Study Material

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Overview of the mineral industry in India

India is endowed with huge resources of many metallic and non-metallic minerals. It has significant mineral resources of Coal (4th largest reserves in the world), Iron ore, Manganese ore (7th largest reserve in the world as in 2013), Mica, Bauxite (5th largest reserve in the world as in 2013), Chromite, Natural gas, Diamonds, Limestone, Titanium and Thorium (world's largest along coast of Kerala shores). India's oil reserves, found in Bombay High off the coast of Maharashtra, Gujarat, Rajasthan and in eastern Assam meet 25% of the country's demand. Not surprisingly, therefore, mining sector is an important segment of the Indian economy. Since independence, there has been a pronounced growth in the mineral production both in terms of quantity and value. India produces as many as 95 minerals, which includes 4 fuel, 10 metallic, 23 non-metallic, 3 atomic and 55 minor minerals (including building and other materials) 1. Mining sector, being one of the core sector of economy, provides basic raw materials to many important industries like power generation (thermal), iron and steel, cement, petroleum and natural gas, petro-chemicals, fertilisers, precious & semi-precious metals/stones, electrical & electronics equipment, glass and ceramics etc. The rapid urbanization and projected growth in the manufacturing sector in India is likely to result in a surge in the demand for minerals. India occupies a dominant position in the production of many minerals across the globe. India’s ranking in 2015 as compared to world production was 2nd in barytes, and talc/ steatite/ pyrophyllite, 3rd in chromite, coal & lignite and zinc (slab), 4th in kyanite/ andalusite/ sillimanite, 5th in iron ore, and Steel (Crude), 6th in bauxite ore, 7th in manganese ore and 8th in aluminium.

Most of the metallic minerals in India occur in the peninsular plateau region in the old crystalline rocks. Over 97 per cent of coal reserves occur in the valleys of Damodar, Sone, Mahanadi and Godavari. Petroleum reserves are located in the sedimentary basins of Assam, Gujarat and Mumbai High i.e. off-shore region in the Arabian Sea. New reserves have been located in the Krishna-Godavari and Kaveri basins. Most of the major mineral resources occur to the east of a line linking Mangaluru and Kanpur. Minerals are generally concentrated in three broad belts in India. There may be some sporadic occurrences here and there in isolated pockets. These belts are: The North-Eastern Plateau Region: This belt covers Chhotanagpur (Jharkhand), Odisha Plateau, West Bengal and parts of Chhattisgarh. It has variety of minerals viz. iron ore coal, manganese, bauxite, mica. The South-Western Plateau Region: This belt extends over Karnataka, Goa and contiguous Tamil Nadu uplands and Kerala. This belt is rich in ferrous metals and bauxite. It also contains high grade iron ore, manganese and limestone. This belt packs in coal deposits except Neyveli lignite. This belt does not have as diversified mineral deposits as the north-eastern belt. Kerala has deposits of monazite and thorium, bauxite clay. Goa has iron ore deposits. The North-Western Region: This belt extends along Aravali in Rajasthan

and part of Gujarat and minerals are associated with Dharwar system of rocks. Copper, zinc has been major minerals. Rajasthan is rich in building stones i.e. sandstone, granite, marble. Gypsum and Fuller's earth deposits are also extensive. Dolomite and limestone provide raw materials for cement industry. Gujarat is known for its petroleum deposits. The Himalayan belt is another mineral belt where copper, lead, zinc, cobalt and tungsten are known to occur. They occur on both the eastern and western parts. Assam valley has mineral oil deposits. Besides oil resources are also found in offshore-areas near Mumbai Coast (Mumbai High).

Domain of Mineral Economics

Mineral economics is a discipline that applies principles of economic theory to problems involving mineral resources. Mineral economics specifically relates concepts and ideas of general economics to the various aspects of the occurrence, exploitation and final use of minerals. It is the study of supply and demand for energy, metal, non-metallic or industrial mineral resources. Such studies normally include investigation of the geography of the mineral occurrences, valuation of the mineral deposits, exploration and production cost analysis, transportation and marketing studies, as well as inquiries into historical use, future market and substitution potentials for the various mineral commodities.

Mine Productivity

Mine productivity is generally defines as more output for fixed input or the same output for less input or simply the ratio of output to input.

Over the broad spectrum of different mining operations, it is difficult to define the size of the productivity problem. To overcome this, economists typically measure productivity over a range of factors referred to as **Multifactor Productivity (MFP),** with the most common factors being labour, capital and material. Various factors affecting Mine Productivity are as follows:

1. **Innovation and technological changes**
2. **Resource depletion and ore quality**
3. **Government regulations**
4. **Worker quality**
5. **Investment lags**
6. **Economies of scale**
7. **Capacity utilization**
8. **Strikes, accidents and other unplanned production stoppage.**
9. **Management, organization and market structure etc.**

Special considerations for strategic minerals

Strategic Minerals (also known as Critical Minerals) is a broad-based category that constitutes various minerals and elements; the majority of which are minor metals. Geography and availability of domestic supply often defines which minerals are deemed "critical" for any particular region or country.

Strategic Minerals include, besides materials for, combat munitions, all mineral raw materials, which are required for industrial sufficiency and preparedness for defense. Domestic resources in many of these minerals are ample and well distributed. While, however, in respect of strategic minerals India is well supplied-in some of them she has considerable exportable surpluses, in the case of critical minerals (i.e., minerals of essential uses, the supply and procurement of which in adequate amount in the event of any national emergency is uncertain) there are serious gaps and deficiency. In peace time economy this distinction perhaps does not possess much significance, but in the event of war, lack of sufficient reserves of certain mineral raw materials, even though relatively unimportant in themselves, may imply grave hazards to the country's security even.in the face, of an abundance of " strategic " minerals. Among such critical minerals in short supply in India, the more prominent are: petroleum and petroleum products, sulphur, base metals, e.g., lead, zinc, copper, nickel, tin, mercury and platinum and minerals, e.g., industrial diamonds, graphite, alkalis, potash, cryolite, selenium, etc.

National Mineral Policy

Government of India

Ministry of Mines

NATIONAL MINERAL POLICY, 2019

(For non-fuel and non-coal minerals)

1. VISION

Minerals are a valuable natural resource being the vital raw material for the core sectors of the economy. Exploration, extraction and management of minerals have to be guided by national goals and perspectives, to be integrated into the overall strategy of the country's economic development. Endeavour shall be to promote domestic industry, reduce import dependency, and feed into Make in India initiative.

Natural resources, including minerals, are a shared inheritance where the State is a trustee on behalf of the people and therefore it is imperative that allocation of mineral resources is done in a fair and transparent manner to ensure equitable distribution of mineral wealth to sub-serve the common good. Mining needs to be carried out in an environmentally sustainable manner keeping stakeholders' participation, and devolution of benefits to the mining affected persons with the overall objective of maintaining high level of trust between all stakeholders.

It shall also be ensured that the regulatory environment is conducive to ease of doing business with simpler, transparent and time-bound procedures for obtaining clearances. Since mining contributes significantly to state revenues, there is a need for an efficient regulatory mechanism with high penetration of e-governance systems to prevent illegal mining and value leakages. Mining contributes significantly to employment generation, thus, there shall be a keen focus on gender sensitivity in the mining sector at all levels. Endeavour shall be made to set up a unified authority at national level for mineral development and co- ordination to fulfill objectives of this policy.

2. REGULATION OF MINERALS

2.1 Management of mineral resources is the responsibility of both the central and state governments in terms of entry 54 of the Union List (List I) and entry 23 of the State List (List II) of the Seventh Schedule of the Constitution of India.

2.2 In order to make the regulatory environment conducive to ease of doing business, the procedures for grant of mineral concessions shall be transparent and seamless with an assured security of tenure along with transferability of concessions playing a key role in mineral sector development.

2.3 To ensure enforcement of mining plans, the Indian Bureau of Mines (IBM) and the State Directorates of Mining & Geology will be strengthened with

adequate man power, equipment and skill sets upgraded to state-of-the-art levels.

2.4 There will be an emphasis on strengthening the regulatory mechanism by incorporating E-Governance, including satellite and remote sensing applications. Provisions shall be made for end-to-end accounting of mineral/ore in the supply chain with use of IT enabled systems. Efforts shall also be made to devise appropriate mechanism(s) for awareness and information campaigns and also for involvement of local populations to supplement the law enforcement capabilities in preventing illegal mining.

3. ROLE OF STATE IN MINERAL DEVELOPMENT

3.1 The core functions of state in mining will be facilitation and regulation of exploration and mining activities, making provision for development of infrastructure and tax collection. An Annual Business Plan/Road map for the development of mineral sector shall be brought out by the respective states. There shall be transparency and fairplay while reserving areas for State agencies unless security considerations or specific public interests are involved. Grant of clearances for commencement of mining operations shall be streamlined with simpler and time bound procedures facilitated through an on-line public portal with provision for generating triggers at higher level in the event of delay. As part of Initiative for ease of doing business the states shall make an endeavour to auction mineral blocks with pre-embedded statutory clearances. Mineral bearing area/zone shall be earmarked as Mining Land in the land record by the states. Endeavour shall be made to rationalize those areas that were reserved but remained unused by PSUs, for speedy development.

3.2 Trust is vital to the ability of our country to achieve sustained growth in mining sector. State will endeavor continuously to increase trust level between government, miners, local communities and other stakeholders through openness, fairness, better regulation, responsiveness, inclusive policy making.

4. PROSPECTING AND EXPLORATION

4.1 The country is blessed with ample resources of a number of minerals and has the geological environment for occurrence of many others. To explore the country's entire geological potential, it shall be ensured that regional and detailed exploration is carried out systematically, scientifically and intensively over the entire geologically conducive mineral bearing area of the country, using state-of-the-art technologies, including seismic 2D/3D interpretative systems, in a time bound manner.

4.2 While the Government agencies will continue to perform the tasks assigned to them for survey and exploration, the private sector would be encouraged to take up exploration activities. Government agencies will expend public funds particularly in areas where private sector investments are not forthcoming due to reasons such as high uncertainties. States may be

mandated to create dedicated funding for boosting exploration activities without additional burden on miners.

4.3 Particular attention will be given to the prospecting and exploration of minerals in which the country has a poor resource-cum-reserve base despite having the geological potential for large resources. Special attention will be given towards exploration of energy critical minerals, fertilizer minerals, precious metals and stones, strategic minerals and other deep seated minerals which are otherwise difficult to access and for which the country is mainly dependent on imports.

4.4 Exploration shall be incentivised to attract private investments as well as state-of-the-art technology, within the ambit of auction regime, through Right of First Refusal at the time of auction or seamless transition from Reconnaissance permit to Prospecting Licence to Mining Leases or auctioning of composite Reconnaisance permit cum Prospecting License cum Mining Lease in virgin areas on revenue sharing basis or any other appropriate incentive as per international practice.

4.5 Clearances shall be streamlined with simpler, transparent, accountable and time bound procedures to facilitate exploration in order to conform to the statutory requirements especially for geologically complex deposits.

4.6 In the offshore areas, it is necessary to ensure that India's Exclusive Economic Zone is explored and extracted to the maximum possible extent. Cooperation between Ministry of Earth Sciences (MoES) and Geological Survey of India (GSI) needs to be further institutionalised so as to achieve this objective within a time bound framework.

5. DATA BASE OF MINERAL RESOURCES AND TENEMENTS

5.1 National inventory of mineral resources will be based on comprehensive and up to date review of exploration data which will be maintained in digitised form comprising both a resource inventory and a tenement registry. The resource inventory will be maintained in accordance with a globally accepted public reporting standard for ensuring reliability of reporting and acceptability to financial institutions and stock exchanges showing reserves and remaining resources as well in the traditional methodology in vogue. The registry shall be a web-based system for public viewing integrated with GIS, such that information could be shown spatially in the form of map based service.

5.2 Efforts shall be made by the Government to establish a Mining Tenement System (MTS) which would primarily involve automating the entire concession life-cycle using state-of- the- art IT systems.

5.3 Baseline and mineral exploration data generated by various central & state government agencies as well as mineral concession holders will be collated and maintained for open dissemination as a public good. Collaboration between national and international scientific and research bodies, universities, professional bodies and industry will be encouraged for scientific and

technological research to address the mineral exploration challenges in the country.

6. MINING AND MINERAL DEVELOPMENT

6.1 General Strategy

Minerals are a major resource for the core sectors of the economy. There is a huge demand for minerals in view of the rapid urbanization and the projected growth in the manufacturing sector. With the thrust on Make in India initiative the demand for minerals is likely to grow at a rapid pace. Extraction and management of minerals has to be guided by long-term national goals and perspectives and integrated into the overall strategy of the country's economic development. Mining technology will be upgraded to ensure extraction and utilisation of the entire Run-of-Mines (RoM).

A thrust will be given to extraction of mineral resources in which the country is well endowed so that the needs of domestic industry are fully met keeping in mind both present and future needs, while at the same time fulfilling the demand of external markets for such minerals, so as to enhance domestic economic and social well-being.

Though primary minerals will remain the principal source for fulfilling demand, efforts shall be made to augment supply by developing processes for recovery of metal through recycling. The reusable nature of metals contributes to conservation of natural resources and includes other benefits in terms of energy conservation, environmental and economic benefits.

Considering that a large number of merchant mining leases are going to expire in the year 2020, and for captive mines in 2030, efforts shall be made to ensure uninterrupted supply of minerals/ore to the downstream industry.

Merger and acquisitions of mining entities and transfer of mining leases granted transparently will be encouraged by introducing appropriate incentives in existing laws.

6.2 Conservation and Mineral Development

Conservation of minerals shall be construed not in the restrictive sense of abstinence from consumption or preservation for use in the distant future but as a positive concept leading to augmentation of reserve/resource base. There shall be an adequate and effective legal and institutional framework promoting zero-waste mining as the ultimate goal and a commitment to prevent sub-optimal and unscientific mining. The concept of collaborative mining amongst mining concessionaires located in large mining belt shall be encouraged to ensure optimum extraction of mineral. Value addition and general customisation of product will be encouraged by providing fiscal and/ or non-fiscal incentives.

6.3 Scientific Methods of Mining

Mine development and mineral conservation as governed by the rules and regulations will be on sound scientific basis, with the regulatory agencies, viz. IBM and the State Directorates, closely interacting with R&D organisations and scientific and professional bodies, to ensure preparation of optimal Mining plan. Conditions of mining leases regarding extent of area/size, shape, disposition with reference to geological boundaries and other mining conditions shall be such as to favourably predispose the leased areas to systematic, scientific, optimum, and complete extraction of minerals. The regulatory agencies will be suitably strengthened through capacity building measures in terms of adequate manpower, technology, equipment and skill-set.

6.4 Mining Machinery and Mineral Beneficiation Equipment

Use of equipment and machinery which will improve the efficiency, productivity and economics of mining operations as well as mineral beneficiation process, safety and health of persons working in the mines/beneficiation plant and surrounding areas shall be encouraged. Availability of such equipment and machinery shall be incentivized and freely allowed. At the same time capacities shall be developed for indigenous industry for manufacture of mining machinery and mineral beneficiation equipment and machinery for which induction of modern technology and participation shall be encouraged.

6.5 Human Resource Development

Development of human resources shall be the mainstay to improve the competitive edge of the national mining industry with a focus on improving gender balance in mining industry. Emphasis shall be laid on mechanisation, computerisation, automation and adoption of state of the art technology of the existing and new mining units. The human resource development strategy shall be suitably reoriented for the purpose. Facilities for basic and specialised training shall be constantly reviewed and upgraded from time to time, to ensure that adequately trained manpower at all levels is available for the development of mines and minerals. As the mining sector takes off, the country will need more and more mining engineers, Environment engineers, geo-scientists and IT professionals. The functionaries of central and state governments shall be trained in international practices to strengthen the mining sector regulation as per international standards.

6.6 Infrastructure Development

Mining infrastructure requires a special thrust as the economic efficiency of evacuation of minerals from pit mouth to user point or port or rail head is closely linked to the end use value of the mineral and of the viability of the industry producing and using the mineral.

While local evacuation networks will be encouraged to be built in an integrated manner along with developing the mineral blocks, dedicated mineral corridors shall be planned to facilitate transport of minerals from mining areas in hinterland. Development and installation of innovative, eco-friendly and

efficient modes of evacuation like slurry pipelines and close loop conveyors shall be promoted and encouraged. An enabling environment will be created to allow mining companies to undertake construction of such infrastructure including construction of conventional transportation networks like rail and road for their own usage in coordination of State/Central agencies. Use of coastal water ways and inland shipping shall also be promoted. To promote investment in the mining sector special incentives or priority movement by railways/port/coastal shipping must be encouraged.

The contribution of mineral development to regional and more specifically peripheral development, commensurate with the huge investment in large mining projects is substantial. An integrated approach shall be encouraged encompassing mineral development, regional development and the social and economic well-being of the local, and particularly, tribal population.

6.7 Financial Support for Mining

Mining is an eligible activity for obtaining financial support from financial institutions. However, at present only those mining projects which have a substantial component of mining machinery, equipment and buildings are being financed. Steps shall be taken to facilitate financing of prospecting, exploration and mine development. Efforts shall be made to grant mining the status of industry.

6.8 Small Deposits

Small and isolated deposits of minerals are scattered all over the country. These often lend themselves to economic extraction through small scale mining. With modest demand on capital expenditure and short lead-time, they provide employment opportunities for the local population. However, due to lack of economies of scale they can also lead to sub-optimal mining and ecological disturbance. Efforts will be made for promotion of small mineral deposits in a scientific and efficient manner while safeguarding vital environmental and ecological imperatives.

Where small deposits are not susceptible to viable mining, a cluster approach will be adopted by granting the deposits together as a single lease within a geographically defined boundary. Similarly in case of small deposits of precious metals and base metals the establishment of common smelting and refining facilities shall be encouraged.

In grant of mineral concessions for small deposits in Scheduled Areas, endeavour will be made to accommodate Scheduled Tribes while extending enabling environment to carry-out mining operations in a systematic and efficient manner.

6.9 Beach Sand Minerals

Efforts will be made to encourage extraction of the replenishable deposits of beach sand minerals for improved economic growth by ensuring coordination between the different agencies viz., State Governments, Ministry of Environment, Forests & Climate Change, Indian Bureau of Mines, Department of Atomic Energy, Atomic Minerals Directorate for Exploration and Research, and Department of Customs and Excise etc. so that regulation of mining of beach sand minerals is in conformity with the mining and other related laws, while also conforming to national security requirements and established international protocols.

6.10 Protection of Environment

Extraction of minerals impacts other natural resources like land, water, air and forest. It is necessary to take a comprehensive view to facilitate the choice or order of land use keeping in view the needs of development as well as needs of protecting the forests, environment and ecology and to conserve biodiversity of areas to be mined.

Prevention and mitigation of adverse environmental effects due to mining in accordance with the latest scientific norms and modern afforestation practices shall form integral part of mine development strategy in every instance. All mining shall be undertaken within the parameters of a comprehensive Sustainable Development Framework which will ensure that environmental, economic and social considerations are integrated effectively in all decisions on mines and minerals issues. The guiding principle shall be that a miner shall leave the mining area in an ecological shape which is as good as it was before the commencement of mining or better with least impact on flora and fauna of the area.

Mining operations shall not ordinarily be taken up in identified ecologically fragile and biologically rich areas. The Government shall identify such areas that are critically fragile in terms of ecology and declare as 'in-violate areas' or 'no-go areas' out of bounds for mining. In order to achieve a better semblance between mineral based development and environment, there shall be an endeavour to create Exclusive Mining Zone (EMZ) with prior in-principle statutory clearances demarcated for the mineralized belt/zone to avoid conflict of interest and to curtail delay in commencement of mining operation.

With a view to reduce pollution, carbon footprint and operational costs, use of renewable sources of energy at mining sites will be encouraged through appropriate incentives. Appropriate sensitization training about environmental issues will be provided to all workers involved in mining operations.

6.11 Sustainable Development in Mining Sector

Environmental, economic and social considerations must be taken into account as early as possible in the decision-making process, to ensure sustainable development in the mining sector which envisions mining as financially viable; socially responsible; environmentally, technically and scientifically sound; with a long term view of development; uses mineral resources optimally; and, ensures sustainable post-closure land uses.

The Government shall set a benchmark against which all mining operations may be evaluated in terms of their comparative performance on sustainable development framework and enforce commitment on part of the mining companies to adopt sustainable development practices for achieving environmental and social goals.

6.12 Welfare of Project Affected Persons

6.12 (a) Relief & Rehabilitation of Displaced and Affected Persons

Mining operations can involve acquisition of land held by individuals including those belonging to the tribals and weaker sections. In all such cases a careful assessment of the economic, cultural, environmental, and social impact on the affected persons need to be undertaken to ensure that suitable, appropriate, relief and rehabilitation packages are evolved.

In areas in which minerals occur and which are inhabited by tribal communities and weaker sections, it is imperative to recognize resettlement and rehabilitation issues as intrinsic to the development process of the affected zone. A mechanism will be evolved which would actually improve the living standards of the affected population and ensure them a sustainable income. For this purpose, all the provisions of rehabilitation and resettlement given in the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013 as amended from time to time will be followed.

6.12 (b) Devolution of Mining Benefits to Project Affected Persons

The mining legislation has been amended to provide for the establishment of District Mineral Foundation (**"DMF"**) with the objective of working for the interest and benefit of persons, and areas, affected by mining related operations. The objectives for devolution of mining benefits under DMF for inclusive and equitable development of project affected persons and areas are to be guided by the provisions of the Pradhan Mantri Khanij Kshetra Kalyan Yojana ("PMKKKY").

It shall be the endeavour of the Government to monitor and review the implementation of schemes under DMF for giving effect to PMKKKY for a national web portal shall be developed with free access to the public.

6.12 (c) Welfare of Tribal Communities

Existence of minerals in tribal areas with rich biodiversity requires a comprehensive assessment. Land acquisition and displacement of tribal communities due to mining projects may lead to distress in tribal communities living in Scheduled Areas.

Grant of mineral concessions in Scheduled Areas shall be guided by the provisions contained in article 244 read with Fifth and Sixth Schedules to the Constitution relating to administration of the Scheduled Areas and Tribal Areas and the provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996 and the Scheduled Tribes and Other Traditional Forest

Dwellers (Recognition of Forest Rights) Act, 2006 or any other relevant statutory acts protecting the interests of tribals. All Relevant Acts/Rules related to rehabilitation and resettlement like The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, subsequent amendments or any other relevant acts/rules shall be strictly implemented.

6.13 Mine Closures

Once the reserves in mine are completely exhausted there is need for scientific mine closure which will not only restore ecology and regenerate bio diversity but also take into account the socio-economic aspects of such closure. Where mining activities have been spread over a few decades, mining communities get established and closure of the mine means not only loss of jobs for them but also disruption of community life. Mine closure should be done in an orderly and systematic manner.

Government has a role in ensuring that post-production mine decommissioning and land reclamation are an integral part of the mine development process; that financial provisions for the costs incurred in mine closure are accorded a high level of priority by the industry; and that consistent approaches are adopted for efficient and effective mine reclamation and rehabilitation.

6.14 Safety of mines and mine-workers

Mining operations at times are hazardous in nature. Accidents happen and often result in occupational health problems, serious bodily injury or even loss of life. Efforts must be directed towards the development and adoption of mining methods which would increase the safety of workers and reduce accidents. Towards this end, participation and cooperation of mine workers shall be secured. Steps will also be taken to minimise the adverse impact of mining on the health and safety of workers and the surrounding population. DGMS should be further strengthened through adequate manpower, equipments, and skill sets in order to carry out the regulatory role for ensuring miners' health and mine safety effectively.

6.15 Mineral Security

Mineral resources security is an important issue with strategic as well as economic significance. Securing access to sufficient, reliable, affordable, and sustainable supplies of minerals is increasingly becoming an important factor for functioning of downstream industries and the overall economy. Hence, ensuring long-term mineral security for nation shall be taken up with utmost priority. To ensure adequate supply of minerals which are not available locally, downstream regulations shall be aligned for their exploration and development and for facilitating acquisition of mineral assets in other countries by public as well private Indian business entities.

7. FOREIGN TRADE AND FOREIGN INVESTMENT

General:

Attracting foreign investment in the mining sector will be encouraged by appropriate mechanism. Efforts shall be made to export minerals in value added form as far as possible. The indigenous mineral industry shall be attuned to the international economic situation in order to derive maximum advantage from foreign trade by carefully anticipating technology and demand changes in the international market for minerals.

Long term Import Export policy and FDI:

Minerals continue to be an important source of foreign exchange earnings. For exports, the policy shall keep in view the dynamics of mineral inventories as well as the short, medium and long term needs of the country. On the other hand, the import of minerals shall be coordinated as far as possible with the indigenous development of mineral based industries. Areas of cooperation with other countries having complementary resource base shall be developed for mutual advantage. The approach shall be to make mineral based materials available to domestic users at reasonable prices as determined by market forces.

To develop mining as a modern stand-alone industry substantial investment is required. A long term export-import policy for the mineral sector would provide stability and prove to be an incentive for investing in large scale commercial mining activity. Assurances, through such a policy for minerals, will be a key factor for investment decisions, particularly Foreign Direct Investment (FDI) decisions in the sector

8. FISCAL ASPECTS

It will be the endeavour of government to design fiscal measures, within the context of the budget, conducive to the promotion of mineral exploration and development including beneficiation and other forms of product refinement. In the context of the changing mineral scenario and the economies of mineral development and products, both at the national and international level, fiscal changes will be examined from time to time consistent with the general tax structure and through the normal budgetary process. Efforts shall be made to benchmark and harmonize royalty and all other levies and taxes with mining jurisdictions across the world to make India an attractive destination for exploration and mining.

9. RESEARCH AND DEVELOPMENT

9.1 General Approach

Research and development in the mineral sector has to cover the entire gamut of activities from geological survey, exploration, mining, beneficiation, concentration of minerals to development of materials. Efforts will be

directed towards the development of new technologies for conversion of existing mineral resources into viable economic resources. Appropriate technologies shall be developed to enable indigenous industries to utilise the mineral resources with which the country is abundantly endowed. R&D efforts shall be directed to find new and alternative uses for minerals whose traditional demand is on the wane. Indigenous technology has to be upgraded through research and appropriate absorption and adoption of technological innovations. Research and development efforts shall be made to improve efficiency in process, operations and also the recovery of by-products and reduction in specification and consumption norms. Efforts will also be directed to evolve low capital and energy saving processing systems.

9.2 Research in Mining Methods

Mining methods determine the safety, economy, speed and the percentage of extraction of the ore reserves from a mine. Research and development thrust shall be directed specially in the areas of rock mechanics, ground control, mine design engineering, equipment deployment and maintenance, energy conservation, environmental protection, safety of operations and human engineering.

9.3 Mineral Processing and Beneficiation

Attention will be given to beneficiation and agglomeration techniques to bring lower grades and finer size material into use. Research organisations, including the National Mineral Processing Laboratories of the Indian Bureau of Mines will be strengthened for development of processes for beneficiation and mineral and elemental analysis of ores and ore dressing products. There shall be cooperation between and coordination among all organisations in public and private sector engaged in this task. Research and development shall be oriented to ensure maximum economic recovery of the associated minerals and valuable metals including incentivization and promotion of state-of-the-art technology.

9.4 Development of Automated Equipment

To meet the objective of safety and economic production, attention will be given to the development of robotics, automated equipment for mining, especially for deep mining and transportation to surface. While efforts shall be made for indigenous development, Government shall also consider an appropriate fiscal measure to facilitate import of automated equipments, machinery and mining robots etc. which are not available in the country, which can be used for exploration, mineral development and value addition in the downstream industry.

9.5 Deep Sea Mining

Deep ocean resources represent an exceptionally large and potentially important mineral resource. Integrated systems for prospecting, exploration, extraction, mining and processing of these resources shall be expedited with the development/acquisition of necessary technologies. Appropriate mechanism for coordinating as well as funding of the survey and exploration of Deep Sea Bed Area will be established with the Ministry of Earth Sciences.

9.6 Production of Materials of High Purity

Research will be directed towards raw materials required for production of materials of high purity for use in advanced technology applications such as semi-conductors, photo-voltaic, lasers, special sensors, high temperature new ceramics, hard and high temperature materials, superconductors, insulators, very thin films, glasses and liquid crystals and metal and mineral fibres.

9.7 Coordination of Research Organisations

Research and development activities in the mineral sector are carried out in the national laboratories, educational institutions and R&D units of public and private sector enterprises. Pooling of resources, efforts and expertise available in various R&D Organisations is imperative to meet the challenges and to fulfil the tasks ahead in the mineral sector. Coordination, synergy and convergence among the various institutions engaged in R&D in the mineral sector shall be strengthened to derive the maximum benefit. Interchange of scientists between institutions shall be encouraged to accelerate the pace of interaction. It shall also be ensured that the research findings are made available to users expeditiously. There shall be cooperation between and coordination among all organisations in the public and private sectors engaged in this task.

10. INTER GENERATIONAL EQUITY

There is a need to understand that natural resources, including minerals, are a shared inheritance where the state is the trustee on behalf of the people to ensure that future generations receive the benefit of inheritance. State Governments will endeavour to ensure that the full value of the extracted minerals is received by the State. However, for assessment of inter generational equity in respect of each mineral, a disaggregated approach shall be adopted considering aspects like reserves/ resources and potential for reuse through recycling, which are relevant and suitable in the Indian context.

11. INTER MINISTERIAL MECHANISM FOR SUSTAINABLE DEVELOPMENT

A unified authority in the form of an inter-ministerial body under Ministry of Mines, with members like Ministry of Coal, MoEarth Sciences, MoEFCC, Ministry of Tribal Affairs, Ministry of Rural Development, Ministry of Panchayati Raj, Ministry of Steel, including state governments, shall be constituted to institutionalise a mechanism for ensuring sustainable mining with adequate concerns for environment and socio-economic issues in the mining areas, and to advise the Government on rates of royalty, dead rent etc.

This proposed mechanism shall also decide the limits on the extent of mining activities that should be permitted which would, *inter alia*, involve undertaking a detailed study for assessing what should be the state-wise/region-wise ceiling of annual excavation of minerals, considering the availability of mineral resources, the carrying capacity of the region, and the macro environmental impact on the region while also keeping in mind the principles of sustainable development and intergenerational equity and all other relevant factors.

12. OUTCOMES AND CONCLUSION

Under the 'Make in India' initiative, the Government of India aims to increase the share of the manufacturing sector in the economy. This national initiative requires a holistic development of the mineral sector on a sustainable basis in order to fulfil the demand of downstream industries dependent on mineral/ore supply.

The outcomes expected from these policy proposals are, an increase in the production of MCDR (*Mineral Conservation and Development Rules, 2017*) minerals (in value terms) by 200 % in 7 years; and on the other hand reduce the trade deficit in minerals sector by 50% in 7 years.

The success of this national mineral policy will be critical in propelling India on to a loftier development trajectory. Successful implementation of this policy and shall be ensured by achieving a national consensus among

various key stakeholders and their commitments to fulfil its underlying principles and objectives.

Concept of Resource and Reserve

A **mineral resource** is a concentration of naturally occurring material (solid, liquid or gas) in the earth's crust in such form that economic extraction is potentially feasible. It comprises identified and known materials plus those yet not identified, but which on the basis of geological evidence are presumed to exist.

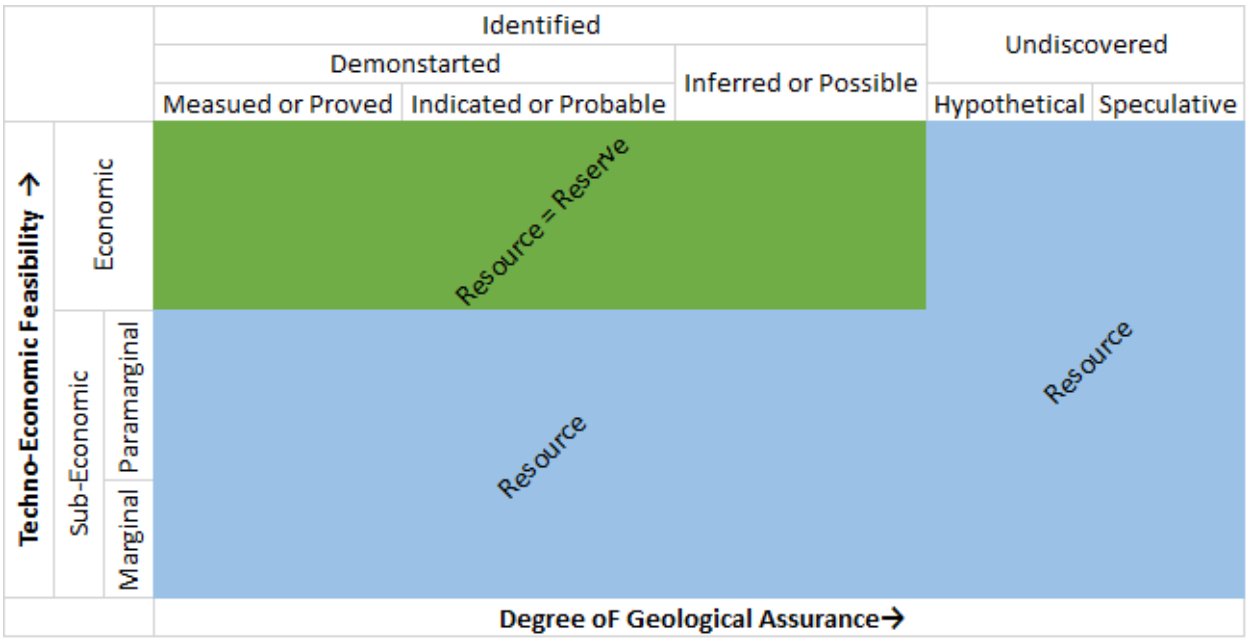
Classification of mineral resource on the basis of <u>degree of geological assurance</u>:

1. Identified
    a. Demonstrated
        i. Measured
        ii. Indicated
    b. Inferred
2. Undiscovered
    a. Hypothetical
    b. Speculative

Classification of mineral resource on the basis of <u>techno-economical feasibility</u>:

1. Sub-Economic
    a. Marginal
    b. Paramarginal
2. Economic

Table 1. Classification of Resources



Reserve: The portion of an identified resource estimated from geological and engineering evidences which can be mined at profit.

Identified Resources: Specific bodies of mineral bearing material whose location, quality, and quantity are known from geological evidences, supported by engineering measurements with respect to demonstrated category.

Undiscovered Resources: Unspecified bodies of mineral bearing material summarized to exist on the basis of broad geological knowledge and theory.

Measured (Proved): Materials for which estimates of the quality and quantity have been computed within a margin of error 20 percent from sample analysis and measurements from closely spaced and geologically well-known sample sites.

Indicated (Probable): Materials for which estimates of the quality and quantity have been computed partly from sample analysis and measurements and partly from reasonable geological projections.

Inferred (Possible): Materials in unexplored extensions of demonstrated resources for which estimates of the quality and size are based on geological evidence and projection.

Examples:

1. In an underground mine, if a vein has been sampled at two levels and in winzes and raises (i.e. **all four sides has been exposed and sampled**) then the estimates are proved.
2. If a vein has been sampled at two levels and if there is no data of sampling in raises or winzes, the reserve estimated from such data would be probable reserve (**widely spaced boreholes**).
3. When the reserve estimation is done from extrapolation of sampling data to the areas where no sampling data is available is termed as possible reserve or inferred. In a property if an orebody has been tested up to 100 meters depth and in the neighboring properties of the ore is known to persist to a greater depth then on geological grounds, it may be possible to assume the ore body will persist in this property also and this extrapolated reserve will be called possible or inferred reserve.

Hypothetical Resource: Undiscovered materials that may reasonably expected to exist in a known mining district under known geological conditions.

Speculative Resource: Undiscovered materials that may occur either in known types of deposits in a favourable geological setting where no discoveries has been made or an unknown type of deposit yet to be recognized.

Difference of tenor, grade and specification:

Ore: Natural aggregate of one or more minerals from which one or more metals or economic minerals can recovered at profit.

Tenor: Incidence of mineral or metal content in an ore. The tenor in case of non-metallic minerals conveys the percentage of mineral content in the ore mined. Where in case of metallic minerals it signifies metal content in an ore mined.

In case of asbestos mines, tenor 6% means the incidence of asbestos fiber in the ore is 6%. In case of metallic deposits, tenor 6% means incidence of that metal is 6%.

Grade: It signifies the commercial classification and takes into account the chemical and physical properties as well. It is an expression of the quality of the deposit and may be expressed in terms of metal content in case of metals. Deposits like iron ore, manganese ore, etc.in terms of gram per unit weight, in case of precious metals, in terms of percentage of oxide, in terms of size etc.

Specification: The specification is intimately related with the grade. It pinpoints the tolerance limit of all constituents present in it. Individual consumer may prescribe different specification for the same grade of mineral.

Mineral Sampling, Errors and Grade Control

Sampling: A mineral sample is the material collected from the mineral deposit to represent the formation with regards to quality and quantity of the mineral. Sampling is a technique by which a part of the mineral deposit is collected represent the whole mineral deposit.

Actually the volume of the sample collected is extremely small compared to the volume of the mineralized body and this warrants extreme carefulness in collection of sample and analysis. The main purpose of most geological sampling is to estimate the average grade, volume, and specific weight of the ore and therefrom compute the reserve of the targeted population.

Grade Control: Grade control in underground mines aims to deliver quality tonnes to the process plant via the accurate definition of ore and waste. It comprises a decision-making process including data collection and interpretation; local estimation; development and mining supervision; ore and waste destination tracking; and stockpile management. The foundation of any grade control program is that of high-quality samples collected in a geological context. The requirement for quality samples has long been recognized, where they should be representative and fit-for-purpose. Once a sampling error is introduced, it propagates through all subsequent processes contributing to data uncertainty, which leads to poor decisions and financial loss. Proper application of the Theory of Sampling reduces errors during sample collection, preparation, and assaying. To achieve quality, sampling techniques must minimize delimitation, extraction, and preparation errors. Underground sampling methods include linear (chip and channel), grab (broken rock), and drill-based samples. Grade control staff should be well-trained and motivated, and operating staff should understand the critical need for grade control.

Sampling Techniques:

1. Linear
    a. Chip
    (Individual punctual chip specimens collected in a discontinuous fashion aggregated to form a sample)
    b. Chip-Channel
    (Series of continuous chips aggregated to form a sample)
    c. Channel

(Consistent volume cut across sample zone, can be hand or diamond saw cut)

d. Panel

(Large and/or multiple chip or chip-channel samples)

2. Broken-Rock
    a. Grab

    (Hand "grab" of sample from a rock pile)
3. Drill-hole
    a. Diamond core

    (Solid core of sample over a given length)

    b. Reverse Circulation

    (Chippings over a given length recovered though the center of the drill string)

    c. Blast-hole/Sludge

    (Chippings over a given length recovered up the outside of the drill string)

Chip Sampling: This technique involves taking a series of chips over a continuous or semi-continuous band using a hammer and chisel. When a series of discontinuous chips are collected, a series of punctual samples result which are effectively "specimens". Depending on geology, the chip-band can be cut horizontally, vertically, or perpendicular to the dip of the ore body. The separation of the individual chips varies from touching (a chip-channel) to centimeters or more apart. Chip sampling is susceptible to extreme errors through operator preferences and rock hardness.

Channel Sampling: This method involves cutting a channel across the rock face. Depending on geology, the channel can be cut horizontally, vertically, or perpendicular to the dip of the ore body. The channel should be kept at a uniform width and depth to ensure a low Delimitation Error and Extraction Error. Channels should generally be around 5 cm to 10 cm wide and 2.5 cm deep to yield a sample of between 3–6 kg/m. In practice, hand-cut channel samples are relatively difficult to keep uniform, and can be more like a "chip-channel" sample. Cutting of channels rarely permits equal depth representation over the entire cross-section due to different rock hardness and human effects. Sample quality may decrease as the channel progresses across the face due to poor sampler motivation and fatigue. Some

operations use a diamond saw to cut channels in an attempt to improve sample quality. Two parallel saw cuts to about 2.5 cm depth are made 5 cm to 10 cm apart across the required width. A hammer and chisel (or compressed air pick) is then used to extract the intervening block of sample.

Panel Sampling: Panel samples comprise multiple chips spaced across a panel or contiguous chips over the entire panel area.

Grab Sampling: The goal of grab sampling is to predict the grade of ore from a particular source (e.g., stope, stockpile, or truck) and/or reconcile with the predicted grade. It is often used because of access issues (e.g., non-entry stopes—sub-level caving operations), safety (e.g., to avoid unsupported backs), or lack of other sample data. On occasion, samples may also be taken from drive or stope floors to monitor ore loss. Surface grab sampling is often used to monitor the grade of stockpiles prior to blending or feeding to the plant or for reconciliation purposes.

Grab sampling involves collecting a large sample or series of smaller samples (that are later combined) from the muckpile at a face or drawpoint, or from tram cars or trucks transporting the ore from these points. Samples are generally collected by hand or shovel by a geologist, field technician, or miner.

Types of errors in sampling

1. **Fundamental:** Results from grade heterogeneity of the broken lot. Of all sampling errors, the Fundamental Sampling Error does not cancel out and remains even after a sampling operation is perfect. Experience shows that the total nugget effect can be artificially high because sample masses are not optimal.
2. **Grouping and segregation:** Relates to the error due to the combination of grouping and segregation of rock fragments in the lot. Once rock is broken, there will be segregation of particles at any scale (e.g., surface stockpile or laboratory pulp).
3. **Delimitation:** Results from an incorrect shape of the volume delimiting a sample.
4. **Extraction:** Results from the incorrect extraction of a sample. Extraction is only correct when all fragments within the delimited volume are taken into the sample.
5. **Weighing:** Samples should represent a consistent mass per unit (e.g., kg/m).
6. **Preparation:** Refers to issues during sample transport and storage (e.g., mix-up, damage, loss and alteration), preparation (contamination and/or losses), and intentional (sabotage and salting), and unintentional (careless actions and non-adherence of protocols) actions.
7. **Analytical:** Relates to all errors during the assay and analytical process, including issues related to rock matrix effects, careless actions, and analytical machine maintenance and calibration.

Sample salting: There are two kinds of sample salting,

1. Intentional: Surreptitious addition of valuable material to a sample with intent to deceive.
2. Innocent: It can have the same end effect as intentional salting but is by accident or carelessness or improper working procedure.

Concept of Strategic Minerals

Strategic Minerals (also known as Critical Minerals) is a broad-based category that constitutes various minerals and elements; the majority of which are minor metals. Geography and availability of domestic supply often defines which minerals are deemed "critical" for any particular region or country.

Strategic Minerals include, besides materials for, combat munitions, all mineral raw materials, which are required for industrial sufficiency and preparedness for defense. Domestic resources in many of these minerals are ample and well distributed. While, however, in respect of strategic minerals India is well supplied-in some of them she has considerable exportable surpluses, in the case of critical minerals (i.e., minerals of essential uses, the supply and procurement of which in adequate amount in the event of any national emergency is uncertain) there are serious gaps and deficiency. In peace time economy this distinction perhaps does not possess much significance, but in the event of war, lack of sufficient reserves of certain mineral raw materials, even though relatively unimportant in themselves, may imply grave hazards to the country's security even.in the face, of an abundance of " strategic " minerals. Among such critical minerals in short supply in India, the more prominent are: petroleum and petroleum products, sulphur, base metals, e.g., lead, zinc, copper, nickel, tin, mercury and platinum and minerals, e.g., industrial diamonds, graphite, alkalis, potash, cryolite, selenium, etc.

Mine Valuation - Different methods

Discounted cash flow methods (DCFM):

The method of discounted cash flow is used to estimate the Net Present Value of cash flow of a business. In this method it is assumed that the present value of money decreases with the passage of time. So the value of money which is expected in future will be discounted by certain rate to get its present value. Various techniques in DCFM are

1. Net Present Value
2. Profitability Index
3. Net Terminal Value
4. Internal rate of Return

The relation between the cash flow in future and its present value in DCFM is given as follow:

$$PV = \frac{X}{(1+i)^n}$$

Where,

PV = Present Value

X = Expected cash flow in future after n number of years

i = discount rate.

Net Present Value Method:

The Net Present Value of a project is estimated as follow:

$$NPV = \sum \frac{X}{(1+i)^n} = \frac{-X_0}{(1+i)^0} + \frac{X_1}{(1+i)^1} + \frac{X_2}{(1+i)^2} + + \frac{X_3}{(1+i)^3} + \ldots$$

Where, X is cash flow in future, i is discount rate and n is the year of payment.

Note: *X_0 which is with negative sign indicates cash outflow from the project. It is in actual the initial investment which is negative cash flow.*

Internal Rate of Return:

Internal Rate of Return is the discount rate which makes the present value of a business equal to zero. High Internal Rate of Return indicates high profit in the project.

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In the above equation of NPV, a suitable value of "i" for which NPV becomes zero is called Internal Rate of Return.

Profitability Index:

It is the ratio of "the present value of future net cash flow" to "the initial investment" in a business. High profitability index is expected from a project. If a project gives expected return on investment than its profitability index is more than or equal to one. Smaller value of profitability index indicates less return on investment.

$$PI = \frac{\sum_{i=1}^{N} \frac{X_n}{(1+i)^n}}{I_0}$$

Where,

PI = profitability index

X_n = positive cash flow in future

N = life of project

n = the year of cash flow

Non Discounted cash flow methods (NDCFM):

The method of Non Discounted Cash Flow is used to estimate the Future worth of cash flow of a business. In this method it is assumed that the future worth of money increases with the passage of time. So the future worth of presently available money will be estimated by calculating interest at certain rate. Various techniques in DCFM are

1. Payback Period
2. Average rate of return

Future worth is calculated as follow:

$$FW = PV(1+i)^n$$

Where,

FW = Future Worth

PV = Present value of money

i = interest rate

Payback period:

Time required to repay the loan is called payback period. The loan is called repaid when the net present value of the project becomes zero.

The Net Present Value of a project is estimated as follow:

$$NPV = -X + A * \left[\frac{(1+i)^n - 1}{i(i+i)^n}\right]$$

Where, X is the loan amount, A is the annual payment, n is the payback period and, i is the interest rate.

Depreciation, Amortization and Redemption of capital

Depreciation is the reduction in the value of an asset due to usage, passage of time, wear and tear, technological outdating or obsolescence, etc. The estimated value recovered at the end of the asset's serviceable life (trade-in value or scrap value), is referred to as residual value. This should not be confused with book value, which is the initial cost of an asset less related accumulated depreciation.

There are four main methods for calculating depreciation:

1. Straight-line Depreciation:

A method of depreciation whereby equal portions of the amount paid for an asset are shown as an expense during each accounting period of the life of the asset. The straight-line depreciation equation is:

Depreciation expense = (Cost − Residual) / Life (years, months, etc.)

2. Units-of-Production Depreciation: a method of depreciation basing expense on number of units used or produced by the asset during an accounting period to total estimated units to be used or produced during the life of the asset. The units-of-production depreciation equations are:

Depreciation Rate per unit = (Cost − Residual) / Life in units Depreciation Expense = Depreciation Rate per unit × Units used

3. Sum-of-Years'-Digits (SYD) Depreciation: A method of accelerated depreciation that allocates larger amounts of depreciation as an expense during the earlier years of the life of an asset. This method uses a reducing fraction multiplied by the book value (cost - residual) of the asset to determine the amount of depreciation expense for each operating period.
    a. Computing the reducing fraction: The numerator begins with the asset's life in years in the first year and decreases by 1 each subsequent year. The denominator remains constant and represents 100% of its life in fractional elements. The equation to calculate the denominator is:

        The constant denominator = n (n + 1) / 2 b.

    b. The SYD depreciation equation is:

        Depreciation Expense = [SYD fraction × (Cost − Residual)]

4. Double-Declining-Balance (DDB) Depreciation: is another method of accelerated depreciation that allows greater amounts of depreciation to be expensed in the early years of the life of a depreciable asset. DDB ignores residual value in the calculations. This method uses the DDB percentage multiplied by the book value (cost – accumulated depreciation) to determine the amount of depreciation expense for each operating period.
    a. The equation to calculate DDB percentage is:

        DDB % = (100% / Lifetime) × 2

    b. The DDB depreciation equation is:
        Depreciation Expense = DDB% × Book Value Book Value = Cost − Accumulated Depreciation

c. The final book value must be greater than or equal to the residual value. In case the final book value for the last period is less than the residual value, the depreciation expense value of the last period will need to be changed to ensure that the final book value is equal to the residual value.

Annuity: An annuity is a savings account in which money is deposited at regular intervals, rather than one large lump-sum. The formula is

$$A = \frac{p\left(\left(1+\frac{r}{n}\right)^{nt}-1\right)}{\frac{r}{n}}$$

Where p = regular deposit amount, r = rate, n = compounding frequency, t = years and A is the future value

Amortization: An amortized loan is one in which interest accrues on the balance, while your payments reduce the principal plus accrued interest. The formula is

$$P\left(1+\frac{r}{n}\right)^{nt} = \frac{p\left(\left(1+\frac{r}{n}\right)^{nt}-1\right)}{\frac{r}{n}}$$

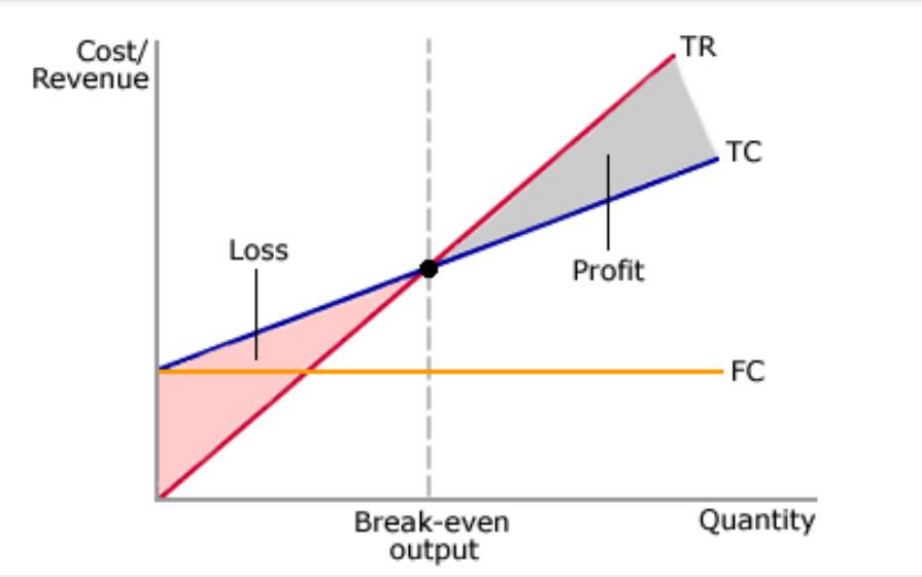
Here, big P is the amount being financed, little p is the payment that amortized big P.

Break Even Analysis

One of the important indicators of success of the start-up company is the time from starting the business till the moment when revenues of product sales equals the total costs associated with the sale of product – it is also called break-even point. In other words profit = 0. Breakeven analysis is accounting tool to help plan and control the business operations. Break-even point represents the volume of business, where company's total revenues (money coming into a business) are equal to its total expenses (total costs). In its simplest form, breakeven analysis provides insight into whether or not revenue from a product or service has the ability to cover the relevant costs of production of that product or service.

Break-even analysis is based on categorizing production costs between those which are:

1. VARIABLE cost that do vary with the number of units produced and sold (raw materials, fuel, direct labor, revenue-related costs).
2. FIXED costs are those which don't vary with the number of units produced and sold (salaries, rent and rates, depreciation, marketing costs, administration costs, R&R, insurance)



Production at Break Even Point = Fixed Cost / (Revenue per unit production – Total cost of per unit production)

Break-even analysis is a useful tool to study the relationship between fixed costs, variable costs and returns. A break-even point defines when an investment will generate a positive return and can be determined graphically or with simple mathematics. Break-even analysis computes the volume of production at a given price necessary to cover all costs. Break-even price analysis computes the price necessary at a given level of production to cover all costs.

To explain how break-even analysis works, it is necessary to define the cost items.

Fixed costs, incurred after the decision to enter into a business activity is made, are not directly related to the level of production. Fixed costs include, but are not limited

to, depreciation on equipment, interest costs, taxes and general overhead expenses. Total fixed costs are the sum of the fixed costs.

Variable costs change in direct relation to volume of output. They may include cost of goods sold or production expenses such as labor and power costs, feed, fuel, veterinary, irrigation and other expenses directly related to the production of a commodity or investment in a capital asset. Total variable costs (TVC) are the sum of the variable costs for the specified level of production or output. Average variable costs are the variable costs per unit of output or of TVC divided by units of output.

The total cost line is the sum of the total fixed costs and total variable costs. The total cost line parallels the total variable cost line, but it begins at the level of the total fixed cost line. The total income line is the gross value of the output, starting at the lower left of the graph and slanting upward. At any point, the total income line is equivalent to the number of units produced multiplied by the price per unit. The key point (break-even point) is the intersection of the total cost line and the total income line. A vertical line down from this point shows the level of production necessary to cover all costs. Production greater than this level generates positive revenue; losses are incurred at lower levels of production.

Memorandum and articles of association

The memorandum contains the names of all the subscribers (the people who were there at the founding point of the company e.g. initial shareholders) and the Articles of Association are a set of rules that govern how the company is run.

The Memorandum

Every company must have a memorandum in place, they will all be in the same format and contain the same information. This includes:

- Company name
- Date of incorporation
- Type of company
- Act under which the company is registered
- Names and signatures of all subscribers (original shareholders or guarantors)
- Limited liability of shareholders or guarantors

Any person who adds their name to the memorandum during incorporation will become a member of the company, and will continue to be members until they decide to leave. Details of members will be made public on the Companies House website under the company details.

The Articles of Association

Most limited companies will use the Model Articles, but it is possible to change them if needed. These Articles will set out how the company is run, governed and owned by the members. The Articles can put restrictions on the company's power - which can be useful if the shareholders and directors do not agree and try pulling the company in different directions. This Model Articles cover the following:

- Directors' powers, responsibilities, decision making, appointment and removal, indemnity and insurance
- Shares, distribution of shares and Dividends
- Capitalisation of profits
- Shareholders
- General meetings
- Voting Rights

Shares and debentures

In business, debt and equity are the two significant methods by which they raise money for the company’s expansion and growth.

Whenever a firm chooses an equity to boost funds, the shares of the company are issued to the public, and whoever buys shares gets an opportunity to be part of the company. The second is debt a company receives a loan from the public and also agrees to pay the interest regularly. There, the debenture is issued to the public and whoever buys it is known as creditors.

Here, shares are defined as the share capital of an organization. It gives the shareholder the right to hold a specified amount of the share capital of the firm. Similarly, a debenture is a great financial tool that shows the debt of a business to the outside party/public and gives a fixed interest rate.

A debenture is a debt tool used by a company that supports long term loans. Here, the fund is a borrowed capital, which makes the holder of debenture a creditor of the business. The debentures are both redeemable and unredeemable, freely transferable with a fixed interest rate. It is unsecured and sustained only by the issuer’s credibility.

Unlike shareholders, the debenture holders who are the creditor of the company do not hold any voting rights. The debentures are of following types:

- Secured Debentures
- Convertible Debentures
- Unsecured Debentures
- Registered Debentures
- Non-convertible Debentures
- Bearer Debentures

A tiny part of a firm's capital is identified as shares and is usually sold in the stock market to raise funds for a business. The price at which the investor buys the share is known as share price. The shareholders are qualified to receive the dividend as mentioned by an organization because they are the owner of a portion of share for the company.

The shares are transferrable/movable and are broadly categorized into two different sections.

- Equity share
- Preference share

Investment Decisions

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