valuation, which focuses on upside growth potential). Proved reserves are estimated by petroleum engineers who are either company employees or external reserve engineers. For financial reporting, the reserve estimates are generally prepared annually and disclosed as supplements to the financial statements.

Proved reserves come from known reservoirs and can be produced with "reasonable certainty" under current pricing and technological operating assumptions. They can be subdivided into proved developed (PD) and proved undeveloped (PUD) reserves to reflect differences in the timing, certainty of production, and required capital to bring proved reserves into production.

Proved developed reserves (PDs) are produced from existing wells. As producing assets, they provide the greatest degree of certainty and cash flow protection for debt service and re-investment in existing production and new reserves. Proved undeveloped reserves (PUDs) provide a lesser degree of certainty and cash flow protection. They carry higher geological risks, and require capital spending to become PD cash generating assets. PD reserves typically compose upwards of 70% of the proved reserves of integrated companies. In recent years PUDs have increased as a relative share of total proved reserves, particularly among the independent E&Ps, most of which have 30% or more of their reserves booked as PUDs.

Since the integrated companies generally have larger internal capital resources, balance sheets, and longer investment horizons than the independent E&P companies, an increase in the proportion of PUDs is a less critical issue, albeit still very germane. Their inclusion in proved reserve analysis can distort or overstate a company's real reserve and production growth prospects. This was at least part of the problem inherent in Royal Dutch Shell's massive 2004 reserve restatement.

Production Profile: Production is the source of current cash flow and, in contrast to reserves, can be measured very accurately via the regular reporting of revenues in the financial statements. An assessment of a company's production and where its projected growth will come from is essential to judging credit risk. As with reserves, large production is a distinguishing characteristic for the integrated companies, which typically have a mature and diversified base of stable cash generating fields that underpin their drilling programs and capital investment. They usually can project production out three to five years based on current development projects and identified discoveries.

These profiles are typically disclosed publicly, albeit in varying detail. However, many variables and assumptions are involved, and the farther out a projection extends, the less certain the ultimate outcome. For the majors, given the immense size of their asset base, production growth beyond 1% - 3% per year represents a significant challenge.

The depletion profile of a producing property also needs to be well understood to assess cash flow coverage, reserve life, and re-investment risk. For example, a company could have a short-lived reservoir with a high decline rate (as is the case in the Gulf of Mexico), a longer-lived field with several years of plateau production and a long tail, or mature long-lived production from a heavy oil field with a lower present value. A balance or array of different types of profiles can thus be an important form of diversification.

While familiarity with a company's reserves and production at a given point in time is important, we are more focused on trends over a multi-year period. This will be discussed in more detail as part of the Re-investment Risk rating factor, but it is important to note that we evaluate companies dynamically and not from a static perspective. We look at the overall trend in reserves and production, whether they are generally increasing or decreasing and the reasons why, as well as the volatility of a company's production and cash flow.

Reserve Life Index (RLI): The RLI measures a company's asset and cash flow durability based on its proved reserves and production. In theory, the RLI, which is measured in years, shows how long a company can produce hydrocarbons at current production rates, until reserves are depleted. RLI assumes no replacement

Petroleum Reserve Disclosures

North American companies that file with the SEC must comply with its guidelines for reporting reserves, whereas companies outside North America may use another standard. Petroleum companies disclose their proved reserves once a year in their annual reports or in 10-K filings with the Securities and Exchange Commission in a section called Supplemental Oil and Gas Information, which typically follows the footnotes to the audited annual financial statements. This disclosure is required by FAS 69 and includes total oil and gas reserves for the past three years, as well as a breakdown of the sources of annual changes to reserves by certain categories (discussed as part of the re-investment rating factor). These disclosures also commonly provide geographic breakdowns on reserves and production.

Production volumes are reported both annually and quarterly in press releases and 10-Q filings. As noted, production volumes can be more clearly measured than reserves since they are the basis for reported revenues. Industry and regulatory standards define how volumes of oil and natural gas are measured, which provides a greater degree of reliability and transparency. The FAS 69 disclosure also provides an annual production figure for oil and gas.

A primary challenge in measuring reserves is that companies are only required to disclose their reserves annually in the FAS 69 disclosures. Intra-year changes in reserves cannot be readily determined since companies are not required to disclose these values. Companies produce oil and gas continually, which reduces reserves, while drilling and remedial activities throughout the year add to reserves. As the calendar year progresses, the prior year-end reserves become increasingly more stale. In addition, companies buy and sell reserves during the year that may or may not be disclosed. For significant acquisitions or divestitures, companies often disclose in a press release the volume of proved reserves bought or sold. We add or deduct these values to the prior year-end reserves volumes to determine a pro-forma intra-year reserves number.

A further challenge is to balance the use of reserve information provided with the appropriate context and understanding of its subjectivity and limitations. The term "proved reserves" implies something that is known with certainty, when in fact proved reserves cannot be measured directly. Proved reserves represent estimated volumes of oil and natural gas in underground reservoirs that can be economically produced using current technology. While reserve calculations are underpinned by a significant amount of science, engineering, and decades of industry experience, they ultimately rely on engineering and managerial judgment and are not required to be independently audited. Moody's attempts to strike an appropriate balance by qualitatively considering the company's policies and procedures and the critical assumptions and estimates used to measure proved reserves.

For a more detailed discussion of reserve definitions and issues, please see the Financial Reporting Assessment on the Oil & Gas Exploration and Production Industry shown in the Related Research section.

of reserves. It can be measured on a BOE basis, or for either oil or natural gas, or on a total proved or PD basis. A longer proved reserve life generally indicates more capital investment flexibility and better production support for debt service. With a longer RLI, a company has more flexibility to reduce capital investment and ride out a period of low prices without seriously impairing its asset base.

In assessing the RLI, Moody's looks at the absolute level of the reserve life and the RLI trend. In contrast to the independent E&Ps, for which we emphasize PD RLI, for the integrated companies we tend to focus on and have mapped total RLI, partly because the integrateds have larger capitalizations and longer investment cycles, but also because they have other sources of cash flow to support investment, such as free cash flow generated by the downstream and cash from periodic asset sales.

Nevertheless, the PD RLI is a valuable metric for a closer look at asset and cash flow durability. The PD RLI measures only the PD reserves and thus provides a clearer indication of true reserve durability absent further investment. The RLI does not address reserve quality and it needs to be analyzed along with other reserve characteristics. For example, a long total proved RLI could indicate increasing PUD bookings, which effectively lengthens reported total RLI, since total current production is measured against undeveloped reserves that are not producing.

Factor Mapping: Reserve & Production Characteristics

	Aaa	Aa	A	Baa	Ba	B	Caa
Total Proved Reserves (billion boe)	> 10	5 - 10	2 - 5	1 - 3	0.5 - 1	0.25 - 0.5	< 0.25
Total Production (million boe p.a.)	> 1,000	400 - 1,000	200 - 400	100 - 200	50 - 100	25 - 50	< 25
Total Proved Reserve Life (Yrs)	> 12	10 - 12	8 - 10	6 - 8	4 - 6	2 - 4	0 - 2

Company Mapping: Reserve & Production Characteristics

Company	Senior Unsecured or Corporate Family Rating	Outlook	Total Proved Reserves (million boe)	Total Production (million boe p.a.)	Total Proved Reserve Life (Years)
ExxonMobil	Aaa	Stable	Aaa	Aaa	Aaa
BP	Aa1	Stable	Aaa	Aaa	Aaa
Total	Aa1	Stable	Aaa	Aa	Aa
Royal Dutch Shell	Aa1	Negative	Aaa	Aaa	A
Chevron	Aa2	Stable	Aaa	Aa	Aaa
ENI	2 (Aa2)*	Stable	Aa	Aa	Aaa
Statoil	3 (Aa2)*	Stable	A	A	Aa
Norsk Hydro	3 (A1)*	Stable	A	Baa	Aa
Petrobras	4 (A2)*	Stable	Aaa	Aa	Aaa
ConocoPhillips	A3	Review Up	Aa	Aa	Aaa
Marathon Oil	Baa1	Stable	Baa	Baa	A
Repsol YPF	Baa1	Stable	A	Aa	Aa
PEMEX	4 (Baa1)*	Stable	Aaa	Aaa	Aa
Rosneft	6 (Baa3)*	Review Up	Aa	Baa	Aaa
LUKOIL	Ba1	Stable	Aaa	Aa	Aaa
PDVSA	6 (B1)*	Developing	Aaa	Aaa	Aaa

** Reflects Moody's Methodology for Government-Related Issuers*

Positive Outlier

Negative Outlier

Observations

There is a high degree of positive correlation on the mapped ratings for reserves and production and the credit ratings of the integrated oil peer group. A substantial proportion of the industry's reserves are concentrated with the majors and national oil companies (NOCs), reinforcing all of the benefits of scale, asset and cash flow durability and diversification cited. This trend has only intensified with the industry consolidation that has taken place over the past decade.

Notable negative outliers include Royal Dutch Shell, with an 8.8-year RLI (and shorter PD RLI). We have not downgraded its credit rating to the degree suggested by the metric, with the Aa1 actual rating (negative outlook) hinging on its global leadership position, strong balance sheet, and roster of large-scale development projects that are expected to contribute to future growth. Notable positive outliers are LUKOIL, PEMEX, Rosneft and PDVSA.

Their large reserve bases and long RLIs almost all map to Aaa, reflecting unmatched assets under their control as state-owned (or former state-owned) entities, but also significant "immature" reserves in need of investment dollars and development expertise. The real sources of ratings divergence for these companies, of course, are political and other sovereign-related issues that exert a downward impact on their ratings.

FACTOR 2: RE-INVESTMENT RISK

Why it Matters

A petroleum company's key asset, its reserve base, is finite and depletes with every barrel produced. To survive, a company must reinvest substantial capital consistently and successfully over a long period of time to find new reserves and replace and grow its production. Otherwise, its reserves and market value will dwindle and the company will eventually liquidate. This fact ties in directly with the use of RLI, as previously discussed, as a mapped metric.

An assessment of re-investment risk focuses on the consistency and repeatability of a company's reserves replacement, and how economically a company replaces production, as measured by unit finding and development (F&D) costs. A company that consistently replaces its oil and gas production with fresh reserves, and that does so at competitive costs, will be more likely to survive industry and commodity cycles and service its debt over long periods of time. On the cost structure side, unit F&D costs have significant implications for a company's future profitability, its competitiveness, and its ability to function under both high and low commodity price scenarios. Unit F&D costs also become a key input to capital efficiency measures, which are discussed as a key factor in the next section.

Positive Rating Indicators

- Consistent reserve replacement from all sources in excess of 100%
- Competitive F&D costs at or below industry averages
- Successful execution of reserve replacement strategies and integration of acquired reserves
- Acquiring reserves at competitive prices and successful integration of reserves into upstream strategy

MEASUREMENT CRITERIA

- Three-year all sources reserve replacement
- Three-year all sources finding and development (F&D) cost

Notes on Measurement Criteria

Reserve Replacement Ratio: Reserve replacement is a key measure of drilling or operating success. It is the ratio of reserves added in a given year to that year's production. Analysis of reserve replacement starts with all of the various sources of replacement ("all sources"), which include extensions and discoveries (E&D), revisions (both upward and downward), and acquisitions. All-sources reserve replacement can be further deconstructed into organic or "drill-bit" replacement, which includes E&D and revisions, but excludes the beneficial impact of acquisitions. Because a company is liquidating if it is not replacing its reserves, in mapping ratings we would view 100% replacement from all sources as a minimum investment grade metric.

Looking at the sources of replacement can help pinpoint the quality of a company's drilling efforts and success over time and can shed light on key reserve attributes and the effectiveness of capital invested. It is important to understand the nature of the reserve changes and the underlying assumptions, which are not always clear from public disclosures. A pattern of extensions and upward revisions could mean that exploration and development are progressing as planned and point to conservatism in reserve booking practices. Frequent downward revisions could indicate liberal booking practices, reservoir performance issues, unduly optimistic development assumptions, or changing economic conditions.

Price-driven revisions also need to be assessed. The standard practice is to estimate year-end reserves based on year-end commodity prices held constant for the life of the reserves. Moody's looks at the sensitivity of a company's reserves to changes in commodity prices, especially if prices are unusually high at the calculation date. International reserves are often subject to a production sharing agreement (PSA) or contract (PSC). These contracts are structured to return more barrels to the host country when oil prices are high, resulting in a negative reserve revision (and reduced production volumes) for the company, even though cash flows may not be affected. They also provide a floor or recovery mechanism when oil prices are low, resulting in positive reserve revisions.

While organic reserve replacement and acquisitions each bear particular risks, organic replacement is generally viewed as a more reliable indicator of reserve success. Companies developing their own properties are often perceived as being better able to "control their destiny" rather than depending on the acquisitions market at any given time.

Acquisitions also introduce a level of event risk, which is reflected in financing methods and in the price paid for reserves, with its attendant impact on cost structure and asset returns. That said, for most of the integrated oil companies, niche and corporate acquisitions have typically played a very key role in reserve replacement, reflecting myriad opportunities, but they also reflect the increasingly difficult challenge of replacing reserves. Ultimately, whether a company follows an organic or acquisition replacement strategy, or some combination, the key issue is how consistently it executes its strategy to create a durable oil and gas portfolio.

Analysis of reserve replacement also involves qualitative factors such as the geographic and geologic fit of reserves with the rest of the portfolio, the proportion of developed and undeveloped reserves, and the economic value of the new reserves. Most of the major integrateds hold and have focused on building large legacy land or field positions that provide economies of scale and require greater technical knowledge. Adding reserves in the same area can play to these advantages, while exploration and development activity in an entirely new area can increase operating, technical and competitive risks. Developed reserves represent more value to debt holders than undeveloped reserves, which require capital investment and typically a longer time horizon. Factors such as reserve life, basis differentials and price realizations, and operating costs can also affect field valuations. Replacing light sweet oil production with less valuable, heavier or sour oil reserves is not as good as replacement reserves of a similar or higher quality.

Finding & Development Costs (Replacement Costs) per BOE: F&D cost is a unit measure of the total costs incurred to add and develop a barrel of new reserves to the point of production. The lower the F&D costs, the more profitable a company's operations will be in a wider range of price environments. "All Sources" F&D costs are calculated by dividing the total costs incurred (acquisitions + exploration + development + goodwill booked in corporate E&P acquisitions) by total BOE reserve additions to determine a unit F&D cost. Costs incurred are disclosed as part of the FAS 69 supplementary information. "Drill-bit" replacement is a more stringent measure of F&D costs that is limited to exploration and field extensions and excludes the impact of acquisitions. F&D costs are subject to numerous variables, including the complexity and size of the reservoir, reserve booking practices, timing issues such as development approvals, and the length of the development cycle. We have mapped F&D costs from all sources on a three-year average, as with reserve replacement, which is more representative of longer lead times and the development cycle, and of the fairly large amount of mergers and acquisitions undertaken to address organic growth challenges.

Factor Mapping: Re-investment Risk

	Aaa	Aa	A	Baa	Ba	B	Caa
3-Year All-Sources Reserve Replacement	> 150%	130% - 150%	110% - 130%	100% - 110%	80% - 100%	60% - 80%	< 60%
3-Year All-Sources F&D Cost	< $5	$5 - $6	$6 - $7	$7 - $10	$10 - $12	$12 - $15	> $15

Company Mapping: Re-investment Risk

Company	Senior Unsecured or Corporate Family Rating	Outlook	3-Year All-Sources Reserve Replacement	3-Year All-Sources F&D Cost
ExxonMobil	Aaa	Stable	Baa	Aa
BP	Aa1	Stable	Aaa	Aaa
Total	Aa1	Stable	Baa	Aa
Royal Dutch Shell	Aa1	Negative	B	B
Chevron	Aa2	Stable	Ba	A
ENI	2 (Aa2)*	Stable	A	Baa
Statoil	3 (Aa2)*	Stable	Baa	Baa
Norsk Hydro	3 (A1)*	Stable	Baa	Baa
Petrobras	4 (A2)*	Stable	Aaa	Aaa
ConocoPhillips	A3	Review Up	Aaa	Baa
Marathon Oil	Baa1	Stable	Aaa	Aa
Repsol YPF	Baa1	Stable	B	A
PEMEX	4 (Baa1)*	Stable	Caa	Caa
Rosneft	6 (Baa3)*	Review Up	Aaa	Aaa
LUKOIL	Ba1	Stable	Aaa	Aaa
PDVSA	6 (B1)*	Developing	Ba	Aaa

** Reflects Moody's Methodology for Government-Related Issuers*

Positive Outlier

Negative Outlier

Observations

For re-investment risk, the correlation between mapped and actual company ratings is only moderately strong. It can be argued that 100% replacement is sufficient to maintain a company's reserve and production profile, especially for the large integrated and NOCs. This is a case where size, diversification and large unbooked or undeveloped resources help offset cycle time and depletion risk. In fact, on an all-sources basis, most of the peer companies have been maintaining or even growing reserves, largely supported by the positive impact of mergers and reserve acquisitions, a major impetus for industry consolidation.

The organic reserve replacement record is much less favorable than replacement results from all sources. Many of the integrated companies have core production concentrated in mature older basins in North America and the North Sea. The key challenge for these companies, some with production approaching or exceeding 1 million BOE/day, is to maintain or even grow production at competitive unit costs. Furthermore, while technological advances have improved recovery rates, depletion rates have also increased and have exacerbated the reserve replacement and unit cost challenge. In addition, the industry faces ever-increasing costs as inflationary pressures mount in tight energy markets.

The strongest correlation on reserve replacement and F&D costs for the mapped ratings are BP and ExxonMobil. For companies such as Total and Chevron, long-cycle projects and timing issues explain, at least in part, the poor correlation between their mapped and actual ratings. For the state-owned oil companies, the reasons for the positive outliers are twofold: large untapped resources with relatively low geological risk, which means that reserves can be added at low cost, and the impact of sovereign risk and the foreign currency ceiling. PEMEX's large and notable negative correlation to its rating on both reserve replacement and F&D costs reflects the impact of under-investment on a huge resource base and large capital transfers to the government. The company's actual ratings (Baa1 foreign currency, Baa1 local currency) reflect extraordinary implicit government support that outweighs the risks inherent in its weak reserve replacement profile.[3]

FACTOR 3: OPERATING & CAPITAL EFFICIENCY

Why it Matters

Operating and capital efficiency measures are key both to management and to investors in the petroleum industry, which is fundamentally a commodity business. No single company controls the prices for the crude oil and natural gas it sells or, for that matter, the margins on its refined products. To achieve competitive returns, a company must have a lean cost structure and be able to control both its cash operating and capital costs, while optimizing the capital invested in both the upstream and downstream. The petroleum industry is also highly capital-intensive, so strong returns are critical to attracting low-cost debt and equity capital. In fact, while many of the integrated companies have the cash flow and financial wherewithal to fund capital spending internally, they frequently rely on external debt and new equity capital, particularly to finance larger acquisitions and mergers.

The model maps two factors to measure capital efficiency: one for the consolidated operations and one that focuses only on the upstream. A standard measure of pre-tax consolidated return on capital employed (ROCE) captures the company's total return. ROCE remains a useful consolidated return measure for an integrated company, since both upstream and downstream operations contribute to earnings but have different return characteristics. It takes into account the impact of capital structure and the debt and equity elements of financing for the entire enterprise, and encompasses the large amounts of capital invested not only in the upstream, but also in refining, marketing, pipelines, chemicals and other businesses.

However, given the real concentration of value for integrated companies in exploration and production, we also look at full-cycle costs and the leveraged full-cycle ratio to measure upstream cost structure and capital efficiency. The full-cycle ratio ties together cash operating costs and the ongoing capital invested in replacing reserves. It shows how much cash margin a company generates for each dollar invested in the F&D effort. Put another way, the full-cycle ratio measures the cash-on-cash return that each barrel produces, or how much cash a company generates in excess of its cost of replacing reserves. The leveraged full-cycle ratio can be quite meaningful when analyzed at different points in the price cycle, and is useful in assessing where a company stands relative to its peers in capital efficiency.

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3. For state-owned integrated oil companies, extraordinary government support is considered as an additional rating factor once a company's baseline credit risk assessment is determined using the approach discussed in this methodology. Please refer to Moody's Special Comment entitled "The Application of Joint Default Analysis to Government-Related Issuers" (April 2005).

Positive Rating Indicators

- Competitive Full-Cycle cost structure
- Leveraged Full-Cycle Ratio 2x and even higher in a robust commodity price environment

Measurement Criteria

- Consolidated ROCE
- Leveraged Full-Cycle Ratio (Cash Margin per BOE/Avg. F&D)

Notes on Measurement Criteria

ROCE: Pre-tax ROCE is a consolidated (rather than segment) measure of return earned on all of a company's sources of capital, as measured by EBIT divided into total capital employed. EBIT as the numerator is adjusted to exclude minority interest expense and extraordinary or non-recurring items. In the denominator, total capital employed includes total debt and equity sources including minority interests, deferred taxes and cumulative FX translation adjustments. The debt component is adjusted to include all off-balance-sheet debt equivalents such as operating leases, debt guarantees, unfunded pension liabilities, and other items in accordance with Moody's standard adjustments[4]. Capital employed is an average of the current and prior year to attempt to reflect flow items that change the balance sheet during the year.

Leveraged Full-Cycle Ratio: The constituent parts of the leveraged full-cycle ratio include the company's current cash operating margin and its 3-year-average F&D costs, thereby capturing the operating and capital elements over a multi-year investment cycle. The ratio is calculated by dividing a company's cash margin per BOE (production revenues less production and other cash costs including interest expense) by its 3-year all-sources average F&D costs. Production costs are particularly important in assessing the ability to produce profitably in a given price environment. Unit production costs include operating, gathering and processing, well maintenance, facility and equipment costs, direct administrative expenses and production taxes. They can vary significantly depending on the type of reserves being produced and a company's inherent efficiency. The lower a company's embedded production and F&D costs, the more cash generated, which can then be re-invested in growth.

Because production revenues generate the cash margin component, the ratio is also highly sensitive to the impact of increasing and decreasing commodity prices and of oil and gas quality differentials. In general, a full-cycle ratio that remains above 1.0X during periods of weak commodity prices would be viewed positively, because the company is generating at least $1.00 for every dollar spent over the cycle. In more robust pricing environments, the cash return should be significantly higher, reflecting higher cash margin realizations.

It should be noted that the full-cycle ratio as calculated for the integrated companies is not directly comparable to those of the independent E&Ps. For the integrateds, oil and gas production is burdened with all of the interest, selling, general and administrative expenses (SG&A), and other costs of the full enterprise, when in reality the other business segments such as refining, marketing and chemicals can bear leverage and could be allocated a portion of the costs. This unallocated approach for the integrateds is punitive relative to that for a pure E&P company in that it overstates the upstream cost burden. The ranges used for mapping the integrated companies are therefore lower than for the E&P companies. It does, however, point up the robustness of the integrateds' cash margins, since these fully burdened production barrels still generate very solid full-cycle ratios.

4. *See Moody's Approach to Global Standard Adjustments in the Analysis of Financial Statements for Non-Financial Corporations - Part I (July 2005)*

Factor Mapping: Operating & Capital Efficiency

	Aaa	Aa	A	Baa	Ba	B	Caa
Return on Capital Employed (ROCE)*	> 18%	16% - 18%	14% - 16%	12% - 14%	10% - 12%	7% - 10%	< 7%
Leveraged Full-Cycle Ratio on 3-Year All-Sources F&D	> 2.0x	1.5x - 2.0x	1.25x - 1.5x	1.0x - 1.25x	0.5x - 1.0x	0.25x - 0.5x	< 0.25x

**EBIT / Average Capitalization (incl. debt) on 3-year average*

Company Mapping: Operating & Capital Efficiency

Company	Senior Unsecured or Corporate Family Rating	Outlook	ROCE (3 yr. ave.)	Leveraged Full-Cycle Ratio on 3-Year All-Sources F&D
ExxonMobil	Aaa	Stable	Aaa	Aaa
BP	Aa1	Stable	Baa	Aa
Total	Aa1	Stable	A	Aaa
Royal Dutch Shell	Aa1	Negative	Aaa	Baa
Chevron	Aa2	Stable	Aaa	Aaa
ENI	2 (Aa2)*	Stable	Aaa	A
Statoil	3 (Aa2)*	Stable	Aaa	Aaa
Norsk Hydro	3 (A1)*	Stable	Aa	Aaa
Petrobras	4 (A2)*	Stable	Aaa	Aaa
ConocoPhillips	A3	Review Up	Baa	Aaa
Marathon Oil	Baa1	Stable	Ba	Aaa
Repsol YPF	Baa1	Stable	Ba	Ba
PEMEX	4 (Baa1)*	Stable	Aaa	Ba
Rosneft	6 (Baa3)*	Review Up	Baa	Aaa
LUKOIL	Ba1	Stable	Aa	Aaa
PDVSA	6 (B1)*	Developing	B	Aaa

** Reflects Moody's Methodology for Government-Related Issuers*

Positive Outlier

Negative Outlier

Observations

Capital returns map closely to the actual ratings and, while the ROCE measure is a three-year average, it should be noted that ROCE is currently at a high point in the cycle with robust upstream pricing and refining margins, and is also benefiting from a period of extensive downstream restructuring. BP, with an ROCE mapping to Baa, is a notable negative outlier to its Aa long-term rating, reflecting the downward pull of low refining and marketing returns (see also mapping on downstream ROCE). Among the positive outliers are the state-owned oil companies.

In general, the leveraged full-cycle ratio maps very well for the publicly held oil companies. A notable negative outlier, again, is Royal Dutch Shell, reflecting the impact of high unit F&D costs and SG&A. Most of the positive outliers are the state-owned (or formerly state-owned) companies that benefit from low geological risk, higher cash margins and inherently low F&D costs. It should be noted that inconsistencies in reporting and classification of certain elements of the unit cost structures, such as production and SG&A costs, can affect the comparability of some of the company results.

FACTOR 4: DOWNSTREAM RATING FACTORS

Why it Matters

Moody's generally views a stand-alone downstream business as demonstrating high business risk characteristics as it is dependent on highly volatile refining margins, while marketing activities usually provide somewhat greater stability. However, once integrated, Moody's considers downstream activities as supportive to an integrated petroleum company's business risk profile, as they provide the company with diversification and, to some degree, a hedge against crude oil price movements; economies of scales, and the opportunity to capture the complete value chain by integrating and managing upstream production with downstream refining, distribution and marketing. Therefore, Moody's considers that the scale and efficiency of the refining and marketing assets of an integrated oil & gas company are essential to its credit assessment.

Positive Rating Indicators

- Large-scale downstream operations
- Limited dependence on a small number of facilities
- Strong operating efficiency

Measurement Criteria

- Total crude distillation capacity (000'bpd)
- Number of refineries with capacity greater than 100,000 bpd
- Segment Return on Capital Employed

Notes on Measurement Criteria

The crude distillation capacity of an integrated oil company is a good measure of the scale of its overall downstream operations. In addition, most of the integrateds have significant retail marketing operations that are often (but not always) closely integrated with the refining assets. Size is critically important for an integrated petroleum company, as it typically implies economies of scale in a business with high fixed costs and provides opportunities to leverage critical mass to benefit from supply synergies. Scale also tends to imply diversification for companies with a number of large refineries. Conversely, Moody's finds that other measures such as market share, while sometimes useful, fails to reflect adequately a company's bargaining power in highly commoditized markets.

Moody's counts the number of refineries with a capacity over 100,000 bpd in which the company has any interest[5], as we find that 100,000 bpd is a level at which refining facilities of this size usually demonstrate greater efficiency. Moody's believes that the operating resilience afforded by a large number of facilities is an important factor in determining the company's ratings, as it helps to protect against any potential temporary disruptions due to shutdowns for maintenance, upgrading or accident.

Downstream ROCE measures the company's ability to generate a consistent level of profits from its asset base. Downstream ROCE therefore gives us valuable insight into the company's operating efficiency as well as the quality of its refining and marketing assets. We, however, note that our downstream ROCE assessment can be affected by the existence of different accounting standards or reporting measures, thus reducing comparability.

5. *Even if a company only owns a 5% interest in a refinery and is entitled to a 5,000 bpd share, that refinery still counts as if it were 100% owned.*

Factor Mapping: Downstream Rating Factors

	Aaa	Aa	A	Baa	Ba	B	Caa
Total Crude Distillation Capacity (000'bpd)	> 3,000	2,000 - 3,000	1,000 -2,000	500 - 1,000	250 - 500	50 - 250	< 50
# Refineries with Capacity > 100 M bpd	> 15	9 -15	6 - 8	3 - 5	2	1	0
Segment ROCE*	> 25%	20% - 25%	15% - 20%	12% - 15%	7% - 12%	5% - 7%	< 7%

** Downstream EBIT / Average Downstream Capital Employed (3-year average)*

Company Mapping: Downstream Rating Factors

Company	Senior Unsecured or Corporate Family Rating	Outlook	Total Crude Distillation Capacity (000'bpd)	# Refineries with Capacity >100 M bpd	Segment ROCE (3 yr. ave.)
ExxonMobil	Aaa	Stable	Aaa	Aaa	A
BP	Aa1	Stable	Aa	Aa	Ba
Total	Aa1	Stable	Aa	Aa	Aa
Royal Dutch Shell	Aa1	Negative	Aaa	Aaa	A
Chevron	Aa2	Stable	Aa	Aa	Ba
ENI	2 (Aa2)*	Stable	Baa	A	Baa
Statoil	3 (Aa2)*	Stable	Ba	Baa	N.A.
Norsk Hydro	3 (A1)*	Stable	N.A.	N.A.	N.A.
Petrobras	4 (A2)*	Stable	Aa	A	A
ConocoPhillips	A3	Review Up	Aa	Aa	A
Marathon Oil	Baa1	Stable	Baa	Baa	Baa
Repsol YPF	Baa1	Stable	A	A	A
PEMEX	4 (Baa1)*	Stable	A	A	Aaa
Rosneft	6 (Baa3)*	Review Up	B	B	Aa
LUKOIL	Ba1	Stable	A	Baa	Aa
PDVSA	6 (B1)*	Developing	Aaa	Aa	Caa

** Reflects Moody's Methodology for Government-Related Issuers*

Positive Outlier

Negative Outlier

Observations

Total crude distillation capacity: Showing relatively good correlation with overall ratings, the companies with the largest refining capacity are the highest-rated. ENI and Statoil are negative outliers, while LUKOIL and PDVSA are positive outliers. ENI's low level of integration between upstream and downstream is offset by its involvement in regulated activities via Snam Rete Gas together with its position as Italy's incumbent gas supplier. Statoil's small-scale downstream business is mitigated by its strong operating efficiency and financial metrics. LUKOIL and PDVSA's large-scale refining capacity is mitigated by the companies' respective high country risk exposures.

Number of refineries with capacity greater than 100,000 bpd: There appears to be a good correlation between ratings and the number of refineries with capacity greater than 100,000 bpd. The only positive outlier is PDVSA.

Segment ROCE: Correlation between segment ROCE and ratings appears to be medium, with three negative outliers — rated either Aa2 or Aa1 — exhibiting downstream ROCE representative of Baa- or Ba-rated companies. The scale of the respective upstream businesses of these companies — BP, Chevron and ENI — is a strong offset. Rosneft and LUKOIL are positive outliers, with their strong ROCE ratios mitigated by their exposure to Russia.

FACTOR 5: FINANCIAL METRICS

Why it Matters

Financial ratios are a measure of a company's existing debt burden, its capacity to incur additional debt and a reflection of balance sheet flexibility. The integrated oil & gas companies, because they are in essence a portfolio of medium- to long-term projects, exhibit a fundamental business risk profile that tends to be more favorable than that of many other rated industries. Excluding event risk, credit metrics for investment-grade issuers are therefore unlikely to change very rapidly.

A key focus of Moody's quantitative analysis is a review of the company's ability to generate cash to service its debt. Another key factor is the conservativeness of the capital structure, which will provide a company with the flexibility to absorb shocks or credit events, such as a sharp decrease in crude oil prices or refining margins, or M&A activity. M&A is a common feature of the oil & gas industry, with companies prone to enter into corporate transactions to offset declining reserves and spur production growth. The impact of an acquisition on a rating will invariably depend on the current capital structure and upon the size of the target, its cash flow characteristics and funding structure.

Positive Rating Indicators

- Strong cash flow in relation to the amount of debt outstanding
- High interest coverage
- Lower indebtedness relative to the level of reserves
- Conservative capital structure

Measurement Criteria

- Retained cash flow / Net debt
- EBIT/ Interest Expense
- Gross debt / Total proved reserves
- Gross debt / Total capital

Notes on Measurement Criteria

The RCF to net debt ratio is a key measure of a company's ability to repay debt. It measures cash flow generation before working capital movements but after dividends, which in this industry may not be truly discretionary as a result of the need for shareholder returns from players facing below-average upstream production growth prospects. We do note, however, that the retained cash flow metric fails to take into account share repurchases, which must be factored in separately.

The EBIT/ Interest Expense coverage ratio is used to assess a company's financial position by measuring its ability to pay interest and other fixed charges such as rental expenses, and is a key element in an assessment of default probability.

The gross debt to total proved reserves ratio is a useful measure of a company's likely future ability to generate revenues out of its current asset base to cover its indebtedness. An alternative metric taking into account the cost of extracting those reserves (i.e. looking at the proper value of the assets) would be a debt to standardized measure of discounted future net cash flow ratio, as per the supplemental oil and gas information usually included in the financial statements.

Although not ideal, given that it can be affected by accounting differences[6], gross debt to capital is a simple way to compare the capital structure of companies operating within a sector and, more importantly, is also an indicator of management's financial policies, including its tolerance for debt.

Some of the ratios used in this methodology are presented on a gross debt basis and some others on a net debt basis (i.e. gross debt less cash and cash equivalents). In fact, Moody's takes both into consideration:

- In the US in particular, cash balances are usually modest and are generally only working cash that needs to remain in the business. In this case, it makes sense to consider only gross debt.
- In Europe, companies tend to hold considerable liquidity rather than rely on bank lines. In addition, many European companies who have large US dollar-denominated assets also like to fund in foreign currency to hedge their foreign currency assets despite having surplus local currency cash. Considering only gross debt would not reflect the financial strength of these companies and Moody's in this case prefers to focus on net debt.

6. *Although the introduction of IFRS should improve comparability.*

Factor Mapping: Financial Metrics

	Aaa	Aa	A	Baa	Ba	B	Caa
Retained Cash Flow / Net Debt	> 50%	40% - 50%	30% - 40%	20% - 30%	10% - 20%	5% - 10%	< 5%
EBIT/ Interest Expense	> 20x	15x - 20x	8x - 15x	3x - 8x	2x - 3x	1x - 2x	< 1x
Gross Debt / Total Proved Reserves	< $2.50	$2.50 - $3.50	$3.50 - $4.50	$4.50 - $5.50	$5.50 - $6.50	$6.50 - $9.50	> $9.50
Gross Debt / Total Capital	< 30%	30% - 35%	35% - 45%	45% - 55%	55% - 65%	65% - 75%	> 75%

Company Mapping: Financial Metrics

Company	Senior Unsecured or Corporate Family Rating	Outlook	RCF/Net Debt (3 yr. ave.)	EBIT/Interest Expense (3 yr. ave.)	Gross Debt/ Total Proved Reserves	Gross Debt / Total Capital
ExxonMobil	Aaa	Stable	Aaa	Aa	Aaa	Aaa
BP	Aa1	Stable	Aa	A	Aaa	Aaa
Total	Aa1	Stable	Aa	Aa	Aa	Aaa
Royal Dutch Shell	Aa1	Negative	A	A	Aa	Aaa
Chevron	Aa2	Stable	A	A	Aa	A
ENI	2 (Aa2)*	Stable	A	A	A	A
Statoil	3 (Aa2)*	Stable	Aa	Aaa	Aa	Aa
Norsk Hydro	3 (A1)*	Stable	Aaa	A	Aa	Aaa
Petrobras	4 (A2)*	Stable	Baa	Baa	Aa	Ba
ConocoPhillips	A3	Review Up	A	Baa	Aa	Aa
Marathon Oil	Baa1	Stable	Aa	Baa	Ba	A
Repsol YPF	Baa1	Stable	A	Baa	A	A
PEMEX	4 (Baa1)*	Stable	B	A	Baa	Caa
Rosneft	6 (Baa3)*	Review Up	Baa	Baa	Aaa	Ba
LUKOIL	Ba1	Stable	Aaa	A	Aaa	Aaa
PDVSA	6 (B1)*	Developing	Aa	Baa	Aaa	Aaa

** Reflects Moody's Methodology for Government-Related Issuers*

Positive Outlier

Negative Outlier

For illustrative purposes, this methodology report looks at historical ratios. In our actual rating assessment, Moody's considers both historical and, more importantly, projected ratios. The weighting between management target ratios and actual financials will depend on (i) our confidence in the management's capacity to deliver on the planned projects and (ii) the assumptions on which the company's business plan is built. Indeed, Moody's rates through the cycle and would seek to assess the sustainability of a company's financial profile in a conservative commodity price environment.

Observations

In general, financial metrics are closely correlated with ratings. Two out of four measures — EBIT/ Interest Expense coverage and gross debt to reserves — indicate no outliers.

RCF to Net Debt: Integrated oil companies with stronger cash flow to debt metrics are typically rated higher, although Norsk Hydro, Marathon Oil, LUKOIL and PDVSA are positive outliers, while PEMEX is a negative outlier. Norsk Hydro's strong financial metrics are offset by the volatility of its aluminum business, its lack of downstream integration as well as low level of asset diversification, with the vast majority of its upstream production being generated in one country only, Norway. Marathon Oil's ratings remain somewhat constrained by a smaller scale than that of its higher-rated peers, while LUKOIL and PDVSA's ratings are constrained by high country risk exposure. At the same time, PEMEX's lower-than-expected ratio is mitigated by the company's large scale and the extraordinary implicit support of the Mexican government.

EBIT/ Interest Expense: EBIT/ Interest Expense coverage shows very good correlation with overall ratings, with only three positive outliers for this factor: Statoil, LUKOIL and PDVSA. Six of 16 company ratings fell exactly within the rating category indicated by this factor.

Gross Debt to Total Proved Reserves: There appears to be a strong correlation between gross debt to total proved reserves ratios and ratings, with four outliers identified for this factor: Petrobras, Rosneft, LUKOIL and PDVSA. Petrobras, Rosneft, LUKOIL and PDVSA's ratings remain constrained by high country risk exposure.

Gross Debt to Total Capital: Showing relatively good correlation with overall ratings, the highest-rated companies have the lowest debt to capital ratios. Norsk Hydro, LUKOIL and PDVSA are positive outliers, demonstrating materially stronger capital structure than their respective ratings indicate, which is mitigated by the factors mentioned earlier. PEMEX is a negative outlier, which is also mitigated by the factors mentioned earlier.

FACTOR 6: GEOGRAPHICAL/GEOPOLITICAL RISK DIVERSIFICATION

Why it Matters

The degree to which an integrated oil company's assets are geographically diversified can have a significant impact on its rating. Considering the huge investments that are commonly undertaken to develop remote oil and gas reserves, the stability of the respective region can be an overriding factor in determining the financial health of a company. Generally speaking, the greater the issuer's exposure to one particular region (in terms of both producing assets and reserves), the more important various factors determining the stability of that region are in the overall analytical process.

Due to the complexity and the variety of factors which ultimately determine a company's geopolitical risk exposure, Moody's does not apply a one-size-fits-all approach to each issuer or each region. There is also no quantifiable method to determine the gravity of any rating discount applicable to being overly exposed to a particular region. One company's relations to a particular government may be superior or inferior to those of another. Russia's Yukos acts as a prime example of the unique breakdown of relations with the state, which ultimately resulted in the company's demise. Furthermore, one company may be more exposed to a particular region through a heavy, long-term investment program that will require longer pay-back periods than a company that is already reaping the rewards of past investments.

As a result of the above arguments, Moody's will always apply geopolitical risk assessments on a case-by-case basis, which will have varied effects on different companies operating in the same region. While we attempt to capture, classify and consequently quantify various risks related to a region through a set of criteria, we also warn of the limitations associated with their uniform application to all oil-producing countries and the rated issuers operating within their frameworks.

Positive Rating Indicators

- A well balanced, geographically diversified portfolio of producing and developing assets
- Clear and transparent concession and ownership regimes, preferably with a dominance of production sharing agreements (PSAs)
- A solid track record of uninterrupted activities in various core regions

Measurement Criteria

- Geographical/Geopolitical Risk Diversification

Notes on Measurement Criteria

Factoring country-specific risk exposure into oil and gas credit ratings is a complex judgment, which primarily examines a wide range of factors including the following:

- Any large single exposures to certain regions, measured by high, medium or low asset concentration by production, reserves and investments
- Any mitigation afforded by a well-diversified portfolio of producing and growth regions
- The issuer-specific factors that could contribute to greater or less risk in that region (e.g. the issuer's track record in the region, whether or not its assets are predominantly offshore or onshore, the reliance of the region's government on international oil companies for the exploitation and development of its reserves)
- Any factors inherent to a particular region, which — in our view — add an element of credit risk to the issuer (e.g. lack of liquidity due to undeveloped domestic banking market, still developing corporate governance and transparency, specific funding structures and ever-changing and/or non-transparent corporate and ownership structures).

The degree to which a company's exposure to a certain region affects its credit rating depends on Moody's view of the risks inherent to the country. A set of industry-specific factors determining our view on the level of risk is summarized below.

Risk / Risk Criteria	Lower Risk <----------			Higher Risk ---------->
Taxes & Royalties / PSA	Largely favorable / Mainly PSA regimes / Highly limited termination rights.	Generally favorable / More PSA than tax & royalty regimes / Limited termination rights.	Challenging / More tax & royalty than PSA regimes / Some termination rights.	Punitive, limited or capped upside on high oil prices / Mainly tax & royalty regimes / Many termination rights.
Ownership & Concession Rights & Enforceability	Unbroken track record of ownership/concession stability. Very long-term concession periods. Clear & independent system of arbitration / dispute settlement.	Long track record of ownership/concession stability. Medium- to long-term concession periods. Clear & independent system of arbitration / dispute settlement.	Track record of ownership/ concession stability, despite occasional disputes. Shorter concession periods. Only partially independent system of arbitration / dispute settlement.	Regular ownership/ concession disputes which have resulted in concession losses or significant changes to terms. Lack of independent system of arbitration / dispute settlement.
Independence & Predictability of Authorities & Bureaucracy	Fully independent legal system and predictable authorities. Few bureaucratic burdens.	Fully independent legal system and largely predictable authorities. Reasonable bureaucratic burdens.	Only partially independent legal system and somewhat unpredictable authorities. Challenging bureaucratic burdens.	Lack of independent legal system, erratic and unpredictable decision-making by authorities. High bureaucratic burdens.
Expropriation Risk	None	Low	Medium	High
Regulation	Favorable and transparent	Largely favorable and transparent	Cumbersome and lacking some transparency.	Punitive, restrictive and non-transparent.
Risk of Civil Unrest, Social Tension and Labor Disputes	No civil unrest, social tension or recent labor disputes.	No civil unrest, although labor disputes have resulted in occasional disruption.	Some risk of civil unrest and regular disruption from labor dispute.	High risk of civil unrest and common disruption from labor dispute.
Macroeconomic Environment	Largely reflected in the sovereign rating: Aaa - A	Largely reflected in the sovereign rating: Baa	Largely reflected in the sovereign rating: Ba	Largely reflected in the sovereign rating: B - Ca
Country's Reliance on IOCs	High	Medium/High	Medium/Low	Low

- **High asset diversification:** A company that has a well balanced geographic portfolio of producing assets and reserves, spread evenly amongst familiar territories and less known 'growth regions'. A company with high asset diversification is generally regarded to be present in at least 15 different countries, with no single country exposure of more than 30% of earnings and net assets.
- **Medium asset diversification:** A company that has a moderately balanced geographic portfolio of producing assets and reserves, with a stronger bias towards less familiar or newly developing 'growth regions'. A company with medium asset diversification is likely to have larger asset concentration (more than 50% of earnings and net assets) in a few regions, which — depending on their risk classification — could have different implications for the company's overall risk profile.
- **Low asset diversification:** A company with low asset diversification is primarily a single-region producer with around 80% or more of earnings and net assets located in one or two regions. Depending on the risk classification of the dominant region, such exposure will have different implications for the company's overall risk profile.

Factor Mapping: Geographical/Geopolitical Risk Diversification							
	Aaa	**Aa**	**A**	**Baal**	**Ba**	**B**	**Caa**
Geographical/Geopolitical Diversification	High			Medium		Low	

Company Mapping: Geographical/Geopolitical Risk Diversification			
Company	**Senior Unsecured or Corporate Family Rating**	**Outlook**	**Geographical/Geopolitical Diversification**
ExxonMobil	Aaa	Stable	Aaa
BP	Aa1	Stable	Aa
Total	Aa1	Stable	Aa
Royal Dutch Shell	Aa1	Negative	Aaa
Chevron	Aa2	Stable	Aa
ENI	2 (Aa2)*	Stable	Aa
Statoil	3 (Aa2)*	Stable	B
Norsk Hydro	3 (A1)*	Stable	B
Petrobras	4 (A2)*	Stable	Ba
ConocoPhillips	A3	Review Up	Aa
Marathon Oil	Baa1	Stable	A
Repsol YPF	Baa1	Stable	Baa
PEMEX	4 (Baa1)*	Stable	Ba
Rosneft	6 (Baa3)*	Review Up	B
LUKOIL	Ba1	Stable	B
PDVSA	6 (B1)*	Developing	Ba

** Reflects Moody's Methodology for Government-Related Issuers*

Positive Outlier

Negative Outlier

Observations

While Total, Royal Dutch Shell, ENI and ExxonMobil all have exposure to "emerging" countries[7] (particularly as regards their reserve potential), we believe that these companies enjoy portfolios which allow them to absorb a significant loss of production or earnings in one region without severely hurting their credit profiles. The same applies to BP, Chevron and ConocoPhillips, although all three are more heavily reliant on a single region, whose disruption could result in a greater strain on production growth and earnings. The remaining companies in our universe all demonstrate large single exposures to certain regions, which make them highly dependent on the stability and reliability of that region in safeguarding their production, reserves and cash flows. As regards these companies, our view of that region's operating environment plays a more prominent role in determining our opinions of stability of cash flows and consequently credit strength.

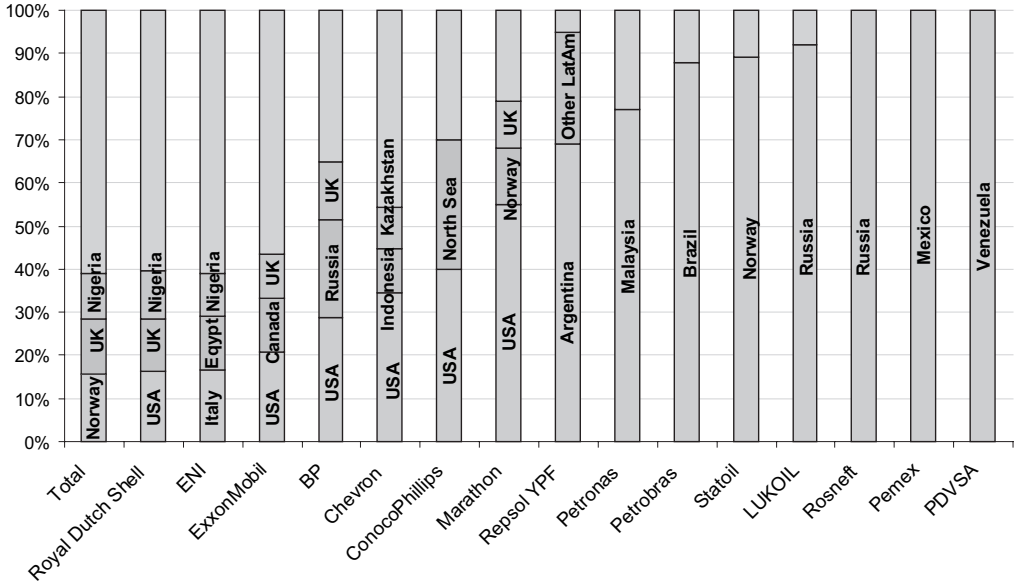
A good example for the various implications of country risk exposure on oil & gas credit ratings is given when looking at the ratings of Repsol YPF, LUKOIL and Statoil. While all three companies are broadly similar (despite LUKOIL's substantially greater scale in terms of reserves), being the most prominent oil companies in their respective regions, well integrated and with strong financial profiles, their ratings are driven by their respective operating environments. Statoil's position as Norway's largest and majority state-owned oil company affords additional protection, which we factor into its rating using Joint Default Analysis. Similarly, LUKOIL's ratings and any upward rating migration are closely tied to the attitude of Russia's authorities to privately owned oil & gas companies following the demise of Yukos, with greater consistency in the application of the tax framework, improvements in infrastructure bottlenecks and less erratic behavior from authorities ultimately likely to improve Russia's operating framework and thus the ratings of the players therein.

Furthermore, despite the importance of macroeconomic factors in determining a company's operating environment, a country's sovereign rating is not a measurement of the risks inherent in operating in this country. Therefore, Moody's may assign a greater degree of risk to an issuer's operations in a given country than the sovereign rating may imply. Conversely, a country's macroeconomic situation may result in a very low sovereign rating (indeed even demonstrating a default), while our view of an oil & gas company's operating stability in that country could be significantly stronger than the sovereign rating implies.

7. *We acknowledge that the term "emerging region" is not always accurate, given that some countries may indeed be "emerging" or even still very under-developed economies, while at the same demonstrating a long track record of uninterrupted oil production. For sake of simplification, we will use this term with all its caveats.*

Moody's also evaluates the government's medium- and long-term reliance on Integrated Oil & Gas Companies (IOCs) for the development and monetization of the country's oil & gas reserves. A dominant, technically able and financially strong national oil company (NOC) is therefore likely to constitute a greater risk factor for IOCs operating in the country, as it is more likely to be able to dictate terms and step into the IOCs' shoes. Saudi Aramco (not rated) of Saudi Arabia or Russia's Gazprom (rated Baa2/Baa3) are two prime examples of such powerful NOCs. At the same time, other NOCs may be more involved in acting as a concessionaire, effectively administrating the flow of funds between the concession holders and the state, while less involved in the technical operations of the fields. Such NOCs, which include the likes of Sonangol in Angola, EGPC in Egypt and the Nigerian National Petroleum Corporation (all not rated), are all likely to be more reliant on IOCs — at least in the short to medium term — therefore reducing the risk of expropriation and serious intervention.

In addition, Moody's will also factor into its analysis issuer-specific factors, such as the issuer's track record and length of experience in the respective country. In other words, a company that has been present in a certain region for many decades without material frictions (e.g. Total in Angola) will be able to mitigate and thereby alleviate the overall detrimental impact from a high country risk classification. The same will apply where most assets and projects are located offshore and therefore more out of reach of civil unrest.[8] Consequently, a company exposed to a medium- to high-risk region may be able to mitigate some of this risk and still achieve strong credit ratings, if we believe that it is insulated from most risks. At the same time, government-ownership is a strong mitigant against geopolitical risks and state interventionism.



Other Considerations

Event Risk

Another important rating factor is the possibility that an unexpected "special event" could cause a sudden and sharp decline in an issuer's fundamental creditworthiness. Typical special events include mergers and acquisitions and capital restructuring programs such as large share repurchases. In the integrated oil & gas sector, the most common special events are mergers and acquisitions (M&A), which were a common theme of the 1990s and saw the creation of the large international super-majors.

However, depending on their financing, such transactions need not always have negative rating implications. On the contrary, in the case of BP and Total, they ultimately resulted in upgrades, given that greater scale and global reach was supplemented by mainly equity funding. Similarly, Exxon's acquisition of Mobil and Chevron's purchase of Texaco were both facilitated under existing credit ratings.

8. For instance, the only disruption to oil production faced by Angola in 27 years of civil war was from an attack on one of its few onshore terminal facilities, while offshore production flowed uninterrupted throughout.

Summary Considerations

In this report, we have discussed Moody's methodology for assigning credit ratings to 16 companies in the global integrated oil & gas industry. We have highlighted favorable and unfavorable outliers of two or more alphanumeric rating bands (Aaa, Aa, A, Baa, Ba, B and Caa). Furthermore, we commonly weight the six key rating factors as follows, although these weightings may vary, depending on the company:

Key Rating Ractor	Weighting
Reserve & Production Characteristics:	25%
Re-investment Risk:	10%
Operating & Capital Efficiency:	10%
Downstream Rating Factors:	15%
Financial Metrics:	30%
Geographic/Geopolitical Risk Diversification:	10%
Total	**100%**

Of the 16 rated integrated oil & gas companies, more than 70% have actual ratings within two notches of their indicated alpha rating levels. This underlines the relatively strong correlation between our ratings and those generated by means of our weighted criteria.

Nonetheless, the significant divergences are primarily the result of factors that cannot be appropriately captured in our model criteria, notably event risk or geopolitical risks, with the most notable outliers found amongst the single-country players. As a result, in the case of these companies, greater weighting is likely to be allocated to such other rating considerations, which may outweigh strong showings in certain model criteria.

Integrated Oil & Gas - Outlier Outcome Summary

Company	Senior Unsecured or Corporate Family Rating	Outlook	Reserve & Production Characteristics			Re-investment Risk		Operating & Capital Efficiency		Downstream Rating Factors			Financial Metrics				Geographical/ Geopolitical Diversification	Indicated Rating
			Total Proved Reserves (million boe)	Total Production (million boe p.a.)	Total Proved Reserve Life (Years)	3-Year All-Sources Reserve Replacement	3-Year All-Sources F&D Cost	ROCE (3 yr. ave.)	Leveraged Full-Cycle Ratio on 3-Year All-Sources F&D	Total Crude Distillation Capacity (000'bpd)	# Refineries with Capacity > 100 M bpd	Segment ROCE (3 yr. ave.)	RCF/ Net Debt (3 yr. ave.)	EBIT / Interest Expense (3 yr. ave.)	Gross Debt / Total Proved Reserves	Gross Debt / Total Capital		
ExxonMobil	Aaa	Stable	Aaa	Aaa	Aaa	Baa	Aa	Aaa	Aaa	Aaa	Aaa	A	Aaa	Aa	Aaa	Aaa	Aaa	Aa
BP	Aa1	Stable	Aaa	Aaa	Aaa	Aaa	Aaa	Baa	Aa	Aa	Aa	Ba	Aa	A	Aaa	Aaa	Aa	Aa
Total	Aa1	Stable	Aaa	Aa	Aa	Baa	Aa	A	Aaa	Aa	Aa	Aa	Aa	Aa	Aa	Aaa	Aa	Aa
Royal Dutch Shell	Aa1	Negative	Aaa	Aaa	A	B	B	Aaa	Baa	Aaa	Aaa	A	A	A	Aa	Aaa	Aaa	Aa
Chevron	Aa2	Stable	Aaa	Aa	Aaa	Ba	A	Aaa	Aaa	Aa	Aa	Ba	A	A	Aa	A	Aa	Aa
ENI	2 (Aa2)*	Stable	Aa	Aa	Aaa	A	Baa	Aaa	A	Baa	A	Baa	A	A	A	A	Aa	A
Statoil	3 (Aa2)*	Stable	A	A	Aa	Baa	Baa	Aaa	Aaa	Ba	Baa	N.A.	Aa	Aaa	Aa	Aa	B	A
Norsk Hydro	3 (A1)*	Stable	A	Baa	Aa	Baa	Baa	Aa	Aaa	N.A.	N.A.	N.A.	Aaa	A	Aa	Aaa	B	A
Petrobras	4 (A2)*	Stable	Aaa	Aa	Aaa	Aaa	Aaa	Aaa	Aaa	Aa	A	A	Baa	Baa	Aa	Ba	Ba	A
ConocoPhillips	A3	Review Up	Aa	Aa	Aaa	Aaa	Baa	Baa	Aaa	Aa	Aa	A	A	Baa	Aa	Aa	Aa	Aa
Marathon Oil	Baa1	Stable	Baa	Baa	A	Aaa	Aa	Ba	Aaa	Baa	Baa	Baa	Aa	Baa	Ba	A	A	A
Repsol YPF	Baa1	Stable	A	Aa	Aa	B	A	Ba	Ba	A	A	A	A	Baa	A	A	Baa	A
PEMEX	4 (Baa1)*	Stable	Aaa	Aaa	Aa	Caa	Caa	Aaa	Ba	A	A	Aaa	B	A	Baa	Caa	Ba	Baa
Rosneft	6 (Baa3)*	Review Up	Aa	Baa	Aaa	Aaa	Aaa	Baa	Aaa	B	B	Aa	Baa	Baa	Aaa	Ba	B	A
LUKOIL	Ba1	Stable	Aaa	Aa	Aaa	Aaa	Aaa	Aa	Aaa	A	Baa	Aa	Aaa	A	Aaa	Aaa	B	Aa
PDVSA	6 (B1)*	Developing	Aaa	Aaa	Aaa	Ba	Aaa	B	Aaa	Aaa	Aa	Caa	Aa	Baa	Aaa	Aaa	Ba	A

* *Numerical rating reflects baseline credit assessment per Moody's Methodology for Government-Related Issuers. Rating in parentheses is Global Local Currency rating or Foreign Currency rating in cases where there is no Global Local Currency rating. For an explanation of baseline credit assessment please refer to Moody's Special Comment entitled "The Application of Joint Default Analysis to Government-Related Issuers" (April 2005).*

Positive Outlier

Negative Outlier

Related Research

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Global Independent Exploration and Production (E&P) Industry, October 2005 (94692)

Global Refining and Marketing Industry, October 2005 (94695)

The Application of Joint Default Analysis to Government Related Issuers, April 2005 (92432)

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OAO LUKOIL, May 2005 (92660)

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Financial Reporting Assessment:

Oil & Gas Exploration and Production Industry, September 2004 (89040)

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