



Despite Having Extensive Uses Across Various Industries, India is Not Realizing its Potential of Rare Earth Industry. Examine. (250 Words / 15 M) (GS-1 Natural Resources)

Approach:

1. Introduction on Rare Earth Minerals.
2. Briefly state the properties & uses of Rare earth minerals.
3. Highlight the major problems in REE exploration in India.
4. Conclusion & Way forward.

The rare earth elements (REEs) are a set of **17 metallic elements** in the periodic table. They are found in **relative abundance** in the Earth's crust. However, unlike other metals they **do not always occur in a concentrated area**, which makes them **harder and more expensive** – often **uneconomical** – to explore. But their properties make their use a necessity.

Currently, **China** controls **more than 60% of the global production** on REEs. **India too possess significant reserves of REEs**, much less than China but significantly **more than the US and Australia** – the big producers. There is a strong strategic and economic case for India to focus on this sector.

Properties & Uses of REEs: Many REEs are **lightweight**, some **luminous**, some have **higher strength especially when combined with metals**, while others have **superior conductivity**. They find use in **almost every electronic device**. In manufacturing, they are used in **automobile catalytic converters, high-strength magnets and metal alloys**. They also have **medical applications** in **magnetic resonance imaging (MRI)** and **cancer drugs**. It is also useful in **future energy transition** technologies – in wind turbines, **electric vehicles** & its batteries, etc. They can be used **in currency notes** to **prevent counterfeiting**. All these make them highly **strategic**.

Problems plaguing India's REE sector:

- In India, **only the government can explore and mine** the REEs. The only Central government PSU that mines REEs is **IREL (India) Ltd.**, under the administrative control of **Department of Atomic Energy**. The other PSU that mines REEs is the **Kerala Minerals and Metals Ltd**. With an estimated reserves at **6,900 kt**, in **2019-2021** only **9 kilotonnes** were mined. In comparison, **Australia** with reserves of **4000 kt** produces around **22 kt/year** and **US** with **1800 kt reserves** produces **170 kt/year**. Thus, given its reserves, India must make its presence felt.
- At the upstream level, extraction of minerals occur. In the midstream, they are converted into metals. Finally in downstream, manufacture of components take place. Currently, **India's capability is only upstream**, and that **too partial**. To use REEs in various applications, a **purity of 99.99%** is required. India's two producers achieve **only 96% purity**, following which **REEs are exported with the country further purifying elements**. Therefore, effectively, **India is fully import-dependent for REEs in any**



usable form. This can be a serious problem, given India's rising demand – with electronics manufacturing, EVs and renewable energy, demand may escalate to **28 kt/year by 2030** – creating **demand-supply mismatch**.

- Globally, the demand-supply situation is now balanced. But **demand is expected to grow much faster than supply**, thereby **pushing up the prices**. This can put pressure on countries like India that need to **import REEs** for all their requirements.

Conclusion & Way forward: Given its significance and India's underperformance in this sector, the government should consider **deregulating the REE mining**, ending the public sector monopoly on production & exploration. **IREL** needs to come **under the control of Ministry of Mines** so that it can **diversify its focus from just atomic minerals**. If need be, it can even be **divested**, with GOI as the majority stakeholder. The **key lies in exploration**. Globally, this task is performed by exploration companies that take on the risk of failure with the possibility of monetizing any discovery. However, this is **not allowed in the Mines and Minerals (Development & Regulation) Act**. Hence, besides **developing the entire value chain, suitable amendments need to be brought in the MMDR Act**. With the right policies, India can become a hub for production of REEs.

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