

3. India's First Integrated REPM Scheme – Economy

The Union Cabinet chaired by Prime Minister Narendra Modi has approved the “Scheme to Promote Manufacturing of Sintered Rare Earth Permanent Magnets” with a financial outlay of ₹7,280 crore

Introduction to the Scheme

First-of-its-kind Strategic Industrial Initiative – The Government of India has launched a groundbreaking initiative to establish 6,000 Metric Tons per Annum (MTPA) of integrated Rare Earth Permanent Magnet (REPM) manufacturing capacity in the country. This marks India's first large-scale, end-to-end ecosystem for rare earth oxides → metals → alloys → finished magnets.

Types of Magnets Included – The scheme supports production of globally important REPMs such as – Neodymium-Iron-Boron (NdFeB) magnets, Samarium Cobalt (SmCo) magnets. These magnets exhibit exceptionally high magnetic strength, vital for advanced technologies.

Beneficiary Allocation – Capacity will be distributed among five selected global bidders, each receiving up to 1,200 MTPA, ensuring competition, technology transfer, and capacity diversification.

Project Tenure – Total Duration – 7 years

1. 2 years – Gestation period (building infrastructure & technology acquisition)
2. 5 years – Incentive disbursement (performance-linked support)

Why India Needs This Scheme

Rapidly Growing Domestic Demand – India's demand for REPMs is rising sharply due to expansions in –

1. Electric Vehicles (EVs)
2. Renewable energy (wind turbines)
3. Consumer electronics & smartphones
4. Aerospace and defence systems
5. Robotics, semiconductors, and industrial motors

Demand expected to double by 2030, driven by green mobility and digitalisation.

Near-Total Import Dependence – India currently imports almost 100% of its annual requirement (~900 tonnes). Global supply shocks (2021–22) triggered 200–300% price spikes, exposing the vulnerability of Indian industries.

Strategic Autonomy & Critical Materials – REPMs are classified as Critical Raw Materials worldwide.

Securing domestic production supports –

1. Atmanirbhar Bharat
2. National Security Strategy
3. Net Zero 2070 commitments
4. Viksit Bharat @2047 roadmap

Dependence on external suppliers—especially China—poses supply chain and strategic risks.

India's Geological Advantage. India holds the 5th-largest rare earth reserves globally (~6.9 million tonnes). Major reserves occur in –

1. Andhra Pradesh
2. Odisha
3. Kerala
4. Jharkhand
5. Rajasthan

Yet, mining-to-magnet value chain remains underdeveloped.

Challenges to Domestic REPM Manufacturing

High Technological Entry Barriers – Production of NdFeB & SmCo magnets requires –

1. Ultra-high vacuum sintering technology
2. Cryogenic milling systems
3. High-purity rare earth reduction
4. Precision alloying and grain boundary engineering

India lacks specialised metallurgists trained in rare earth technologies.

China's Global Dominance – China controls –

1. 60–65% of rare earth mining
2. 85–90% of rare earth magnet production

China's scale, subsidies, and vertical integration make it hard for new players to compete.

Capital-Intensive Manufacturing – Integrated REPM plants require –

1. High-temperature furnaces
2. Purification and separation units
3. Powder metallurgy and coating lines

Upfront investment is extremely high, limiting private sector participation.

Environmental & Regulatory Hurdles – Rare earth processing produces –

1. Radioactive thorium by-products
2. Heavy metal-laden wastewater

Large volumes of process residues. Strict environmental clearances and waste management systems are mandatory.

Steps Taken by India to Overcome These Challenges

National Critical Mineral Mission (NCMM) – 2025 – India's umbrella mission for securing critical mineral supply chains. Geological Survey of India (GSI) tasked with – 1,200 mineral exploration projects (2024–2031) Mapping rare earth, lithium, cobalt, and other essential minerals.

Strengthening Domestic Production Capacity – IREL (India) Ltd, under the Department of Atomic Energy, is upgrading rare earth separation & processing facilities. DAE labs are developing –

1. Rare earth metal reduction tech
2. Alloying technologies
3. Magnet powder processing systems

International Partnerships – India has signed MoUs with –

1. Australia (critical minerals cooperation)
2. United States (supply chain resilience)
3. Japan and EU nations (technology sharing, investment)

Joined the Minerals Security Partnership (MSP) in 2023 to ensure access to non-Chinese mineral supply chains.

Demand-Side Push from Government Schemes – Production Linked Incentive (PLI) schemes covering –

1. Solar PV modules
2. Electronics manufacturing
3. Drones
4. Electric vehicle components

EV transition alone may require 15,000–20,000 tonnes of REPMs annually by 2047.

Innovation & R&D Ecosystem – BARC, ARCI, IITs developing –

1. Next-generation high-performance magnets
2. Recyclable magnets (urban mining)
3. Waste-free extraction techniques

Focus on reducing environmental footprint of rare earth processing.

Overall Significance of the REPM Manufacturing Initiative

Reducing Strategic Import Dependence – Ensures sovereign supply chains for magnets essential to defence, space, and electronics.

Promoting Atmanirbhar Bharat – Strengthens India's industrial base and high-technology capabilities. Encourages domestic value addition instead of exporting raw minerals.

Supporting Green Transformation – Essential for –

1. Renewable energy transition
2. EV adoption
3. Decarbonisation goals under Net Zero 2070

Economic & Industrial Benefits – Boosts high-tech manufacturing, generates skilled employment, Encourages foreign direct investment and technology transfer

Strengthening National Security – REPMs are vital for missiles, radars, aerospace systems, naval propulsion, and satellite technologies.

Conclusion

This REPM manufacturing initiative represents a historic step in transforming India into a global leader in rare earth-based advanced manufacturing. By building a fully integrated supply chain—from mining to magnets—India can reduce its dependence on external suppliers, enhance technological sovereignty, support green energy and EV adoption, and strengthen its defence capabilities. It aligns strongly with – Atmanirbhar Bharat, Net Zero 2070, MSP partnerships, Viksit Bharat @2047 India is positioning itself to become a sustainable, competitive, and globally significant player in the rare earth ecosystem.

Source – <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2194684®=3&lang=2>