TARGET PRELIMS 2024
BOOKLET-44; ECONOMY-9
INDUSTRY

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2. 3 SECTORS OF ECONOMY

Year	Agriculture	Industry	Services
1947	55%	15%	30%
2022-23:	17%	29%	54

3. INDUSTRY

- Industrial sectors consist of manufacturing; construction; Electricity; Gas; water supply & utility; Mining & Quarrying.
- **Share** of various components**:**

	Share in total GVA FY23
Industry	30.0
Mining & quarrying	2.3
Manufacturing	17.3
Electricity, gas, water supply & other utility services	2.3
Construction	8.1

- Industry holds a prominent position in India's economy, accounting for **31% of GDP**, on average, during FY12 and FY21 and employing o**ver 12.1 crore people**.
    - The sector is also significant because of a number of direct and indirect linkages:
        - **Reducing reliance on imports**
        - **Multiplier effect**: Industrial growth has multiplier effect, which translates into employment growth.
            - Industries such as textile and construction have high employment elasticities.
            - Industrial sector also spurs growth in services sector such as banking, insurance, logistics etc.

1) IIP

- **Definition:**
    - The IIP is a composite indicator that **measures changes in the volume of production of a basket of industrial products** over a period of time, with respect to chosen base year.
    - The IIP is computed and published by the **Central Statistics Organization (CSO)** on a monthly basis, six weeks after the reference month ends.

- **Description**

2nd Floor, 45 Pusa Road, Opp. Metro Pillar 128, Karol Bagh, New Delhi-110005
Ph: 08045248491, 07041021151 | Email: students@levelupias.com

- It classifies industry into Manufacturing, Mining and Electricity Sector and measures growth in production in each industry.
- In addition, use based classification of basic goods, intermediate goods and capital goods is also available. This helps in predicting GDP growth as industry is one of the major contributors to growth.
  - The weight of the 3 categories of sectors are as follows:
    - **Manufacturing** has a higher **77.6%.**
    - **Mining (14.4%)**
    - **Electricity (8%**)
  - The weight of various categories under **user-based classification includes**:
    - Primary Goods (34%)
    - Capital Goods (8.2%)
    - Intermediate Goods (17.2%)
    - Infrastructure/construction goods (12.3%)
    - Consumer durables (12.8%)
    - Consumer non-durables (15.3%)

- **Base Year**: 2011-12

- **Purpose:**
  - **Policy decisions**.
  - **Crucial input for compilation of GVA** of the manufacturing sector
  - Used by financial intermediaries, policy analysts and private companies for various analytical purposes.

- **Why changes in the IIP calculation methods** need to happen regularly?
  - To capture the changes in the structure and composition of the industry over time due to technical changes, economic reforms, changes in pattern of demand and supply.

- **Current Situation**
    - For the month of Feb 2024, the Quick Estimates of IIP with base 2011-12 stands at **147.2**.

2) ANNUAL SURVEY OF INDUSTRIES (ASI)

- It is the most important source of Industrial statistics of the **registered manufacturing sector** of the economy.
  - It covers all factories registered under **Sections** 2(m)(i) and 2(m)(ii) of the **Factories Act, 1948**, where the manufacturing process is defined under section 2(k) of the said act.
    - It covers all factories employing 10 of more workers using power and those employing 20 or more workers without using power.
  - It also covers Bidi and Cigar manufacturing establishments registered under the Bidi and Cigar Workers (Conditions of Employment) Act, 1966.
  - All Electricity undertakings engaged in generation, transmission, and distribution of electricity, not registered with Central Electricity Authority (CEA) are also covered under ASI.

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- Units with 100 or more employees registered in the Business Register of Establishments (BRE) prepared and mantained by the State Governments as and when such lists are shared by the respective State governments.
- **Industries excluded**: Defence establishments, oil storage and distribution depots, departmental units of railway workshops, RTC workshops, Govt Mints, sanitary, water supply, gas and storage etc., are excluded from the purview of the survey.

- The survey is conducted under the Collection of Statistics Act, 2008 as amended in 2017 and Rules framed there under in 2011.

- It is conducted by **CSO Industrial Statistics (IS) wing** and is released by MoSPI.
- It ensures timely dissemination of statistical information about dynamics of manufacturing sector.
- The data is given with a **lag of two years**.
- **Note:** For other categories of factories/establishments, which are not covered under the ASI, the information is collected through the unorganized sector surveys conducted by NSSO every 5 years.

- **MoSPI** has released the results of ASI for FY21 and FY22 (Feb 2024)
  - The results show **resilience shown by the Indian Manufacturing Sector** and tells the unique turn-around story of Indian Manufacturing sector after the COVID-19 crisis.
  - **Employment**: Marginal fall in 2020-21; It was more than compensated in 2021-22 with total estimated employment in the sector showing a robust growth of **7.0% (Y-o-Y)**.
    - In fact, the estimated number of persons engaged in the sector in 2021-22 has exceeded the pre-pandemic level (i.e. 2018-19) by more than 9.35 lakh.
  - **States**:
    - In terms of GVA, Maharashtra is ranked-1 in FY22 and Gujarat is ranked-2 in FY22. These states are followed by Tamil Nadu, Karnataka and Uttar Pradesh.

3) IIP VS ASI

- **IIP is monthly indicator whereas ASI is a long-term industrial statistics**. It is used to track the health of the industrial activity in the economy over a longer period.
- The index is compiled out of a much large sample of the industries compared to IIP.

4) PURCHASING MANAGER'S INDEX (PMI)

- **What is Manufacturing PMI?**
  - An indicator of the economic health of the manufacturing sector. It predicts the level of industrial production in advance.
  - It is based on five major indicators.
    1. New orders
    2. Inventory levels (stocks of items purchased)
    3. Backlog of work
    4. Suppliers' delivery times
    5. Employment levels

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- The **purpose** of the PMI is to provide information about current business condition to company decision makers, analysts and purchasing managers.

- How is info collected?
  - Monthly surveys sent to purchasing executives at approximately 400 manufacturers.

- What does the indicator mean?
  - PMI > 50: Expansion of manufacturing compared to previous month.
  - PMI = 50: No change
  - PMI < 50: Contraction of manufacturing compared to previous month.

- **Famous Manufacturing PMI's of India**
  - S&P Global's Manufacturing PMI

- **Beginning**: It was started by the US-based Institute of Supply Management in 1948. Over the years it has become one of the most closely watched indicators of business activity across the world

4. INDUSTRY-CORE SECTOR

1) THE COMBINED INDEX OF EIGHT CORE INDUSTRIES (ICI)

- **The ICI** measures the collective and individual performance of production in select eight core industries.
  - These eight industries comprise **40.27% of the weight** of items included in the IIP.
  - It is compiled and released by **Office of Economic Advisor**, DIPP, Ministry of Commerce and Industry.
    - » **Base Year: 2011-12**.
    - » **Weights of different sectors:** Coal (10.33%), Crude Oil Production (8.98%), Natural Gas (6.88%), ***Refinery Products (28.04%)***, Fertilizers (2.63%), ***Steel (17.92%),*** Cement (5.37%) and **Electricity (19.85%)**.
  - ICI for a reference month is released with a time lag of 1 month, a fortnight prior to release.
- **Updates:**
  - ICI increased by 6.7% (provisional) in Feb 2024 as compared to the Index of Feb 2023.

2) COAL INDUSTRY

- **Coal** is the most important and abundant fossil fuel in India. It accounts for 55% of the country's energy need.
- **India will continue to rely on coal for foreseeable future**:
  - » **Surging power demand in India**: As per the latest World Energy Outlook published by International Energy Agency (IEA), India will witness the largest energy demand growth of any country or region in the world over the next 30 years.
  - » **Renewable** only contributes to 22% of energy being produced in the country. Fossil fuels (mainly coal) still provide for 75% of India's power supply.
    - **Issue of intermittency** in the renewable sector.
- **Coal power dependency is also growing globally:**

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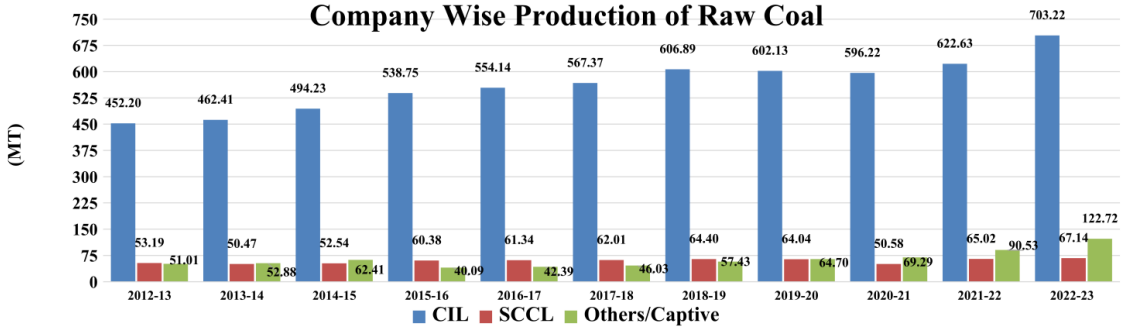
» For e.g. as per a report by US-based think-tank, Global Energy Monitoring, - **coal fired powerplant capacity** grew 2% last year, the highest annual increase since 2016.

A) COAL PRODUCTION IN INDIA

- **In recent years**, India's coal production is on increasing trend (except 2020-21)



Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Total Production (Million tonnes)	609.18	639.23	657.87	675.40	728.72	730.87	716.08	778.20	893.08

- **The All-India Production of Coal** during 2022-23 was **893.19 MT** with a positive growth of 14.77%.
  - » **Coal India Limited** (CIL) produces around 78% of coal in India.
  - » **Singareni Collieries Company Limited (SCCL)** around. 8% of coal production in the country.
  - » **Captive and others** are responsible for more than 14% of the production.

B) COAL IMPORT

- As per the present import policy, coal can be **freely imported (under Open General License) by the consumers** themselves considering their needs based on their commercial considerations.
- **Coking Coal** is being imported by Steel sector mainly to bridge the gap between requirement and indigenous availability and to improve the quality.
  - » **Note**: Coking Coal (also known as **metallurgical coal**) is a grade of coal that can be used to produce good-quality coke. Coke is an essential fuel and reactant in the blast furnace process for primary steelmaking.
- Other sectors like Power Sector, cement, etc. and coal traders are importing **non-coking coal**.

Coal	2019-20	2020-21	2021-22	2022-23	2023-24*
Coking Coal	51.83	51.20	57.16	56.05	48.29
Non-Coking Coal	196.70	164.05	151.77	181.62	172.20
Total Coal Import	248.53	215.25	208.93	237.67	221.19
Coke	2.88	2.46	2.48	3.63	3.21

***Import upto Jan, 2024 (Source:-DGCI&S)**

2nd Floor, 45 Pusa Road, Opp. Metro Pillar 128, Karol Bagh, New Delhi-110005
Ph: 08045248491, 07041021151 | Email: students@levelupias.com

NEW US SANCTIONS ON MOSCOW AND IMPACT ON INDIA'S IMPORT OF COAL FROM RUSSIA (FEB 2024)

- **Russia** was historically a minor exporter of fuel to India. But this changed after western sanctions against Moscow over its war in Ukraine.
- **New US Sanctions** are more likely than previous ones to cut Indian imports of thermal coal from Russia because they specifically cite top exporters **SUEK (Russia's largest coal producer and exporter)** and **Mechel**. It also includes Russia's payment system, financial institutions and energy production.
    - **Indian conglomerates** JSW Group, Vedanta and consortium Arcelor Mittal Nippon Steel India were among the biggest importers of Russian thermal coal in the last six months.

C) MINISTRY OF COAL AND COAL PSUS

- MoC has the overall responsibility of determining policies and strategies in respect of exploration and development of coal and lignite reserves, sanctioning of important projects of high value and for deciding all related issues.
- **Three PSUs** come under the Ministry.
    a. **Coal India Limited** (CIL)
        » A 'Maha Ratna' company under the Ministry of Coal, with headquarter at Kolkata, WB.
        » It is the single largest coal producing company in the world and one of the largest corporate employers with a manpower of 3,46,638.
        » In **FY24**, Coal India Limited (CIL) has surpassed its annual supply target of **610 MT** to the thermal power sector, achieving 610.8 MT till 27th March 2024.
            ▪ It's coal supply to the sector rose by 29.3 million tonnes in absolute volume terms compared to the corresponding period last fiscal.
    b. **Neyveli Lignite Corporation Limited (NLC)**
        » A 'Navratna' with registered office at Chennai and corporate office in Neyveli in TN.
    c. **Singareni Collieries Company Limited (SCCL)** which is a joint sector undertaking of Government of Telangana and Government of India with an equity capital ratio of 51:49.

D) COAL CONTROLLER ORGANIZATION (CCO)

- It is a subordinate office of the Ministry of Coal, having its **headquarter at Kolkata** and field offices in Dhanbad, Ranchi, Bilaspur, Nagpur etc.
- It **collects and maintains coal production data** of all private and public sector coal mines in the country. The info is collected on a monthly basis.
- **History:**
    » Office of Coal Controller (earlier Coal Commissioner) was established in 1916. It is one of the oldest offices in Indian coal sector.
        ▫ The mains aim was to have government control over coal production to adequately meet the coal requirements during World War-1.

- **Functions and Responsibilities:**
    » **Inspection of collieries** to ensure the correctness of the class, grade or size of coal.

- To issue directives for the purpose of declaration and maintenance of grades of coal of a seam mined in a colliery.
- To **act as the appellate authority in case of dispute** between consumers and owner arising out of declaration of grade and size of coal.
- To **regulate disposal of stock** of coal or the expected output of coal in the colliery.
- **Quality surveillance** with respect to maintenance of grade, loading of coal in wagons/ trucks according to laid down procedures regarding grades and sizes.
- To grant opening / re-opening permission of coal mine, seam or a section of seam or to sub-divide a mine.
- Assessment and collection of excise duty levied on all raw coal raised and dispatched.
- Submission of monthly coal data to different ministries of central and state governments, national and international organisations

E) COAL DEPOSITS IN INDIA (FROM INDIA YEAR BOOK)

- **Coal Reserves** (308.80 billion tonnes) of coal reserves have been estimated by Geological Survey of India. The reserves have been found mainly in Jharkhand, Odisha, Chhattisgarh, West Bengal, Madhya Pradesh, Telangana and Maharashtra.
- **Lignite Reserves** (44.59 billion tonnes) have been estimated by GSI. The major deposits are located in Tamil Nadu, followed by Rajasthan, Gujarat, Kerala, West Bengal, Jammu & Kashmir and UT of Puducherry.

F) TYPES OF COAL:

- The degree of change undergone by a coal as it matures from peat to anthracite is known as **coalification**. Coalification has an important bearing on coal's physical and chemical properties and is referred to as **rank of the coal**. Ranking is determined by the degree of transformation of the original plant material to carbon. There are four main categories of coal which differ in heating value, carbon content, Sulfur levels, and moisture contents. The ranks of coals, from those with the least carbon to those with the most carbon, are **lignite**, **sub-bituminous**, **bituminous** and **anthracite**.
  - **Peat** is a layer of vegetable material directly underlying the growing zone of coal forming environment The vegetable material shows very little alteration and contains roots of living plants.
    - **Uses**
      - Peat is widely used as domestic fuel in rural parts of Scotland and Ireland.
  - **Lignite or Brown Coal**, (lowest carbon content of 25-30%). It is the youngest coal type geologically, makes up the largest portion of the world's coal reserves. It is brown and can be soft and fibrous, containing discernible plant material. However, lignite has very high moisture and ash content and low energy content.
    - **Uses**
      - It is used almost exclusively for **electric power generation**.
      - **Jet** a compact form of lignite, is sometimes polished and has been used as an ornamental stone since the upper Paleolithic.
  - **Sub-bituminous Coal (35-45% carbon)** is a dull black coal with a slightly higher heat value than lignite. Despite its low heat value, it has lower sulfur content and is clean to burn.
    - **Uses:**
      - It is used primarily as fuel for steam electric power generation

2nd Floor, 45 Pusa Road, Opp. Metro Pillar 128, Karol Bagh, New Delhi-110005
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- Important source for light aromatic hydrocarbons for the chemical synthesis industry.

- **Bituminous Coal or soft coal (45-86% carbon)** : Older than subbituminous coal, dense sedimentary rock, usually black, but sometimes dark brown.
  - **Uses**
    - Primarily as fuel in steam electric power generation
    - Substantial quantities used for heat and power applications in manufacturing and to make **coke.**
- **Anthracite (86-98% carbon),** highest rank of coal, is a harder, glossy black coal. Low in volatile matters which can form tars, oils and gasses when heated. Only a small percentage of the overall market.
  - **Uses**
    - Primarily for residential and commercial space heating
- **Graphite (100% technically**), technically the highest rank coal, difficult to ignite and is not commonly used a fuel.
  - **Uses**
    - It is mostly used as pencils.
    - When powdered, also used as Lubricant.

3) OPENING UP OF COMMERCIAL COAL MINING

- **Background**
  - **Nationalization of Coal Mines, 1973**
    - Coal Mines (Nationalization) Act, 1973 nationalized all the coal mines in India.
    - **Why?**
      - Adequate investment needs in the coal mining sector were not fulfilled by the private sector.
      - Unscientific mining practices adopted by some private miners and poor working conditions of labour in some of the private coal mines became matters of concern for the government.
    - So, since 1970s, **Coal India** had the monopoly over mining and selling of coal in India. It accounted for 80% of the country's coal supply. Another public sector company is **Singareni Collieries,** a venture of Coal India and the Telangana (earlier Andhra) government.
    - The rest of the requirement is met through **import** and **production from captive mines** by private players.
      - These coal mines were allocated on **recommendation basis** (not auction) only for their specific use (also called Captive Mining)

- **In Sep 2014, Supreme Court cancelled 214 coal block allocations since 1993.**
  - The 4 allocation which were not cancelled included government run blocks on non-Joint-venture basis.
  - The ***Coal Mines (Special Provisions) Act, 2015*** passed in March 2015, contained provisions enabling government to **allocate coal mines through auction**. This thus theoretically **opened coal mining sector** in theory to private sector.

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- **In Feb 2018, Cabinet approved bidding process for Commercial Coal Mining: Key features:**
  - » **Ascending forward auction** on an online platform where the bid parameters will be the price offer in rupees per tonne, which will be paid to the state government on the actual production of coal.
    - No share for centre from commercial mining.
  - » **No restriction on sale and/or utilization** of the coal from mine.
  - » **No cap on price and type** of coal.

- **100% FDI allowed in Coal** mining through automatic route in commercial coal production (Aug 2019)

- **Government unveils auction process for Coal Mines** (June 2020)
  - » This marks the **full opening of Commercial coal mining for the private sector through auction** and ends seven decades of restrictions.
    - Commercial Coal Mining Auctions are completely different from the earlier regime of restricted sectors, use and price. Now there is no such restrictions.

- **Terms and conditions** of the auction are also **very liberal**.
  - » New companies (without prior experience) in coal mining can participate.
  - » Reduced upfront amount.
  - » Adjustment of upfront amount against royalty
  - » Liberal efficiency parameters.
  - » 100% FDI through automatic route allowed.
  - » Reasonable financial terms and **revenue sharing model** based on National Coal Index

4) NATIONAL COAL INDEX (NCI)

- **National Coal Index (NCI)**:
  - » The NCI is a price index which reflects the change of price level of coal on a particular month relative to the fixed base year. The base year for the NCI is FY 2017-18.
  - » It has been created by **combining the prices of coal from all the sales channels** - Notified prices, Auction Prices and Import Prices.
  - » The index is meant to encompass all transaction of raw coal in Indian market. This includes coking and non-coking coal of various grades transacted in the regulated (power and fertilizer) and unregulated sector.
    - **Note:** Washed coal and coal products are not included.
  - » It was first rolled out in **June 2020**.
  - » It consists of **five subindices**: three for non-coking coal and two for coking coal.
    - The three subindices for non-coking coal are combined to produce index for Non Coking coal and the two sub-indices for Coking coal are combined to arrive at the Index of Coking coal.
    - **Thus, Indices are separate for coking and non-coking coal**.
  - » The NCI is released every month.
- **The concept and design of the index** as well as the Representative Prices have been developed by the Indian Statistical Institute, Kolkata.

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- **Purpose**
  - » Ministry of Coal has started **commercial auction of coal on revenue share basis**. The amount of revenue share per ton of coal produced from auctioned blocks would be arrived by using the NCI by means of defined formula.
  - » Thus, NCI will truly reflect the market price.

5) OTHER RECENT REFORMS/INITIATIVES IN COAL SECTOR

i. **Scheme for Harnessing and Allocating (Coal/Koyla) Transparently in India (SHAKTI) Policy:**

- Launched in May 2017
- **Need:**
  - Before SHAKTI, coal supply to thermal power plants (TPPs) were done according to New Coal Distribution Policy (NCDP), 2007. CIL had provided Letter of Assurance (LOAs) for around 1,08,000 MW capacity by 2010 and after that no new LOAs were issued due to prevailing scarcity scenario.
  - In 2013, CCEA's decision directed CIL to sign Fuel Supply Agreement (FSA) with TPPs of around 78,000 MW.
  - So, the remaining 30,000 MW plants were lacking fuel supply agreement and thus awaiting fuel supply.
- **Aim**: Promoting transparency and competition in the allocation of coal mines. It is applicable to all coal-based power plants in the country.

- **Key Provisions of the Policy**
  - **Right to fuel produced by Coal India/SCCL** for thermal capacities in the private sector which are equipped with long term PPAs.
    - The policy prescribes **direct linkage allocation to public-sector plants** and **reverse auction for supply of coal linkages to private players**.
  - **Coal linkages is awarded to designated state-owned power distribution** companies (DISCOMS).
    - State or central power generation companies would be assigned linkages via allocation.
    - The firms (independent power producers (IPPs)) with PPAs based on domestic coal will participate in the auction and will bid for discount on existing tariff. This is expected to result in a win-win situation of IPPs having a long-term supply security of coal from a source of their choice while consumer will benefit from a lower tariff.
    - Firms without PPAs shall be bidding for linkage over the notified price of the coal company (i.e. they will bid for fuel linkages with CIL's notified price serving as the reserve).
- By FY2023, 209.614 million tonnes coal linkages have been booked/ allocated under different provisions of SHAKTI Policy.

ii. **New sub-sector under the Policy for Auction of coal linkages of Non-Regulated Sector (NRS)**:- A new Sub-sector '*Production of Syn-Gas leading to coal gasification*' has been created in 2022 under the NRS linkage auctions in order to encourage coal gasification technology so that new consumers requiring

coal for gasification are incentivized. This will also mitigate the adverse impacts of the conventional use of coal on the environment.

iii. **Single window for e-auction of coal**: - Government has recently approved a new mechanism for e-auction of coal by the coal companies. The erstwhile **sectoral e-auction windows of Coal India** Limited has been **done away with** and henceforth, **all the non-linkage coal of the coal companies would be sold through one e-auction window of Coal India Limited / Singaren Collieries Company Limited**. This single e-auction window will cater to all the sectors like power & nonregulated sector included traders. Therefore, coal of any particular grade would be sold in the market to all consumers at one rate (**one nation – one coal grade- one rate**).
    - It will remove market distortions. It will increase operational efficiencies and lead to an increase in domestic coal demand.

iv. **Amendment to NCDP**: To promote optimum utilization of coal resources in the national interest, enabling provisions has been made by way of amendment to the New Coal Distribution Policy (NCDP), 2007, in order **to allow the coal produced from Closed / Abandoned / Discontinued mines of CIL / SCCL to be sold through a transparent and objective manner** as per the guidelines issued by Ministry of Coal from time to time.

v. **Coal linkages for gasification plants of the coal companies**: CIL / SCCL have been allowed to provide long term allotment of coal to their own gasification plants at prices as may be decided by the coal company. This move will **encourage coal gasification technology in the country** and will help in early establishment of this new use of coal.

vi. **Mission Coking Coal:**
    - **Understanding Coking Coal**: Metallurgical coal or Coking coal is a grade of coal that can be used to produce good quality coke. It is an essential fuel and reactant in the blast furnace process of steel making. The demand for coking coal is coupled with demand for steel.
    - **Domestic. Coking Coal** is high ash coal (mostly between 18% - 49%) and is not suitable for direct use in blast furnace. Therefore, Coking coal is washed to reduce the ash percentage and is blended with imported coking coal (<9% ash) before utilization in blast furnace.
    - **Imports:** About 50 MT coking coal is imported by the country on an annual basis and the value of coking coal imported in FY2020-21 was Rs 45435 crores.

- **Inter-ministerial committee** including stakeholders from industry to strategize augmentation of coking coal production in India submitted its recommendations. Based on this, Ministry of Coal has set up **Mission Coking coal** to evolve a roadmap for increasing production and utilization of domestic coking coal.

5. CRUDE OIL AND PRODUCTS

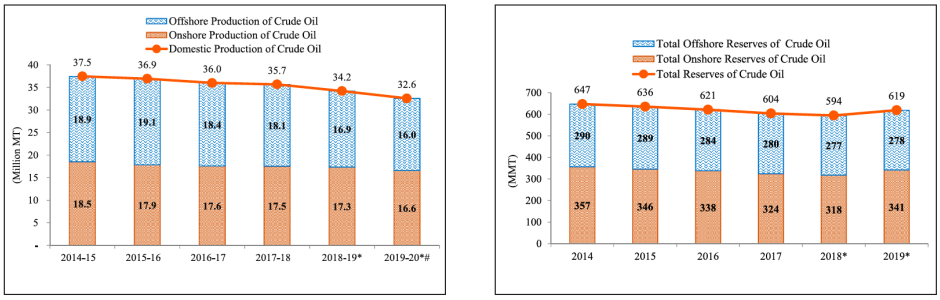
1) PRODUCTION

- **India's** total Crude oil Production (on-shore and off-shore production) was **29.18 million metric tonnes (MMT)** in FY22-23.

2nd Floor, 45 Pusa Road, Opp. Metro Pillar 128, Karol Bagh, New Delhi-110005
Ph: 08045248491, 07041021151 | Email: students@levelupias.com

- India's oil production is one of the lowest among the major economies of the world and has been declining over a period of time.
  - » It has seen a continuous **decline since 2014**.
    - **Why? -> Natural decline and ageing and matured fields** and no major discoveries.
      - » Proven reserves have decreased concurrently since 2014, with the steeper fall in onshore reserves. This fall has seen a reversal in 2019.

(a) Production of Crude Oil **(b) Reserves of Crude Oil**



Source: Ministry of Petroleum and Natural Gas and Economic Survey calculations.

2) IMPORTS

- India is the **third largest oil importer** and **consumer**, shipping in about **85% of its crude needs** and **relies heavily** on the middle east.
  - » **India's** total import in FY23 was 140 million tonnes.

- **Spot Cargoes** vs **Term Cargoes**:
  - » India purchases crude oil from the Middle East through term contracts, and with Russia through the spot market.
    - **Term Contracts** are finalized on a yearly basis, and this is done with National oil Companies (NoCs), while the balance is covered by spot tenders.
      - **Advantages of Term Contract**: Stability in price and supply
    - **Advantage of Spot market**:
      - **Flexible purchases** to meet varying seasonal/market demand and to meet operational exigencies.
      - **Competitive purchase** opportunities -> if price drops in the market
      - **Explore new crude oil grades** from diverse geographies.
        - There are many grades where term contracts are not available.
  - » India imported 49.6 million tonnes from the spot market (35.13% of imports) and 91.6 million tonnes using term cargoes (64.87%).
    - Since 2018, India has increased its dependency on spot contract.

- **Diversification of Crude Oil Sources**:
  - » Oil PSUs have started importing crude oil from the US, Canada, Russia, Australia, Brazil, Guyana, Norway, Egypt, Ghana, Congo, Equatorial Guinea, Libya, Nigeria, etc. and have **diversified its crude supply**.

- **Oil Imports from Russia**:

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» In the first half of FY24, the share of Russian oil in India's overall import rose to **40%**, consolidating Moscow's position as the top supplier as refiners curbed purchase from middle east.
» Though, the imports from Russia have started **decreasing in the 2nd half** of FY24.
- **In Jan 2024**, India's Russian import of oil fell to a 12-month low.

- **India's imported 21.4 million tonnes crude oil in Jan 2024** - the **highest in last 20 months** (since April 2022)
» **Reasons**: Increasing domestic consumption and rising export demand for export products.
» In Jan 2024, India also received first cargo of Venezuelan oil after a gap of three years, as the US eased sanctions on the south American producer.

3) VARIOUS CRUDE OIL BENCHMARKS

- **Intro: Various characteristics of Crude**
▫ There are different types of Crude oil - the thick, unprocessed liquid that drillers extract below the earth - and some are more desirable than others.
» For instance, it's easier for refiners to make gasoline and diesel fuel out of low-sulfur, or "sweet" crude that oil with high sulfur concentration.
» Low-density, or "light" crude is generally favorable to the high density variety for the same reasons.
» Where the oil comes from also makes a difference - transport cost

- **The main benchmarks**
▫ There are dozens of different oil benchmarks, with each one **representing crude oil from a particular part of globe**. However, the price of most of them are pegged to one of the **three primary benchmarks.**

i. **Brent Blend**
- Two-third of the all crude contracts around the world reference Brent Blend making it most widely used oil marker of all
- These days, "Brent" actually refers to oil from four different fields in the North Sea: Brent, Forties, Oseberg and Ekofisk.
- Crude oil from this region is light and sweet, making it ideal for refining of diesel fuel, gasoline and other high demand product.
- Also because supply is waterborne, it is easy to transport to distant locations.

ii. **West Texas Intermediate**
- WTI refers to oils extracted from the wells in the US and sent via the pipeline to Cushing, Oklahoma. The fact that supplies are land locked is one of the drawbacks - its relatively expensive to ship.
- The product itself is **sweet and light,** making gasoline refining very easy, in particular.
- It continues to be the main benchmark for oil consumed in US.

iii. **Dubai/Oman**

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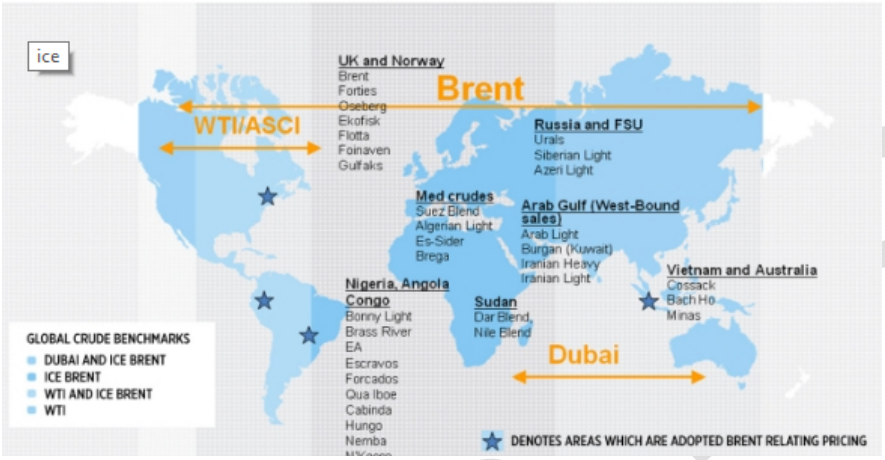
- The middle eastern crude is a useful reference for oil of a **slightly lower grade that WTI or Brent**.
- A "basket" product consisting of crude from Dubai, Oman or Abu Dhabi, it's somewhat **heavier and has higher sulfur content**, putting it in the sour category.
- Dubai/Oman is the main reference for Persian Gulf oil delivered to the Asian market.



- **Russian Oils**:
  - **Urals**
    - Russia produces several types of crude oil, but its main export blend is Urals, which is a medium sour crude. Other grades include Siberian Light, Sokol, Sakhalin Blend, Arctic Oil, and Novy Port.

4) STRATEGIC CRUDE OIL RESERVE PROGRAMME

- **Background**
  - » The erstwhile Planning Commission in its Integrated Energy Policy, 2006, identified **supply market and technical risks as major threats to India's energy security** and recommended to "**maintain a reserve equivalent to 90 days of oil imports** for strategic-cum-buffer- stock purposes".

- **Need of strategic petroleum reserve**
  - » Potential Supply crisis -> West Asia is very volatile, tension between major powers etc.
  - » Price Fluctuations -> A situation like 1970s is very harmful for economies.
  - » Exchange rate fluctuations

- **Crude Oil Storage facilities**
  - » These are underground rock caverns. The rock must be strong enough for the cavern to be stable. A wide range of rock types are suitable, such as igneous (granite, diorite), metamorphic (gneiss, schists) and even sedimentary rocks (sandstones, limestone, chalk, shale)
  - » **Why underground caverns**
    - Safety from hazard of leakage.
    - Lower capital cost and lower operating cost compared to conventional tanks
    - Inherent safety over the above ground storage systems

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- Safety from natural calamities and various forms of sabotage.

- **Locations**
  - » Mostly coastally located - as imports are easy and suitable refinery capabilities.

- **Strategic reserves in India**
  - » State owned Special Purpose Vehicle (SPV), **India Strategic Petroleum Reserve Limited (ISPRL)** has established Strategic Petroleum Reserve (SPR) facilities with total capacity of **5.33 million Metric Tonnes** (or 39 million barrels) at **3 locations** under Phase-1.
    - **Vishakhapatnam** (1.33 MMT)
    - **Mangalore** (1.5 MT)
    - **Padur** (Uduppi district, Karnataka) (2.5 MT)
    - Taking advantage of low crude oil prices in April/May 2020, the Strategic petroleum reserves were **filled** to full capacity. This led to national saving of around Rs 5,000 crores.

  - » **In 2021**, government has approved the **establishment of two additional commercial-cum-strategic facilities** with total storage capacity of **6.5 MMT** at Chandikhol and Padur on **PPP Model**.
    - **Chandikhol** (Odisha) (4 MMT)
    - **Padur** (2.5 MMT).

  - » **In 2024, ISPRL has invited bids for constructing 2.5 million tonnes of underground storage at Padur in Karnataka**.
    - **Bids** are due on 22nd April 2024 and tender is to be awarded by 27th June 2024.

  - » **The entire facility will be owned by GoI**.
    - The Concessionaire shall transfer the SPR with Single Mooring Point (SPM), onshore and offshore pipeline to the GoI, at the end of the 60 years of concession period.
    - GoI will also have the first right to take the oil in case of the Oil Shortage Event.

- **For how many days can India be served by these strategic reserves:**
  - » As per the consumption patter of 2019-20, the **total capacity in first phase** (5.33 MMT) is estimated to provide for about **9.5 days of crude oil requirement**.
  - » Further, the **oil marketing companies** have a storage capacity of **64.5 days** requirements.
  - » The **Phase-2 reserves** with a total capacity of **6.5 MMT will** be able to serve 12 days of India's requirement.

- **Updates: India hold back $600 million strategic oil reserve top-up**: (Jan 2024)
  - » It has been done due to market volatility and the prospect of further decline in prices.
  - » Government has decided to lease out around 1 million tonnes of vacant strategic crude oil storage capacity to Indian and International Companies, instead of spending government money on filling up the available capacity in the caverns.

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6. MINING SECTOR

1) THE MINES AND MINERALS (DEVELOPMENT AND REGULATION) AMENDMENT ACT, 2023

- Amends the 1957 act.
- The act specifies the condition for getting mining and prospecting license.

- **Other Recent Amendments:**
  - » It was comprehensive amended in 2015 to bring several **reforms in the mineral sector**, notably, mandating method of auction for grant of mineral concessions to bring transparency in allocation of mineral resources; for establishing **District Mineral Fund (DMF)** for the welfare of the people and areas affected by mining; **Establishment of National Mineral Exploration Trust (NMET)** to give thrust to exploration and for ensuring stringent penalty for illegal mining.
  - » The act was **further amended in 2016 and 2020** to address emergent issues.

- It was **again amended in 2021**, to bring further reforms in the sector, such as, removing the distinction between captive and merchant mines, transfer of statutory clearances to ensure continuity in mining operations even with changes of lessee, removing the restrictions on transfer of mineral concessions, lapsing of rights of non-auctioned concession holders which have not resulted in mining leases to ensure that concessions to private sector are only granted through auctions etc.

- **Key changes by 2023 Amendment**:
  - » **Reconnaissance to include sub-surface activities**:
    - **Before amendment** the act defined reconnaissance operations as operations undertaken for preliminary prospecting and includes (i) aerial surveys (ii) geophysical surveys, and (iii) geochemical surveys. It also includes geological mapping. But it **prohibited** pitting, trenching, drilling, and subsurface excavation as part of reconnaissance.
    - **The amendment** allows these prohibited activities.

  - » **Introduction of a new type of mineral concession called Exploration License (EL) for Specified Minerals**:
    - **Before amendment**, the act provided for a reconnaissance permit, a prospecting license, a mining lease, and a composite license for prospecting and mining.
    - **Amendment** introduces an **exploration license**, which will authorise either **reconnaissance or prospecting, or both activities** for specified minerals.
      - The exploration license can be issued for **29 minerals specified in 7th schedule**.
        - These include gold, silver, copper, cobalt, nickel, lead, potash, and rock phosphate.
        - These also include **six minerals out of 12 which were earlier classified as atomic minerals** under the Act:
          - (i) Beryl and other Beryllium mineral, (ii) Lithium, (iii) niobium, (iv) titanium, (v) tantallium, and (vi) zirconium
      - **Note**: The amendment has **omitted 6 minerals from the list of 12 atomic minerals specified in Part-B of the First Schedule of the Act**:

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        - These six minerals have various application in renewable energy sector, space sector, electronic sector and are **critical in net-zero emission commitment of India**.
        - **Impact**: Removal of these minerals from the list of atomic minerals will open up the exploration and mining of these minerals to **private sector**.
    - **Note**: Unlike other minerals, the prospecting and mining of atomic minerals is reserved for government entities under the act.

- **Central Government, through rules,** will prescribe the details such as manner of auction, term, conditions, bidding parameters etc. The **state government**, through competitive bidding will grant the license.

- **Validity of exploration license** will be **5 years** (extendable by 2 years by application to state government (after completion of 3 years, but before the expiry of license)).

- **Maximum Area in which activity can be conducted**:
    - Under the act, a prospecting license allows activities in **area upto 25 sq km**; a single reconnaissance permit allows activities in area upto 5,000 sq kms.
    - **Amendment** allows activities under a **single exploration license** in area upto 1,000 sq km.

- **Submission of geological reports regarding findings** within three months of the completion of the operations or expiry of the exploration license is a must.

- **Incentive for exploration licensee**: If the resource are proven by exploration, the state government must conduct an **auction for mining lease within six months** of the submission of the report by the exploration licensee. The **licensee will receive a share in the auction value** of the mining lease for the minerals prospected by them. The shares will be prescribed by the central government.
    - If **auction doesn't happen in six months**, the **state government will pay to exploration licensee an amount prescribed by the central government**.

- **Significance**:
    - » The proposed EL would **facilitate, encourage, and incentivize private sector participatio**n in all spheres of mineral exploration for critical and deep-seated minerals. This will lead to introduction of new technology, finance, and expertise in exploitation for deep seated and critical minerals.

- **Central government has been empowered to exclusively auction some critical and strategic minerals**:
    - » Under the act, auction of concession is undertaken by the state governments, except in **certain specified cases**.
    - » The **amendment empower the central government**, to **exclusively auction mining leases and composite license** for **certain critical minerals** *viz., molybdenum, rhenium, tungsten, cadmium, indium, gallium, graphite, vanadium, tellurium, selenium, nickel, cobalt, tin, platinum group of elements, minerals of "rare earth" group* (not containing

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Uranium and Thorium); **fertilizer minerals** such as potash, glauconite and phosphate (without uranium) and minerals being removed from the list of atomic minerals.

» **Why?**

- It will increase the pace of auction and early production of minerals which have become indispensable for new-technologies such as space, electronics, IT, energy transition, food security, etc.

» **Note**: Even though the auction will be conducted by Central Government, the **mining lease or composite license for these minerals to the successful bidders** will be granted by the **State Government** only and the **auction premium** and other statutory payments shall continue to be received by the State governments.

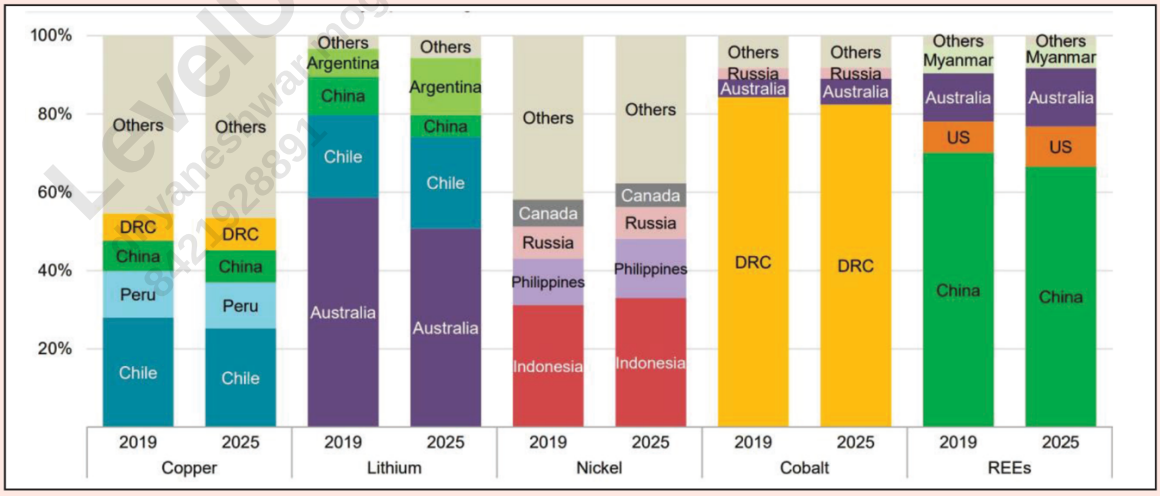
- **Significance of the Amendment:**
  - » **Attract FDI and other investment in Mining sector.**
  - » **Encourage new junior mining companies in the sector.**
  - » **Promote exploration and mining of critical minerals.**

2) CRITICAL MINERALS

- **Why in news?**
  - » Report: Critical Minerals for India: By Ministry of Mines (June 2023)

- **Critical Minerals** are those minerals that are essential for economic development and national security.
  - » **Scarcity of these minerals** or **concentration in few countries** may create supply chain vulnerabilities.
    - In fact, the demand for critical minerals is set to increase with renewable energy transition, the supply chain is very concentrated and unevenly distributed.

Figure VII.11: Concentration of production of selected minerals in 2019 and 2025



Source: International Energy Agency Report on 'The Role of Critical Minerals in Clean Energy Transitions'

- **Critical Minerals** are **essential for advancement of many sectors**, including high-tech electronics, telecommunication, transport and defence. They are also vital for global transition to clean energy.

» **For e.g.:**
  - **Lithium, nickel, cobalt, manganese, and graphite** are crucial to battery performance, longevity and energy density.
  - **REEs are essential for permanent magnets** that are vital for wind turbines and EV motors.
  - **Electricity networks** need a huge amount of copper and aluminium, with copper being a cornerstone for all electricity-related technologies.

- **Which are the minerals which are considered critical**?
  » The Ministry of Mines have formed a committee in 2022 to identify the minerals critical for India. Based on **three stage assessment process** and also considering important parameters such as reserve position in the country, production, import dependency, use for future technology/ clean energy, requirement of fertilizer minerals in an agrarian economy the committee has **identified a set of 30 critical minerals**: These are:
    - Antimony, Beryllium, Bismuth, **Cobalt**, **Copper**, Gallium, Germanium, Graphite, Hafnium, Indium, **Lithium**, Molybdenum, Niobium, **Nickel**, PGE, Phosphorous, Potash, **REE,** Rhenium, **Silicon**, Strontium, Tantalum, Tellurium, Tin, **Titanium**, **Tungsten**, Vanadium, Zirconium, Selenium and Cadmium.
    - **Note**: **Platinum Group Elements (PGE)** consist of Platinum (Pt), Palladium (Pd), Rhodium (Rh), Ruthenium (Ru), Osmium (Os) and Iridium.
    - **Note**: Of these 30 critical minerals, 24 are included in the list of critical and strategic mineral in Part D of Schedule-1 of MMDR Act.

  » The committee also recommends **creation of a Centre of Excellence for Critical Minerals** (CECM) in the Ministry of Mines which will periodically update the list of critical minerals for India and notify the critical mineral strategy from time to time and will execute a range of functions for the development of an effective value chain of critical minerals in the country.

A) OTHER STEPS TAKEN TO PROMOTE THE PRODUCTION AND AVAILABILITY OF CRITICAL MINERALS IN THE COUNTRY:

» The Ministry of Mines have created a **joint venture company** - **Khanij Bidesh India Ltd (KABIL)** with the equity contribution from three Central Sector Enterprises namely, National Aluminium Company Ltd, Hindustan Copper Ltd, and Mineral Exploration and Consultancy Ltd with the objective to ensure consistent supply of critical and strategic minerals to Indian domestic market.
  - KABIL is also mandated to **identify and acquire overseas mineral assets of critical and strategic nature**, such as Lithium, Cobalt etc.
  - It has already initiated engagement with **several state-owned organizations of the shortlisted source countries**, through Ministry of External Affairs and the Indian Embassies in Countries like Argentina and Australia to acquire mineral assets overseas primarily the critical and strategic minerals.

» **The 2023 Amendment to MMDR Act, 1957** has also streamlined the auctioning process of critical and strategic minerals.

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- 24 Critical and Strategic Minerals have been inserted in part D of the **Schedule-1 of the MMDR Act, 1957**.
- **Central government** has been empowered to auction the critical and strategic mineral blocks.

» **Ministry of Mines** under its '**Science and Technology Program'** provides **grants** for **Promotion and Research and Innovation in Start-Ups and MSMEs** in Mining, Minerals Processing, Metallurgy and Recycling Sector (S&T-PRISM).
- One of the thrust areas of S&T-PRISM includes focus on extraction of strategic and critical minerals and elemental level.

» The Ministry is also actively involved in **Mineral Security Partnership (MSP)** and other multilateral/bilateral partnerships with various countries to secure the critical mineral demand of India.

A) MINERAL SECURITY PARTNERSHIP

- **The MSP is a collaboration of 14 countries** and the **EU** to **catalyze public and private investments in responsible critical minerals supply chains globally**.
  - » It aims to accelerate the development of critical energy sector in a diverse and sustainable manner. It will be working with host government and industry to facilitate targeted financial and diplomatic support for strategic projects along the value chain.
  - » It seeks to ensure that critical minerals are produced, processed, and recycled by catalysing investments from governments and private sector across the full value chain.
  - » **Members**: **India** became the 14th member in June 2014. Other members include USA, Canada, UK, France, Germany, Italy, Norway, Sweden, Finland, Estonia, Japan, Republic of Korea, Australia, and the European Union (represented by European Commission).

B) SUPPLY CHAIN RESILIENCE INITIATIVE

- It was unveiled by India, Japan and Australia in 2021 to strengthen economic ties and to reduce dependency on countries like China for critical imports. It is aimed at addressing vulnerabilities in the global supply chain which were exposed by the COVID-19.

- **Goals**:
  - » Build a more resilient, stable, and inclusive supply chain network in the Indo-Pacific region.
  - » Promoting diversification of trade and investment among the three countries
  - » Use technology (especially digital technology) to enhance the supply chain efficiency.

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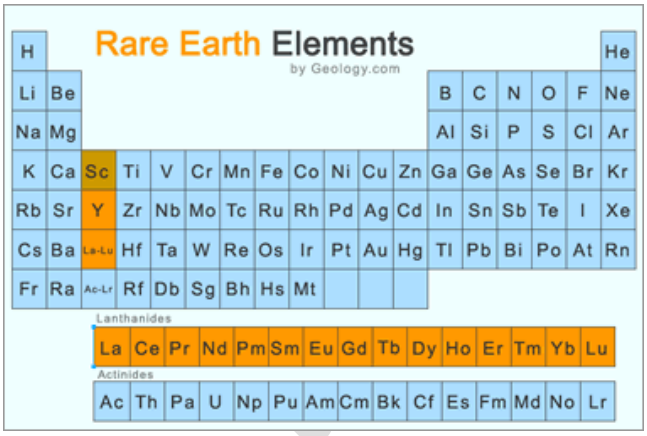
3) RARE EARTH METALS

- Rare earth elements are a **group of 17 chemical elements that occur together in the periodic table** (see image)

- The group consists of **Yttrium (39)** and **15 Lanthanide (57-71)** elements
  - » Lanthanide elements include.
    - Lanthanium, Cerium, Praseodymium, Neodymium, Promethium, Samarium, **Europium**, Gadolinium, Terbium, Dysprosium, holmium, Erbium, Thulium, Ytterbium, and Lutetium.
  - » **Scandium** is found in most rare earth element deposits and is sometimes classified as rare earth element. International Union of Pure and Applied Chemistry **(IUPAC)** includes scandium in their rare earth element definition.



- They are all metals and have many similar properties which often cause them to be found together in geological deposits.

- **Uses of Rare Earth Metals, why the demand has increased in last few decades, why is it expected to increase further?**
  - » They are used in **electronic devices** (e.g. computer memory, DVDs, rechargeable batteries, cell phones, catalytic converters, magnets, fluorescent lightings etc.)
    - Explosion in demand in last 30 years => Telecommunication revolution.
    - E.g. **Neodymium** is a critical component of permanent magnets and has the ability to carry material 1,300 times its own weight.
    - E.g. **Europium** is necessary for **LED bulbs** and **Color television screens**.
    - E.g. **Samarium is used in optical lasers**.
  - » **Batteries of electric and hybrid electric batteries**.
    - Concern for climate change, energy independence => will further increase the demand
  - » Rare earths are also used as **Catalysts, Phosphors,** and **Polishing compounds.**
    - These are used for air pollution control, illuminated screens on electronic devices, and the polishing of optical quality glass.
      - All these products are expected to rise in demands.
  - » **Emerging Medical Technologies:** Several rare earth metals are used in these.
  - » **Critical Defense uses.**
    - Rare earth metals are key ingredients for **making the very hard alloys used in armored vehicles and projectile**s.
    - **Defense Electronic**

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        - Night vision goggles, precision guided weapons, communication equipment, GPS equipment, batteries and other defense electronics.
        - Substitutes are not as effective and diminishes the superiority of military

    - So, it is clear that Sunrise technologies currently being developed are rare earth intensive.

- **Rare???**
    - Despite being named rare, the metals are plentiful in earth's crust. However, these metals are **very difficult to mine** because it is unusual to find them in concentrations high enough for economic extraction. Because of geochemical properties these metals are typically dispersed.

- **Production and Trade**
    - **Before 1965 -** very little demand; supply from **placer deposits in India and Brazil;** in 1950s South Africa leading supplier, US also producing.
    - **First Explosion of Demand - Color television** - Europium essential element to produce color.
        - **US became leading producer** from Mountain pass mine California.
    - **China -** began to produce notable amount in 1980s and became leading producer in 1990s and early 2000s.
        - **Why was China able to become world leader in Rare Earth Metals?**
            - Long term view and consistent support from government
            - Mineral Availability
            - Weak Environmental laws
            - Cheap Production -> Closure of mines in other parts of the world
            - Huge Demands in China as China is the world leader in consumer electronics.

    - **Until a few years ago**, China controlled 90% of the supply of rare earths. The danger of this fact was illustrated most starkly in 2010 and 2011, when China imposed extreme export restrictions. The entire world was left scurrying to fend for Rare Earth Supplies. It led to more than 700% jump in global prices, crippling downstream industries dependent on rare earths worldwide.

    - Now, after aggressive production by the US, Australia and Canada, **China's share is down to 60%**. But still, China's control over global market remains a pain point for all involved.

    - Further, COVID-19 disruptions and tensions with China have demonstrated major supply side insecurities which India may face.

    - A group of Western countries are cooperating to develop alternatives to China through '**China plus one'** strategy.

- **India and Rare Earth Metals:**
    - India's rapidly growing economy currently has **two massive input deficiencies** which threaten its stability - Oil, and rare earths. India is almost 100% import dependent for most rare earths.
    - Interestingly though, India **has great potential for domestic production** as it possesses 4th highest reserves of rare earths in the world (after China, Russia and Vietnam).

- **Why India produces very small quantity of REMs**
    a. In India, they are **classified as atomic minerals**. Why?

- Because some of these elements **occur in the earth's surface along with thorium and uranium** which are radioactive minerals. Thorium is prevalent in the same beach sands where other rare earth minerals also occur.
- Thus, mining for rare earth in India is **reserved for government companies** of which there are only two in India: **Indian Rare Earths Ltd (IREL)** (owned by GoI) and **Kerala Minerals and Metals Ltd** (owned by Kerala Government). And their production capacities and technologies are limited which is why India is import dependent.
- **Beach sand mining was banned in 2016** in an attempt to conserve strategic minerals including rare earth and thorium.

b. **Expertise mismatch**: Present **policies separate the rare earth ecosystem from other R&D ecosystems like electronics and metallurgy**.
c. **Incentive Mismatch**: For IREL, most of the income come from the production and marketing of other minerals contained in beach sands - ilmenite, sillimanite, and zircon. With access to beach sand with easily recoverable other minerals, IREL has little incentive to refocus on globally competitive rare earth extracting and processing.
d. **Fragmented, siloed, and severely inefficient research system**
e. **Lack of proper linkages between miners and manufacturers**
f. **License-Permit Raj**: Even after 1991 Economic reforms, some sectors like agriculture and mining continue to be highly regulated.
    - For e.g. in 2019, the central government amended the atomic Minerals Concessions rules, 2016, whereby threshold values for a range of minerals were drastically reduced. This decision effectively nationalized beach sand and forced several private players out.

7. NEXT BOOKLET

1) **TEXTILE SECTOR**
2) **ELECTRONICS SECTOR/ SEMICONDUCTOR SECTOR**
3) **E-VEHICLE SECTOR**
4) **MSME SECTOR**
5) **VARIOUS SCHEMES LIKE PLI SCHEME**
6) **SERVICE SECTOR**

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