

Technical Guide on Valuation of Assets in Extractive Industries



Valuation Standards Board
and

ICAI Registered Valuers Organisation

The Institute of Chartered Accountants of India
(Set up by an Act of Parliament)
New Delhi

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Foreword

The Valuation Standards Board (VSB) was formed by the Institute of Chartered Accountants of India (ICAI) to formulate Valuation Standards with a view providing the consistent, uniform and transparent valuation policies to the members undertaking the Valuation Assignments and to set up concepts, principles and procedures which are generally accepted internationally having regard to legal framework and practices prevalent in India. The Board also Interacts/ Represents on issues relating to Valuation with Government/IBBI and promotes for adoption of ICAI Valuation Standards.

Continuing with the joint endeavour for the benefit of the Valuation Professionals in India, the Valuation Standards Board of ICAI and ICAI Registered Valuers Organisation are bringing out this publication “Technical Guide on Valuation of Assets in Extractive Industry”. The Technical guide addresses the major issues that have an impact on the valuation of asset in extractive industry and tries to provide instructions for doing so.

I extend my sincere appreciation to CA. Mangesh Pandurang Kinare, Chairman, CA. Cotha S. Srinivas, Vice-Chairman, and all Members of Valuation Standards Board for bringing out this publication which will help the professionals to further enhance their professional understanding.

I am sure that this publication would provide great assistance to the members, especially the Registered Valuers and other Stakeholders.

CA. (Dr.) Debashis Mitra

President, ICAI

Director, ICAI RVO

Date: 07.02.2023

Place: New Delhi

Preface

Valuation is a multi-facet discipline that requires both subjectivity and objectivity and most importantly professional judgement of Valuers. There are several factors like preconceptions, management capability, valuer's understanding of the future market and competition, business complexities etc. which are not evident from the financial statements but are based on professional assumptions of a Valuer and are critical in Valuation. Different assumptions considered by different Valuers have often led to drastic differences in the final valuation, which has had far reaching impact on the financial ecosystem of the country.

Every interested stakeholder is impacted by the valuation profession, which is a crucial economic institution that we are all aware of. Users' reliance on valuations is growing, and with that reliance comes a desire for increased objectivity, transparency, and accuracy. For a variety of reasons, including transactions, regulatory filings, impairment testing, financial reporting, security coverage, etc., corporations, investors, private equity players, and lenders frequently rely on valuations. Since assets are important generators of business value, recent developments in the Indian valuation landscape have necessitated a greater emphasis on proper valuation.

Extractive industry is one of the major contributors in the economy of India. India produces 95 minerals, including metallic, non-metallic, atomic and minor minerals. India is ranked as one of the leading global producers of valuable minerals such as iron ore, chromite, coal, and bauxite. Valuation of Asset in Extractive Industry is one of the crucial elements for the valuer and the stakeholder to determine the information they the looking for.

Looking at the importance of this industry, the Valuation Standards Board of ICAI and ICAI Registered Valuers Organisation (ICAI RVO) have taken this joint initiative and are bringing out "Technical Guide on Valuation of Assets of Extractive Industries". This publication's goal is to offer guidelines for Assets valuation in the Extractive Industry. It includes a study of the entire mineral properties, including the various activities related to the extraction and valuation methodology, the industry's history and future prospects, and the major factors affecting this sector's valuation.

We take this opportunity in thanking the President ICAI, CA (Dr.) Debashis Mitra, and the Vice President ICAI, CA. Aniket Sunil Talati for their thought leadership and continued encouragement in bringing out the publication.

We would also like to express our gratitude towards the Board of ICAI RVO comprising of Shri Rajeev Kher, Chairman of the Board and other Directors, Shri Pawan Singh Tomar, Prof. Anil Saini and Dr. Rakesh Sehgal for joining in the constant efforts of the Board.

We would also like to thank all members, co-opted members, special invitees of the Board for their support and guidance in bringing out this publication.

We would also like to thank CA. T. V. Balasubramanian and CA S. Narasimhan who have contributed towards finalisation of this publication.

We would like to put on record the efforts put in by CA. Sarika Singhal, Secretary VSB, ICAI and Officiating CEO, ICAI RVO, Ms S. Rita, Deputy Secretary ICAI and Ms. Seema Jangid, Assistant Secretary ICAI and other team members comprising of CA. Swati Singh, CA. Dimple Edon and Mr. Vinu Mathew for providing the technical and administrative support.

We firmly believe that this publication will be extremely helpful to the profession's members, valuers, industries, and other stakeholders.

CA. Mangesh Pandurang Kinare

Chairman

Valuation Standards Board, ICAI

CA. Cotha S Srinivas

Vice Chairman

Valuation Standards Board, ICAI

Date: 3rd February, 2023

Place: New Delhi

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Chapter 1

Brief about Extractive Industry

One of the best mineralization, geological, and exploratory potentials for both non-bulk and bulk commodities is found in India's vast landmass. The foundation of India's industrial, commercial, and economic success is its abundant mineral resources. The key Sectors of Indian economy also include Extractive sector. Many important sectors, including the service sector, which needs computing devices made of quartz, lithium, lead, zinc, and silver, as well as the steel, cement, capital goods, and oil industries, depend on the mining industry for basic raw materials.

Somewhat unexpectedly war broke out in February 2022 this year between Russia and Ukraine, a conflict that replaced COVID-19 in headlines across the world. Already reeling from the devastating impact of a new strain of the Covid19 pandemic, the world had to deal with a war that affected the availability of crude oil, edible oil and food grain. Not only this but when most countries were going through the shocks in geopolitics, energy and economics, many of the industries are rapidly falling into a recession.

India's natural resource sector is projected to make a big economic contribution and has a considerable effect on global commodity markets during these challenging times. The extractive industry, which is India's largest and most diverse natural resource sector, is well-positioned to contribute significantly to the country's economic development. The industry has made the necessary investments to expand exponentially, and it is collaborating with the Government to advance equitable development, boost environmental standards, and increase public support for the vital mining and minerals sector.

In India, inflation has been hovering around 7% - at 7.01% in June 2022 and 6.71% in July 2022 – well above the RBI's target of 6% forcing the regulator to raise interest rates by 40 bps in April and 50 bps in June 2022. India's situation, however, is not as grim. Despite the ongoing geopolitical conflict, India has been able to import crude oil from Russia helping the country to keep the average price of imported crude oil down.

The Government's proactive policies such as Production Linked Incentives (PLI), its thrust to the creation of infrastructure, and expansion of capital expenditure have been attracting large amounts of investments from the

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private sector. These factors provide comfort that India can sail through the current challenges with minimal impact and this is also reflected in the higher than world average growth rates assigned to India by global financial institutions.

Chapter 2

Leading Companies in Extractive Industry

Top Leading Mineral and Mining Companies in India

Below has been given a table providing the details of the top leading mineral and mining companies in India:

Name of the Company	Brief Description of the Company	Market Capitalisation as of year 2022
Coal India	Coal India Limited (CIL) is an Indian central public sector undertaking under the ownership of the Ministry of Coal, Government of India. It is headquartered in Kolkata. It is the largest Government-owned-coal-producer in the world	₹ 138,692.00 Cr
Vedanta	Vedanta Limited (VEDL), a subsidiary of Vedanta Resources Limited, is one of the world's leading natural resources companies with interests in zinc-lead-silver, oil & gas, aluminum, power, iron ore, steel and copper, operating across India, South Africa and Namibia.	₹ 115,549.00 Cr
NDMC	Incorporated in 1958 as a Government of India public enterprise, NMDC is India's largest producer of iron ore. Since its inception, the corporation under the administrative control of the Ministry of Steel has been involved in the exploration of a wide range of minerals including copper, rock phosphate, limestone, magnesite, diamond, tungsten and beach sands	₹ 36,178.32 Cr

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	amongst others in some of the most remote corners of the country	
KIOCL	KIOCL Limited (Formerly known as Kudremukh Iron Ore Company Limited), a Flagship Company under the Ministry of Steel, Govt. of India was formed on 2 April 1976 for mining and beneficiation of low-grade iron ore at Kudremukh, Karnataka, India. KIOCL has been a pioneer with over four decades of experience in operating Iron Ore Mining, Beneficiation and Iron–Oxide Pelletisation in the Country. KIOCL is having facilities to operate 3.5 MTPA Iron-oxide Pellet Plant, Blast Furnace Unit to manufacture 2.16 lakh tonnes per annum of Pig iron at Mangaluru, Karnataka.	₹ 13,635.00 Cr
Gujarat Mineral Development Corporation Limited (GMDC)	Gujarat Mineral Development Corporation Limited (GMDC) is a major Indian state-owned mineral and lignite mining company based in Ahmedabad. GMDC was founded in 1963. Its product range includes essential energy minerals like lignite, base metals and industrial minerals like bauxite and fluorspar. Gujarat Government has given its green signal to GMDC to form a joint venture with NALCO for a 1 mtpa refinery.	₹ 4,776.36 Cr
MOIL	MOIL (earlier known as Manganese Ore (India) Limited) is a Mini Ratna state-owned manganese ore mining company headquartered in Nagpur, India. With a market share of 50%, it is the largest producer of manganese ore	₹ 3,482.65 Cr

Leading Companies in Extractive Industry

	in India. MOIL operates 11 mines in adjoining districts of Maharashtra and Madhya Pradesh	
Maithan Alloys	Maithan Alloys Ltd is among India's leading manufacturers and exporters of niche value-added manganese alloys. The Company pioneered the manufacture in India of multiple manganese alloy variants used in automobile grade steel.	₹ 2,892.95 Cr

Chapter 3

Background about the Extractive Industry

Iron ore, Bauxite, Chromium, Manganese ore, Baryte, Rare Earth, and Mineral salts are all abundant in India. Due to reforms like the Make in India Campaign, Smart Cities, Rural Electrification, and a focus on developing renewable energy projects under the National Electricity Policy as well as the increase in infrastructure development, the metals and mining sector in India is anticipated to undergo significant reform in the coming years.

Comparing India's mining industry to that of other developing nations like China and Brazil, it is still underdeveloped. It has huge untapped potential and Government's persistent efforts and initiatives are likely to help develop it further. As the GDP of a country increases with rapid urbanization and industrialization, its mineral consumption also grows at a rapid pace. India holds an advantage in terms of cost of production, being among the lowest cost producer of steel and aluminum, due to ample mineral availability and access to cheaper manpower.

With uncertainty and transformation driven by various factors, organizations across all industries of the energy, natural resources, mineral oil and chemicals sector are exploring how to adjust their businesses, satisfy changing customer demands, and take advantage of new opportunities.

The expansion of the mining sector is crucial for the overall industrial development of a country since minerals are priceless natural resources that are crucial raw materials for key industries. India's abundant deposits of numerous metallic and non-metallic minerals provide a solid foundation for the growth and development of the country's mining sector. India is largely self-sufficient in metallic minerals including bauxite, chromite, iron ore, and lignite as well as mineral fuels like coal and lignite. The industry has the potential to significantly impact GDP growth, foreign exchange earnings, and give end-use industries like building, infrastructure, automotive, and electricity, among others, a competitive edge by obtaining essential raw materials at reasonable rates.

Chapter 4

Recent Development and Future Outlook of the Industry

Mining is a major economic activity in India that accounted for 2.5% of the country's GDP in FY22. India produces 95 minerals, including metallic, non-metallic, atomic and minor minerals. India is ranked as one of the leading global producers of valuable minerals such as iron ore, chromite, coal, and bauxite. The mining sector in India was highly regulated earlier, and the legal framework has undergone significant changes in the past few years, resulting in a more transparent and efficient regime operating now.

India holds a fair advantage in production and conversion costs in steel and alumina. Its strategic location enables export opportunities to develop as well as fast-developing Asian markets. As of FY22, the number of reporting mines in India was estimated at 1,425, of which reporting mines for metallic minerals were estimated at 525 and non-metallic minerals at 720.

Building work was briefly halted during the Government-imposed lockdown in the pandemic scenario to stop the spread of new COVID 19 cases, which reduced the need for steel from the construction industry. However, considering the post-pandemic situation, the building sector is accelerating and is anticipated to raise demand for the market under study in the upcoming years.

Growth is being fueled by an increase in automotive and infrastructural construction. The sectors' expansion is also being aided by the power and cement industries. Given the high growth projections for the residential and commercial building sector, demand for iron and steel is expected to persist. The current and foreseeable circumstances make it abundantly clear that the extractive industry may experience a boom time in the years to come.

Contribution of the Mining and Quarrying Sector to the Gross Value Added (GVA) of the Nation

As per the first advanced estimates of National Income for 2021-22 released by the National Statistical Office, Ministry of Statistics and Program Implementation, the 1st AE of GVA of mining and quarrying sector during 2021-

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22 at 2011-12 prices is Rs 336859 crore, which shows a growth of 14.33% as compared to PE of GVA during 2020-21 at ₹ 294644 crore.

Gross Value Added (GVA): Share/Contribution of Mining and Quarrying (%)

GVA in Rs crore at current prices		
Sector	2021-22 (1st AE)	2020-21 (PE)
Mining and quarrying	475202	292120
Total	21036541	17915167
Contribution in %	2.26	1.63

Chapter 5

Recent Key Drivers in Valuation of Companies in Extractive Industry

To perform the Valuation of assets in the extractive industry, it is useful to have the aid of an instrument that shows the sector's value drivers and their connections with each other. Such an instrument can simplify the understanding of the industry's trends and developments.

In the case of Companies in the Extractive Industry, some of the key drivers that a Valuer needs to assess are as under:

i. Commodity price

As the basis for the revenue obtained from each quantity of a certain commodity produced, the commodity price is frequently seen as the key determinant of a mine's profitability. Investors with different time horizons have significantly diverse perspectives on commodity price risk. Short-term investors frequently concentrate on transient variations in supply and demand.

To gauge how saturated the market is right now for a given item, they respond to information on brief production houses and consider variables like warehouse levels. An investor's short-term outlook on a particular commodity sector may shift as a result of market announcements like China's economic growth, new housing or unemployment.

The two reference prices that are frequently used to estimate how profitable a mine will be in the short term (temporarily) from selling its output are the spot market and forward curve. Longer-term investors are more concerned with a commodity's structural makeup and the potential evolution of long-term supply and demand imbalances.

They look at newly opened mines and the key factors influencing demand for both raw materials and the finished goods that each raw material serves as an input. They carefully assess factors like cash cost and grade and take into account how substituting (alternative, less expensive commodities) and changing technology may affect the sector over time. Temporary fluctuations in consumption have no appreciable impact on the demand's long-term viability when measured in terms of end users. Water-related variables like scarcity

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(which would necessitate desalination) might increase mining capex and lead to fewer new mines being built, according to long-term investors (as the economics may not work at given prices).

Additionally, adjustments to environmental regulations affect the ongoing monitoring and cleanup of operational expenses. This may lead to an industry-wide shift in the cost curve, which affect the dynamics of a particular commodity's pricing (if it costs more to produce a single unit). Due to the geographic concentration of a significant amount of the world's production of some commodities, even small changes that affect capital expenditures and operational costs in a country like India can have a significant impact on the global market.

ii. Environment Related Impact

Investors investing in the mining industry might be worried about the environmental impact of mine because it can impact profitability through increased monitoring costs, the permitting process and potentially cause production disruptions in the event of pollution or a reported violation.

The risk that might be associated with the timeline of production or project can make a significant impact on both short-term and long-term investors. Concerns are there like any sort of environmental impact can lead to increased costs, a delay to the production timeline or either a temporary or permanent production stoppage.

For better understanding let's take an example, if a mine's feasibility study or permit is delayed by one year, an investor who is considering a project with a longer time horizon may be less concerned, whereas a one-year permitting delay may be sufficient for a short-term investor to abandon a particular position.

Whereas for a long-term investor, it is more crucial that the mine should be properly designed and that the project produces effectively and continuously during its whole life. Long-term investors will benefit from investing in slightly more expensive monitoring programs and preventative maintenance, while shorter-term investors may consider these charges to be wasteful.

A short-term investor would consider these costs to be just a cost, but a long-term investor would view this as an investment, if a mining business loses earnings due to greater expenditure on preventative measures (whose impact may not be felt for 15 years). The management is frequently out of alignment

Recent Key Drivers in Valuation of Companies in Extractive Industry

as well because they are frequently rewarded for short-term success rather than ongoing preventative risk avoidance.

To evaluate how well management and corporations are reducing long-term risks, investors have a limited amount of mine-specific data at their disposal. We are certain that mines collect and disclose this data internally, thus data collecting is not the problem (often, so it can be looked at after the fact in a high impact event).

Consolidating mine-by-mine data and providing it to investors in a useful format appears to be the issue. The end effect is a lack of incentive for businesses (especially smaller ones in need of funding) to take further steps to reduce longer-term risk because investors are unable to factor in the impact of these actions when valuing assets.

iii. Infrastructure Development

The decision of whether to invest in long-term infrastructure, such as rail, pipelines, creating roads, and pipes for water access, or to rely on more expensive temporary methods for the project to run is commonly faced by mining corporations (such as utilising trucks as the main means for transporting supplies and the finished product).

For instance, many miners would transport water in truck from nearby wells to the mine site during the project's development phase as they try to ascertain whether there are sufficient reserves and resources in the ground for a mine to be built. Only once deposits have been identified and studies have shown that a mine should be built, will a mining corporation consider building an expensive pipeline or desalination facility.

Infrastructure projects can be extremely expensive, taking years to finish. These investments demand a long-term dedication to output from a specific place and frequently a conviction that a particular region will prosper over the long haul.

Long-term investors can examine a region's geology and then decide whether a method of conveniently accessing the area will likely be essential and cost-effective in the long run, giving them the option to see a project from a whole different perspective. Investors with shorter investment horizons frequently concentrate on near-term gains and if a certain investment would produce observable value development throughout their shorter investment horizons.

iv. Other Key Considerations/ Drivers

- Revenue
- EBITDA multiple
- Security and health
- Natural disasters
- Cost management
- Social conflict / community relations
- Future Outlook
- Economic Conditions
- Foreign Exchange
- Government Policies
- Project Funding
- Availability of Resources

Chapter 6

Valuation Approaches

Assets in Extractive Industries are valued for a variety of reasons, including mergers and acquisitions the price of a stock offering to the public, non-length arm's transactions support for property agreements, legal disputes, expropriation, and insurance claims.

Further, Exploration assets are those where a commercially viable mineral deposit has yet to be identified. These assets are acquired, sold, optioned, and joint ventured based on their anticipated potential for a commercial mineral resource. As a result, the inherent value of an exploration asset is determined by its exploration potential.

A mineral project's valuation is determined by its mineral deposits. It is crucial for the participants in a mineral project to comprehend the project's mineral inventory due to the non-renewable, finite nature of mineral resources. In reality, acquiring and improving this information to evaluate investment possibilities takes up a significant portion of pre-development efforts.

The appropriate valuation methods employed should be decided based on the exploration and development phase / stage of the property. Mineral and Petroleum properties are generally classified into the following categories with the different stages of exploration and development carrying different levels of risk.

Exploration properties: A Mineral or Petroleum real property interest that is under active exploration for Mineral deposits or Petroleum accumulations. However, economic viability for the same has not been demonstrated.

Resource properties: A Mineral or a Petroleum Resource which has however not been established through a Pre-feasibility Study or Feasibility Study to be economically beneficial or viable.

Development properties: Properties that are established as economically viable through a Feasibility Study, however, there is no production.

Production properties: An operation with active production of Minerals and Petroleum as of the valuation date is understood to be a Production property.

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In the extractive sector, the term "Asset" has an even larger definition that covers not only conventional assets but also various rights relating to their exploration, development, and mining. The phrase "Valuation of Assets in Extractive Industry" has various connotations and features that need to be thoroughly analysed and rationalised before building valuation models for any asset.

Generally, the following three main valuation approaches are adopted to measure the value of Extractive Industries assets in correlation with the valuation approaches and methodologies prescribed under ICAI Valuation Standard 103 Valuation Approaches and Methods.

- (a) Market approach
- (b) Income approach
- (c) Cost approach

As a practice, properties with mineral reserves are valued using the Income Approach while properties without mineral reserves are valued using the Market or Cost Approach.

Considering the nature of the assets, the Valuer needs to place reliance on technical experts who have estimated the quantitative information and other technical information which then forms the basis of the valuation in a significant manner.

The valuer when using more than one methodology should assess and complement the findings of the methods used. It should be noted that the three approaches draw inferences from the same set of data and this should be viewed in combination when recommending the valuation conclusion.

Valuation of assets in the extractive industry is a unique activity of utmost importance that helps the valuer and other stakeholders to determine the value of assets. Unlike determining the value of other assets and product entities, valuation of assets in extractive industry have some unique features in terms of approaches and methodologies.

Numerous factors are either directly or indirectly related to the valuation process. The valuation of assets in extractive industry can be done in one of three ways which will be discussed later in this book. In this technical guide, an effort has been made to describe the classification of valuation models, several approaches to valuing the assets, and the chosen methodology used in India for valuation of assets in the extractive industry.

The term Mineral assets has even broader connotation that which encompasses not only mineral deposits but also various rights regarding their exploration, development, and mining

The project's development stage will be a major factor in any decision to choose a valuation technique. The valuation approach to a project that needs to be started from scratch will be substantially different from that applied to a developed, well-drilled, extensively explored property. The stage of the project is one of the major considerations which need to be kept while seeking the valuation.

Example to determine the best Approach

For better understanding, let us take an illustration of an Iron ore extractive company named as Whale Iron Ltd. where we are going to apply the valuation methodologies to the five stage of Iron ore extraction process and the outcomes of the application of each method are compared.

This approach made it possible to pinpoint the methodology that would work best in a certain situation.

The broad parameters for Whale Iron Ltd have five stages, in each stage different development scenarios will be considered and included:

1. an exploratory target in greenfield (Stage A)
2. an established mineral occurrence that has been partially sampled (Stage B)
3. an ore body with drillings (Stage C)
4. a mine that has only been partially constructed (Stage D)
5. an active mine (Stage E)

The following parameters are included in supporting economic data:

- For the projects, the gold price stays constant in real terms at US \$.350/oz.
- The assumed inflation rates for India and the United States of America (USA) are 7.5% per year and 2.5% per year, respectively.
- The spot exchange rate between the INR and the US Dollar is considered as Rs. 8.70/US\$, and Taxation is assumed to be 30% of profits.

Description of the five stages of Whale Iron Ltd.'s Iron ore extraction projects to be evaluated

Stage	Area Extent	Depth below Surface (meters)	Category	In situ grade (g/t)	Estimated in situ ounces	Proximity	Exploration expenditure US\$ millions	Comments
A	566.89	100 to 500	Inferred resources	5.5	621 500 oz (1.5m reef width and density of 2.75 t/m ³)	Remote from other mineralized deposits	1.3	Since Stage A has not been drilled out, no project feasibility estimates have been made.
B	2898.45	1600 to 2000	Indicated to Inferred resources	12.04	1 876 066 oz (from early-stage assessment)	contiguous to other mineralized deposit	3.0	Stage B has not been completely drilled out. Geological continuity and other geoscientific information can be extrapolated by qualified people, and it is adjacent to other well-documented mineralized areas. The project has access to all necessary infrastructure, including water sources, electricity, and roads (road and rail)
C	700	700 to	Measured	5.71	1 777 300 oz	within the	5	Stage C has completed a

		1000	and indicated resources, some resources were converted to reserves		(from bankable feasibility study)	metalogenic province, but removed from other mineralized deposits		bankable feasibility study supporting it. Capital expenditure of Rs. 250 million will be required to bring the project into production.
D	3678	2500 to 4000	Proven and probable reserves, with additional resources	9.1	52 000 000 oz (from bankable feasibility study)	large and contiguous to other large mineralized deposits	20	Project D has commenced the development of a mine based on a finalized feasibility study. The vertical access shafts have been commissioned and ramp-up to full, sustainable production levels has begun.
E	450	800 to 2000	Proven and probable reserves, with additional resources	9.3	1 519 100 oz (from LOM Plan)	remote from other mineralized deposit	6	Project E has been an operating mine for a number of years. It is fully operational and demonstrates significant face availability and mining flexibility.

TG on Valuation of Assets in Extractive Industry

The three valuation strategies, their associated techniques, and how they apply to the three types of mineral assets that were previously defined are listed in the table below.

Approaches	Description	Method	Exploration Assets	Development Assets	Production Assets
Market	Utilises the idea of substitution. The Property in Extractive Industry being valued is compared with the transaction value of similar properties in the Extractive Industry in an open market.	Market Capitalisation	Mainly applicable to single property companies		
		Net Metal Value per unit of Metal	Based on Rule of the Thumb		
		Gross "in situ" Metal Value	Not acceptable		
		Value Per Unit Area	Widely Used	Not widely used	Not widely used
		Option Agreement Terms	Widely Used	Widely Used	Quite Widely Used
		Comparable Transactions	Widely Used	Widely Used	Widely Used
Cost	Utilises the historical or future amounts spent on the Assets	Multiples	Quite Widely Used	Quite Widely Used	Widely Used
		Geoscience Factor	Not widely used	Not widely used	Not widely used
		Appraised Value	Quite Widely Used	Not widely used	Not widely used
Income/Cash	Depends on the "Value in use"	Discounted Cash Flow	Not widely	Widely Used	Widely Used

Valuation Approaches

flow	principle and necessitates calculating the present value of future cash flows over the Asset's useful life.		used		
		Real Options	Less widely Used	Quite Widely Used	Quite Widely Used

As we can see from the above-mentioned illustration, there are various stages in the Iron Ore project, ranging from the beginning to the end of the project. However, it is important to note that Iron Ore projects represent a sequence from early through late stage and therefore the transition from one method to another should demand a certain level of judgment. Hence, it is merely an example for better understanding of the readers, in practical life the approaches may vary according to the circumstances.

Exploration	Evaluation	Construction	Production
Methods • Comparable Transaction • Appraised Value	Methods • Multiplies (e.g. PER Ratio) • Discounted Cash Flow (DCF) • Real Options Valuation (ROV)		

Chapter 7

Market Approach

A valuation method known as the "market approach" makes use of the prices and other pertinent data produced by market transactions involving similar or identical assets, liabilities, or a collection of assets and liabilities, such as a company, this strategy is suitable in a going-concern situation.

When evaluating assets that are traded in an active market, a valuer uses the market price approach, considering the transacted price observed over a suitable time frame.

When an asset is traded in more than one active market, the valuer also considers the market with the biggest trading volume. Furthermore, to lessen the influence of volatility from any one-time event on the asset, the valuer might think about adopting a weighted average or volume weighted average.

The following are the common methodologies for the Market Approach while valuing the Assets in Extractive Industry:

- Market Capitalisation
- Option Agreement Terms
- Comparable Companies Multiple Method
- Comparable Companies Transaction Method

7.1 Market Capitalisation

The most current market value of a company's outstanding shares is its market capitalization, or "market cap." Market capitalization is one of the most effective methods of determining a company's worth. It is critical for readers to realise that this valuation of a firm is dependent on its stocks. The Market Cap is determined by multiplying the share price at the moment by the total number of outstanding shares.

Market capitalization value is frequently used by the investment community to rate firms and assesses their relative proportions within a certain industry or sector. Simply multiply the current market share price of a company by the total number of outstanding shares to find its market capitalization.

Mining analysts employ the market capitalization approach for minerals research, comparing how listed mining firms do with their counterparts on this basis.

7.2 Option Agreement terms

When a property is covered by an existing option agreement, the option agreement terms approach can be used. A schedule of required and optional monetary payments as well as a work commitment is often applied across a number of years in an option agreement. The sum of the payments made, the work commitments completed, and the subjective likelihood that the optionee will complete the remaining payments and the remaining exploration programs approximate the value of the property.

It is a contract entered into by the owner of mineral rights and a third party that enables the latter to acquire a stake in the mining property in return for specific benefits provided to the license holder.

These types of agreements should allow a capable business with the means to carry out a significant exploration programme to explore the property. Also, to gain from the value of the property through receiving monetary payments, shares, or employment with a corporation.

Options are classified as 'put' or 'call'. The holder of a put option has the right, but not the responsibility, to sell the commodity at a predetermined price at a specified moment in time. Call options provide the holder the right, but not the duty, to purchase the commodity at a predetermined price at a predetermined time. These puts and calls can be bought, resulting in a long position, or sold, resulting in a short one. Because the delivery price is set, put options gain realisable value for the owner as the spot price of the commodity falls.

As a result, option appraisals concentrate on the value due to flexibility. Valuation methodologies that neglect the value associated with a mineral property's optionality tend to undervalue that property because they do not account for the added value of flexibility in the face of future unknown occurrences. As a result, if two mining projects are similar but for more operational flexibility, the project with greater flexibility will have a higher value. The rationale for this is that a more flexible project allows the owner to react to coming events in ways that increase the project's value or, at the very least, decrease its possible losses. Given the less flexible operation, the owner has few options for changing the path of the project in the case of inherent obstacles.

7.3 Comparable Companies Transaction Method

- Market Comparable Method involves the identification of comparable companies followed by the derivation of market-based multiples. While applying such multiples to the subject company's financial metrics (e.g. revenue or earnings), careful adjustments to account for differences in fundamentals between the comparable companies and the subject must be undertaken.
- Theoretically, a comparable company is one with cash flows, growth potential and risk similar to the company being valued. Conventionally, looking at the companies within the sector provides a better-matched and similar-profiled set of comparable companies. Alternatively, in some cases, it is necessary to look across sectors to identify comparable companies. In practice, one seldom finds exactly similar companies.
- The next step is to arrive at a standardised set of ratios for comparison, commonly known as multiples. Multiples are a ratio of the enterprise value/equity value over different financial parameters like Revenue, Earnings before Interest, Tax, Depreciation and Amortisation ("EBITDA"), Profit after Tax ("PAT"), Earnings per Share ("EPS"), book value etc., with some being preferred over the others. For example, EBITDA multiple is preferred over PAT multiple to eliminate the effect of differences in depreciation policies and the impact of leveraging.
- As comparable companies are not exactly similar to the company being valued, the multiples derived from such companies cannot be applied sacrosanct, and thus merit various subjective adjustments to account for differences in risk profile, growth rate, etc. For example, a company with a higher EBITDA margin should command a better multiple than an average performer or a positive adjustment is required for a company with better growth potential.

7.4 Comparable Companies Transaction Method

- A variant of the Comparable Companies Multiple Method, the Comparable Companies Transaction Method uses transaction multiples in place of trading multiples. Transaction multiples, as the name suggests, are the multiples implied in the recent acquisitions/disposals of comparable companies.

Market Approach

- This method is especially useful if there are limited comparable companies. Also, it incorporates the market sentiments in a better way, as the multiples, unlike trading multiples which are affected by the inefficiencies of the market, are based on an informed negotiation between buyers and sellers.
- Various factors should be considered while using transaction multiples. These are nature of transactions - hostile deal, group restructuring, industry trends, negotiation or control premiums that may have been paid, time of the transaction - whether at the high or low of the industry cycle, consideration - share or cash, contingent to future performance, etc. This method suffers from the limitation of data availability, as the requisite information relating to transactions, specially about private companies, is seldom available.

Chapter 8

Income Approach

Although a company's projected earning power is typically a major component in business or share valuations, there may be times, particularly in valuations for compensation, when other aspects take on a disproportionately greater significance. Investors are primarily concerned with a company's potential to continue making profits in the absence of any other special interests.

The Income approach considers the “value-in-use” principle and requires determination of the present value of future cash flows over the useful life of the property. The value using the Income Approach considers the expected benefits from the property, usually in the form of discounted cash flows or using real option analysis in conjunction with the income approach.

Some of the instances where a Valuer may apply the income approach:

- where the asset does not have any market comparable or comparable transaction;
- where the asset has fewer relevant market comparable; or
- where the asset is an income producing asset for which the future cash flows are available and can reasonably be projected

The following are the common methodologies for the Income Approach while valuing the Assets in Extractive Industry:

- Discounted Cash Flow
- Real Options

8.1 Discounted Cash Flow

The income technique, which uses a discounted cash flow analysis, is the recommended methodology since it overcomes some of the drawbacks of the cost and similar transaction approaches. However, the study must be supported by adequate credible data.

Discounted Cash Flow is the most commonly used valuation technique, and is widely accepted by valuers because of its intrinsic merits, some of which are as follows:

Income Approach

- i. Theoretically, it is a very sound model because it is based upon expected future cash flows that will determine an investor's actual return;
- ii. It is based on expectations of performance specific to the business, and is not influenced by short-term market conditions or non-economic indicators;
- iii. It is not as vulnerable to accounting conventions like depreciation, inventory valuation in comparison with the other techniques/approaches since it is based on cash flows rather than accounting profits;
- iv. It is appropriate for valuing green-field or start-up projects, as these projects have little or no asset base or earnings which renders the Cost Approach (net asset value) or the Market Approach (application of market multiples) inappropriate. However, valuation must recognise the additional risks in such a case (e.g. project execution risks, lack of past track record, etc.) by using an appropriate discount rate.

Because it takes into account a mining plan derived from a feasibility study report—one of the most reliable technical assessments of the assets—or other pertinent inputs that can be collected, the Discounted Cash Flows (DCF) method is one of the ways to evaluate mining assets.

The Income Approach is frequently utilised for production and development properties, but it is less relevant for those that are being explored. When utilising the DCF model to estimate the property's worth, the following factors must be taken into account:

- a) It's been noted that the typical DCF models have a single net cash flow stream that captures the majority of the property's projected value when employing a certain variable, like the grade of metal. The uncertainty of projected quality disparities may have an impact on the property's value, thus valuers need to be aware that grade and quality differences are likely to exist.
- b) Even though static DCF model uses predetermined financing, standard production policy, taxation payouts, etc. While a static DCF model relies on a set production policy, predetermined financing and taxation payments, etc., it is important to take into account the possibility that operational policies could change and that tax and financing payoffs could be modified as a result of shifting business conditions.

- c) The worth of non-economic resources like a gold or copper-gold mine, the financial effects of windfall taxes, or the actual cost of a financing arrangement with embedded commodities derivatives are all difficult to estimate because of the static DCF's limitation. A number of models are created taking various designs and project situations into account as common industry practice.

8.2 Real Options Valuation (ROV)

- Commodity price volatility is a fundamental characteristic of mining project appraisal and investment decision-making, hence commodity price is an essential aspect for mining enterprises. Classic discounted cash flow (DCF) methods are widely utilised for mining project valuations; however, due to commodity price unpredictability and operational flexibility, determining mining project values using traditional DCF methods alone is challenging and sometimes unsuitable. The commodity price and its inherent volatility should be adequately simulated and included in the evaluation process to evaluate the economic feasibility of a mining project more precisely.
- As a result, academics and practitioners continue to develop and use real options valuation (ROV) approaches for evaluating mining projects under commodity price uncertainty that incorporate continuous-time stochastic models. Although the idea of ROV emerged a few decades ago, most of the models generated to date are largely relegated to theoretical research and academics; as a result, the application of ROV methodologies remains poorly understood and is frequently not employed in mining project appraisals.
- Due to the shortcomings of conventional valuation techniques, the Real Option offers valuation techniques that have been used for many years as strategic decision-making tools to produce more distinct outcomes, such as the Black-Scholes formula or the binomial option-pricing model.
- Flexibility and operational adaptability are essential for long term corporate success and real option (RO) appears suitable for analysing risky projects. Nevertheless, its application in engineering design has been slow-moving compared to financial uses. Therefore, there is a compelling argument for using visual, intuitive and transparent models, such as the binomial decision tree, which has the potential to eliminate decision maker apprehension and improve RO use in engineering design and decision making.

Chapter 9

Cost Approach

In most cases, the projections shall comprise the statement of profit & loss, balance sheet, cash flow statement, along with the underlying key assumptions. However, in certain cases, if balance sheet and cash flow statement are not available, details of future capital expenditure and working capital requirements may also suffice.

The projections reflect the accrual-based accounting income and expenses. For arriving at the cash flows, non-cash expenses, such as depreciation and amortisation, shall be added back. Further cash outflows relating to capital expenditure and incremental working capital requirements, if any shall be deducted.

It can be challenging to evaluate a property that is still in the early stages of mining discovery because the most value is purely subjective and poorly quantifiable.

It becomes simpler to construct a valuation approach that explicitly connects the estimated Value to actual realities once an exploratory asset has shown, quantifiable outcomes, such as a Mineral Resource. The Cost Approach is particularly helpful when taking into account properties that are still in the early phases of exploration; however it can be used with varying degrees of success for all types of mineral assets. Since it might be difficult to value these early-stage exploratory assets, any clear approach to do so would be beneficial for the valuer.

The following are the common methodologies for the Cost Approach while valuing the Assets in Extractive Industry:

- Multiples
- Appraised Value

9.1 Multiples

- Some mineral rights and property transactions have been analysed and based on a multiple of exploration expenditure quantum, and an indicative value has been calculated from these expenditures. The Multiples of exploration costs technique of valuation is an appropriate

TG on Valuation of Assets in Extractive Industry

approach to mineral property appraisals if only spending relevant to major exploration is included and the quality of the exploratory effort is deemed acceptable.

- The "multiple of exploration expenditure" technique of mineral valuation is applicable to exploration properties at any stage of exploration up to a reasonably advanced stage, but without any resources identified. The method is often employed and may be the only semi-quantitative choice in many instances that face a professional valuer. Importantly, it frequently serves as the starting point for conversations about farming in an exploration tenement.
- In this valuation technique, the original owner of the land in issue seeks to at least recoup his exploration investment on the property, but ideally wishes to achieve a premium on that capital outlay. This methodology is also known as the cost approach method. The cost approach method focuses on the amount that was spent on the property added to which, or deducted from which is a premium, or discount, as the case may be.
- The premium or discount will be determined by significant historical exploration expenses as well as warranted future costs or any existing liabilities. Commensurate with the above in mind, the anticipated degree of mineralization on the property, based on exploration results, or if insufficient drilling has been completed to delineate a mineralized zone, then based on anticipated mineralization through inference, will ultimately determine whether the property should be attributed any value at all. Assuming that mineralization has been discovered, it must be determined to what degree a premium above the initial exploration expense may be offered.
- The multiples of exploration expenditure (MEE) methodology are based in large part on vendor psychology, where a vendor seeks a return on opportunity investments and uses multipliers as a result to assess a potential fair market value. Others consider it to be the most effective way to value exploratory properties until it is possible to use a DCF strategy, even though it is not advised as a major valuation method by some employees.
- The multiple of exploration expenditure technique determines a base value for the tenements by multiplying current exploration expenditure by either past exploration expenditure or committed future exploration expenditure.

- To arrive at a fair value for the tenements, this base value is increased by a prospective enhancement multiplier (PEM), with adjustments for market premium or discount and consideration of the caliber of the exploration team.

9.2 Appraised Value

- The Appraised Value Method is based on the idea that the true value of an exploration property or a marginal development site rests in the possibility of the presence and finding of a profitable mineral deposit. The Appraised Value Method is based on the assumption that the amount of exploratory spending justified on a property is proportional to its worth. The cost method has some merit since option agreements on mineral assets are frequently based on the expenditures necessary to acquire an interest.
- The appraised value method's primary concept is that an exploration property is worth the significant previous exploration expenditures plus the indicated future cost. An important element of this method, which is often overlooked in its application, is that only those past expenditures which are considered reasonable and productive are retained as value. Productive means that the results of the work give sufficient encouragement to warrant further work by identifying potential for the existence and discovery of an economic mineral deposit.
- Future expenses that are justified include a realistic exploration budget to test the indicated potential, which can be geophysical or geochemical anomalies, intriguing showings, or mineralized zones that have previously been discovered. As previously stated, if exploratory effort reduces potential, it is not productive, and its cost should not be maintained at its current value or lowered. If the property is thought to have little or no exploration potential, it has little or no value.
- Annually, past expenses are often examined. In situations of significant inflation, historical expenditures are increased to the valuation date or current unit costs are applied to the work retained.
- The Appraised Value of the entire property is calculated first in the event of dual or multiple property ownership. The value is then assigned to one or more of the property owners. During an option or earn-in period, each party's property interests are deemed to be the final earned

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interests. Some properties have a royalty, which is usually expressed as a net smelter return or a net profits interest. Such royalties are deducted from the Appraised Value allotted to the non-royalty holder on a pro rata basis.

Chapter 10

Valuation of Assets in Oil & Gas Extraction

Extraction is a very inclusive term that include ample activities like the extraction of fuels (Coal, Oil & Gas) and Metals (Zinc, Copper, Aluminum etc.) and minerals (Like Graphite, Granite, Magnetite etc.). India is the world's third largest energy consumer, trailing only China and the United States. It is also the largest consumer of energy. India's energy needs are primarily met by coal, crude oil, natural gas, and renewable energy, accounting for 5.7% of global primary energy consumption.

The expanding economy and population growth are the primary drivers of rising oil and gas demand. The Indian Government has thought to promote the use of natural gas as a fuel and feedstock throughout the country, with the goal of increasing its share of the primary energy mix from around 6.7% to 15% by 2030. The Government has adopted several policies to fulfill the increasing demand. It has allowed 100% foreign direct investment (FDI) in many segments of the sector, including natural gas, petroleum products and refineries, among others.

Because India's economic growth is inextricably linked to its energy demand, demand for oil and gas is expected to rise, making the sector very appealing for investment. Valuation of overseas oil and gas extraction demands more precise quantitative research to support investment decision-making and for the consideration of other stakeholders. The valuation of assets is a critical component in most restructuring situations involving stakeholders with various claims to a Company's assets. Because of the technical data and skillset required to value these reserves, valuation analyses in restructurings involving oil and gas reserves are frequently more complex.

Although assessing oil and gas assets is not inherently more complex than valuing other asset classes, it does need a thorough grasp of the relative advantages of classic valuation approaches. Valuing oil and gas assets, which are a diminishing asset base with value connected to continually changing commodity prices and historical production trends, need a deep grasp of the technical intricacies included in a company's reserve database. Although

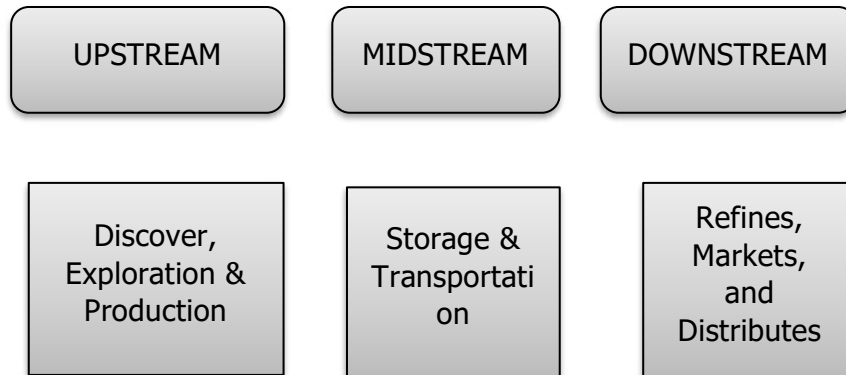
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commodity prices change, the value estimations of the underlying oil and gas assets should be based on present conditions rather than unexpected economic or environmental developments that might alter the fair market value beyond the valuation date.

The oil and gas industry's value chain is classified into three distinct segments or sectors:

- i. **Upstream** : Upstream companies are also known as "Exploration and Production (E&P) companies." These companies are primarily involved in locating and appraising possible oil and gas producing blocks, drilling exploratory wells, preparing Field Development Plans (FDPs), and constructing infrastructure in economically feasible oil fields to generate commercial amounts of hydrocarbon.
- ii. **Midstream**: The midstream business stores and transports oil and gas after the upstream industry discovers and produces it. Midstream firms connect petroleum-producing locations to population centers where customers can be found. Midstream companies are generally involved in hydrocarbon transportation. Depending on the type of commodity being delivered, the various means of transportation include pipelines, marine, rail, and road transportation.
- iii. **Downstream**: The downstream section refines, markets, and distributes the ultimate product to customers, whereas the midstream segment delivers products. Gasoline, jet fuel, heating oil, and diesel are examples of end products. These companies process and refine crude oil into a range of derivative products such as liquefied petroleum gas, gasoline, jet fuel, diesel oil, other fuel oils, and so on, which are then supplied to various end-users. The final products are determined by the refinery's complexity. Some are able to produce various varieties to meet current demand.

Valuation of Assets in Oil & Gas Extraction



Value chain in the oil and gas industry

When valuing companies in the oil and gas industry, three standard valuation approaches are typically used: the Income Approach, the Market Approach, and the Asset Approach. Understanding the sector of the value chain in which the subject company operates is the first step in selecting the appropriate valuation approach. Certain considerations must be made for each industry.

We have given an overview of the extraction in oil and gas and why there is an urge to do valuation of the assets in Oil and Gas extraction but in this technical guide we have covered the major part of Mineral Properties and the associated extracted activities to the mineral mining as the extractive industry itself is quite a vast industry.

Chapter 11

Financials of Some Industries in Extractive Business

We have collated financials of some companies in Extractive Industries to understand the importance of this industry from economic and Government perspective.

1. Coal India Ltd. Financial Highlights

YEARLY RESULTS OF COAL INDIA (in Rs. Cr.)	MAR '22	MAR '21	MAR '20	MAR '19	MAR '18
Net Sales/Income from operations	1,131.92	640.25	845.16	315.39	357.06
Other Operating Income	--	--	--	618.91	7.44
Total Income From Operations	1,131.92	640.25	845.16	934.30	364.50
EXPENDITURE					
Consumption of Raw Materials	1.19	2.24	5.09	7.58	6.93
Purchase of Traded Goods	--	--	--	--	--
Increase/Decrease in Stocks	-11.99	14.21	15.68	-9.41	42.09
Power & Fuel	--	--	--	10.81	12.11
Employees Cost	438.84	443.90	545.25	474.66	525.04
Depreciation	20.83	19.67	54.39	26.25	18.14
Excise Duty	--	--	--	--	--
Admin. And Selling Expenses	--	--	--	--	--
R & D Expenses	--	--	--	--	--
Provisions And Contingencies	--	--	--	0.43	-10.35

Financials of Some Industries in Extractive Business

Exp. Capitalised	--	--	--	--	--
Other Expenses	260.33	163.84	486.56	392.18	284.60
P/L Before Other Inc., Int., Excpt. Items & Tax	422.72	-3.61	-261.81	31.80	-514.06
Other Income	10,935.62	7,679.1 8	11,566. 33	10,548. 66	9,571.0 3
P/L Before Int., Excpt. Items & Tax	11,358.34	7,675.5 7	11,304. 52	10,580. 46	9,056.9 7
Interest	1.50	1.59	5.26	18.04	-257.86
P/L Before Exceptional Items & Tax	11,356.84	7,673.9 8	11,299. 26	10,562. 42	9,314.8 3
Exceptional Items	--	--	--	--	--
P/L Before Tax	11,356.84	7,673.9 8	11,299. 26	10,562. 42	9,314.8 3
Tax	155.27	33.88	18.38	92.75	21.41
P/L After Tax from Ordinary Activities	11,201.57	7,640.1 0	11,280. 88	10,469. 67	9,293.4 2
Prior Year Adjustments	--	--	--	--	--
Extra Ordinary Items	--	--	--	--	--
Net Profit/(Loss) For the Period	11,201.57	7,640.1 0	11,280. 88	10,469. 67	9,293.4 2
Equity Share Capital	6,162.73	6,162.7 3	6,162.7 3	6,162.7 3	6,207.4 1
Reserves Excluding Revaluation Reserves	10,195.22	10,588. 98	10,650. 57	7,834.6 6	6,487.3 0
Equity Dividend Rate (%)	170.00	160.00	120.00	131.00	165.00
EPS BEFORE EXTRA ORDINARY					
Basic EPS	18.18	12.40	18.31	16.87	14.97
Diluted EPS	18.18	12.40	18.31	16.87	14.97

TG on Valuation of Assets in Extractive Industry

EPS AFTER EXTRA ORDINARY					
Basic EPS.	18.18	12.40	18.31	16.87	14.97
Diluted EPS.	18.18	12.40	18.31	16.87	14.97
PUBLIC SHARE HOLDING					
No Of Shares (Crores)	--	--	--	--	--
Share Holding (%)	--	--	--	--	--
PROMOTERS AND PROMOTER GROUP SHAREHOLDING					
A) PLEDGED/ENCUMBERED					
- Number of shares (Crores)	--	--	--	--	--
- Per. of shares (as a % of the total sh. of prom. and promoter group)	--	--	--	--	--
- Per. of shares (as a % of the total Share Cap. of the company)	--	--	--	--	--
B) NON-ENCUMBERED					
- Number of shares (Crores).	--	--	--	--	--
- Per. of shares (as a % of the total sh. of prom. and promoter group).	--	--	--	--	--
- Per. of shares (as a % of the total Share Cap. of the company).	--	--	--	--	--

Source: Dion Global Solutions Limited

Financials of Some Industries in Extractive Business

2. ONGC Ltd. Financial Highlights

PROFIT & LOSS ACCOUNT OF OIL AND NATURAL GAS CORPORATION (IN RS. CR.)	MAR 22	MAR 21	MAR 20	MAR 19	MAR 18
	12 mths	12 mths	12 mths	12 mths	12 mths
INCOME					
REVENUE FROM OPERATIONS [GROSS]	109,962.30	67,890.90	95,701.41	109,299.88	84,580.16
Less: Excise/Sevice Tax/Other Levies	26.53	53.91	47.77	45.13	74.41
REVENUE FROM OPERATIONS [NET]	109,935.77	67,836.99	95,653.64	109,254.75	84,505.75
TOTAL OPERATING REVENUES	110,318.87	68,087.18	96,165.84	109,609.42	84,929.69
Other Income	6,515.58	7,142.51	6,105.03	7,519.01	7,883.55
TOTAL REVENUE	116,834.45	75,229.69	102,270.87	117,128.43	92,813.24
EXPENSES					
Cost Of Materials Consumed	3,272.47	6,664.78	7,654.91	7,423.12	5,615.88
Purchase Of Stock- In Trade	0.00	0.00	0.00	0.00	0.00
Operating And Direct Expenses	5,508.29	5,607.37	6,305.10	5,666.51	7,031.80
Changes In Inventories Of FG,WIP And Stock- In Trade	-142.95	-426.35	246.99	-166.27	-63.02
Employee Benefit Expenses	11,082.09	10,126.54	11,512.42	12,113.03	11,381.05
Finance Costs	2,359.86	2,214.54	2,823.68	2,492.14	1,508.47
Depreciation And Amortisation Expenses	18,076.22	16,327.38	18,616.86	15,778.62	14,470.17
Other Expenses	48,299.14	31,409.83	42,378.09	51,384.27	23,687.29

TG on Valuation of Assets in Extractive Industry

TOTAL EXPENSES	75,794.46	60,201.93	77,003.13	77,174.41	63,920.77
PROFIT/LOSS BEFORE EXCEPTIONAL, EXTRAORDINARY ITEMS AND TAX	41,039.99	15,027.76	25,267.74	39,954.03	28,892.47
Exceptional Items	0.00	1,375.03	-4,899.05	0.00	0.00
PROFIT/LOSS BEFORE TAX	41,039.99	16,402.79	20,368.69	39,954.03	28,892.47
TAX EXPENSES-CONTINUED OPERATIONS					
Current Tax	9,454.00	3,056.00	7,410.00	11,142.00	6,354.92
Less: MAT Credit Entitlement	0.00	0.00	0.00	0.00	0.00
Deferred Tax	-8,241.75	951.40	-124.58	2,096.00	2,814.09
Tax For Earlier Years	-478.00	1,148.95	-361.28	0.24	-221.80
TOTAL TAX EXPENSES	734.25	5,156.35	6,924.15	13,238.24	8,947.21
PROFIT/LOSS AFTER TAX AND BEFORE EXTRAORDINARY ITEMS	40,305.74	11,246.44	13,444.54	26,715.79	19,945.26
PROFIT/LOSS FROM CONTINUING OPERATIONS	40,305.74	11,246.44	13,444.54	26,715.79	19,945.26
PROFIT/LOSS FOR THE PERIOD	40,305.74	11,246.44	13,444.54	26,715.79	19,945.26
OTHER ADDITIONAL INFORMATION					
EARNINGS PER SHARE					
Basic EPS (Rs.)	32.04	8.94	10.69	20.86	15.54
Diluted EPS (Rs.)	32.04	8.94	10.69	20.86	15.54
VALUE OF IMPORTED AND INDIGENIOUS					

Financials of Some Industries in Extractive Business

RAW MATERIALS STORES, SPARES AND LOOSE TOOLS					
Imported Raw Materials	0.00	0.00	0.00	0.00	0.00
Indigenous Raw Materials	0.00	0.00	0.00	0.00	0.00
STORES, SPARES AND LOOSE TOOLS					
Imported Stores And Spares	0.00	0.00	1,168.64	1,037.92	1,393.57
Indigenous Stores And Spares	0.00	0.00	4,565.92	4,768.14	3,528.44
DIVIDEND AND DIVIDEND PERCENTAGE					
Equity Share Dividend	11,448.13	2,201.55	7,233.67	9,595.18	7,764.12
Tax On Dividend	0.00	0.00	1,201.45	1,684.46	1,152.12
Equity Dividend Rate (%)	210.00	72.00	100.00	140.00	132.00

Source: Dion Global Solutions Limited

3. Vedanta Ltd. Financial Highlights

KEY FINANCIAL RATIOS OF VEDANTA (in Rs. Cr.)	MAR 22	MAR 21	MAR 20	MAR 19	MAR 18
PER SHARE RATIOS					
Basic EPS (Rs.)	46.36	28.23	-18.10	13.65	19.47
Diluted EPS (Rs.)	46.36	28.23	-18.10	13.08	19.47
Cash EPS (Rs.)	54.27	35.01	-9.32	22.36	27.15
Book Value [Excl Reval	208.73	206.42	187.89	209.35	213.21

TG on Valuation of Assets in Extractive Industry

Reserve]/Share (Rs.)					
Book Value [Incl Reval Reserve]/Share (Rs.)	208.73	206.42	187.89	209.35	213.21
Dividend / Share(Rs.)	45.00	9.50	3.90	18.85	21.20
Revenue from Operations/Share (Rs.)	170.10	100.65	96.39	103.88	122.38
PBDIT/Share (Rs.)	69.96	52.71	23.38	31.24	28.38
PBIT/Share (Rs.)	62.04	45.94	14.60	22.53	20.74
PBT/Share (Rs.)	52.73	36.73	-28.13	13.30	24.80
Net Profit/Share (Rs.)	46.36	28.23	-18.10	13.64	19.51
PROFITABILITY RATIOS					
PBDIT Margin (%)	41.12	52.37	24.25	30.07	23.19
PBIT Margin (%)	36.47	45.64	15.15	21.68	16.95
PBT Margin (%)	31.00	36.49	-29.17	12.80	20.26
Net Profit Margin (%)	27.25	28.05	-18.77	13.13	15.93
Return on Networth / Equity (%)	22.20	13.67	-9.63	6.51	9.14
Return on Capital Employed (%)	21.90	16.83	5.68	8.20	7.91
Return on Assets (%)	11.57	7.62	-4.82	3.36	4.93

Financials of Some Industries in Extractive Business

Total Debt/Equity (X)	0.47	0.37	0.57	0.48	0.38
Asset Turnover Ratio (%)	0.44	27.18	25.71	25.61	30.93
LIQUIDITY RATIOS					
Current Ratio (X)	0.68	0.57	0.43	0.46	0.47
Quick Ratio (X)	0.49	0.42	0.30	0.31	0.30
Inventory Turnover Ratio (X)	3.36	6.74	6.30	5.05	5.59
Dividend Payout Ratio (NP) (%)	96.77	33.50	-25.19	138.02	108.61
Dividend Payout Ratio (CP) (%)	82.65	27.02	-48.90	84.21	78.04
Earnings Retention Ratio (%)	3.23	66.50	125.19	-38.02	-8.61
Cash Earnings Retention Ratio (%)	17.35	72.98	148.90	15.79	21.96
VALUATION RATIOS					
Enterprise Value (Cr.)	179,631.40	108,803.80	61,471.00	102,165.00	135,063.60
EV/Net Operating Revenue (X)	2.84	2.91	1.71	2.64	2.97
EV/EBITDA (X)	6.90	5.55	7.07	8.79	12.79
MarketCap/Net Operating Revenue (X)	2.37	2.27	0.67	1.77	2.27

TG on Valuation of Assets in Extractive Industry

Retention Ratios (%)	3.22	66.49	125.19	-38.02	-8.61
Price/BV (X)	1.93	1.11	0.34	0.88	1.31
Price/Net Operating Revenue	2.37	2.27	0.67	1.77	2.27
Earnings Yield	0.11	0.12	-0.28	0.07	0.07

Source: Dion Global Solutions Limited

4. NMDC Ltd. Financial Highlights

KEY FINANCIAL RATIOS OF NMDC (in Rs. Cr.)	MAR 22	MAR 21	MAR 20	MAR 19	MAR 18
PER SHARE RATIOS					
Basic EPS (Rs.)	32.07	20.62	11.79	14.70	12.03
Diluted EPS (Rs.)	32.07	20.62	11.79	14.70	12.03
Cash EPS (Rs.)	33.05	22.11	12.75	16.07	12.84
Book Value [ExclRevalReserve]/Share (Rs.)	118.89	101.53	89.92	84.76	76.97
Book Value [InclRevalReserve]/Share (Rs.)	118.89	101.53	89.92	84.76	76.97
Dividend / Share(Rs.)	14.74	7.76	5.29	5.52	4.30
Revenue from Operations/Share (Rs.)	88.31	52.45	38.21	39.69	36.71
PBDIT/Share (Rs.)	45.41	31.21	21.31	24.55	20.00
PBIT/Share (Rs.)	44.43	30.43	20.35	23.64	19.19
PBT/Share (Rs.)	44.29	30.37	20.00	23.51	19.53
Net Profit/Share (Rs.)	32.07	21.34	11.79	15.16	12.03
PROFITABILITY RATIOS					
PBDIT Margin (%)	51.41	59.50	55.76	61.86	54.48
PBIT Margin (%)	50.30	58.02	53.24	59.57	52.28

Financials of Some Industries in Extractive Business

PBT Margin (%)	50.15	57.91	52.34	59.23	53.20
Net Profit Margin (%)	36.31	40.68	30.85	38.19	32.76
Return on Networth / Equity (%)	26.97	21.01	13.11	17.88	15.62
Return on Capital Employed (%)	34.48	28.53	21.96	27.09	24.22
Return on Assets (%)	21.02	16.99	11.59	15.58	13.30
Total Debt/Equity (X)	0.10	0.07	0.02	0.01	0.02
Asset Turnover Ratio (%)	0.64	41.78	37.56	40.80	40.59
LIQUIDITY RATIOS					
Current Ratio (X)	2.28	1.91	2.63	2.60	2.50
Quick Ratio (X)	1.96	1.74	2.37	2.38	2.33
Inventory Turnover Ratio (X)	0.33	16.68	16.17	18.24	20.32
Dividend Payout Ratio (NP) (%)	45.96	36.36	44.86	36.40	35.74
Dividend Payout Ratio (CP) (%)	44.60	35.09	41.48	34.34	33.49
Earnings Retention Ratio (%)	54.04	63.64	55.14	63.60	64.26
Cash Earnings Retention Ratio (%)	55.40	64.91	58.52	65.66	66.51
VALUATION RATIOS					
Enterprise Value (Cr.)	43,167.06	35,826.18	22,668.43	27,646.12	32,601.54
EV/Net Operating Revenue (X)	1.67	2.33	1.94	2.27	2.81
EV/EBITDA (X)	3.24	3.92	3.47	3.68	5.15
MarketCap/Net Operating Revenue (X)	1.84	2.58	2.09	2.62	3.23
Retention Ratios (%)	54.03	63.63	55.13	63.59	64.25
Price/BV (X)	1.37	1.33	0.89	1.23	1.54
Price/Net Operating Revenue	1.84	2.58	2.09	2.62	3.23
Earnings Yield	0.20	0.16	0.15	0.15	0.10

Source: Dion Global Solutions Limited

5. Maithan Alloys. Financial Highlights

KEY FINANCIAL RATIOS OF MAITHAN ALLOYS (in Rs. Cr.)	MAR 22	MAR 21	MAR 20	MAR 19	MAR 18
PER SHARE RATIOS					
Basic EPS (Rs.)	277.44	80.05	76.22	87.68	100.22
Diluted EPS (Rs.)	277.44	80.05	76.22	87.68	100.22
Cash EPS (Rs.)	282.71	85.42	81.66	93.05	105.52
Book Value [Excl Reval Reserve]/ Share (Rs.)	797.69	525.93	446.38	384.68	300.61
Book Value [Incl Reval Reserve]/ Share (Rs.)	797.69	525.93	446.38	384.68	300.61
Dividend / Share(Rs.)	6.00	6.00	6.00	6.00	3.00
Revenue from Operations/Share (Rs.)	1,050.36	556.43	628.95	682.87	645.44
PBDIT/Share (Rs.)	373.21	109.67	102.60	119.67	135.82
PBIT/Share (Rs.)	367.96	104.31	97.17	114.30	130.52
PBT/Share (Rs.)	367.56	103.90	95.89	112.27	129.13
Net Profit/Share (Rs.)	277.46	80.05	76.23	87.68	100.22
PROFITABILITY RATIOS					
PBDIT Margin (%)	35.53	19.71	16.31	17.52	21.04
PBIT Margin (%)	35.03	18.74	15.44	16.73	20.22
PBT Margin (%)	34.99	18.67	15.24	16.44	20.00
Net Profit Margin (%)	26.41	14.38	12.11	12.84	15.52
Return on Networth / Equity (%)	34.78	15.22	17.07	22.79	33.33
Return on Capital Employed (%)	45.51	19.34	21.16	28.81	41.91
Return on Assets (%)	29.67	12.23	14.57	16.73	23.87
Total Debt/Equity (X)	0.00	0.03	0.01	0.00	0.03
Asset Turnover Ratio (%)	1.32	85.01	120.29	130.30	153.77
LIQUIDITY RATIOS					
Current Ratio (X)	6.50	4.90	6.72	3.34	2.94

Financials of Some Industries in Extractive Business

Quick Ratio (X)	4.85	3.86	5.23	2.63	2.15
Inventory Turnover Ratio (X)	2.02	4.65	6.61	7.62	7.57
Dividend Payout Ratio (NP) (%)	2.16	0.00	9.49	4.12	3.00
Dividend Payout Ratio (CP) (%)	2.12	0.00	8.85	3.88	2.85
Earnings Retention Ratio (%)	97.84	0.00	90.51	95.88	97.00
Cash Earnings Retention Ratio (%)	97.88	0.00	91.15	96.12	97.15
VALUATION RATIOS					
Enterprise Value (Cr.)	3,772.25	1,587.51	389.61	1,431.33	2,259.73
EV/Net Operating Revenue (X)	1.23	0.98	0.21	0.72	1.20
EV/EBITDA (X)	3.47	4.97	1.30	4.11	5.72
Market Cap/Net Operating Revenue (X)	1.26	0.97	0.56	0.74	1.21
Retention Ratios (%)	97.83	0.00	90.50	95.87	96.99
Price/BV (X)	1.66	1.02	0.78	1.31	2.61
Price/Net Operating Revenue	1.26	0.97	0.56	0.74	1.21
Earnings Yield	0.21	0.15	0.22	0.17	0.13

Source: Dion Global Solutions Limited

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