

Scheme to Promote Manufacturing of Sintered Rare Earth Permanent Magnets

Prelims: Current events of national and international importance

Why in News?

The Union Cabinet recently approved a new “first-of-its-kind” scheme, with a financial outlay of Rs.7,280 crore, to manufacture Rare Earth Permanent Magnets (REPM) in India.

***Sintering** is a manufacturing process that uses high heat and pressure to create the densest and most powerful rare-earth magnets*

- **Aim** - To establish **6,000 metric tonnes per annum (MTPA) of integrated Rare Earth Permanent Magnet (REPM)** manufacturing in India.
- **Beneficiary split-up** - The total capacity of 6,000 MTPA is given to 5 beneficiaries through a global competitive bidding process, with each beneficiary being allotted up to 1,200 MTPA of capacity.
- **Scheme duration** - 7 years from the date of award.
 - 2-year gestation period for setting up an integrated REPM manufacturing facility, and
 - 5 years for incentive disbursement on the sale of REPM.
- **Focus on value chain** - The scheme will support the
 - Creation of integrated REPM manufacturing facilities,
 - Involving the conversion of rare earth oxides to metals,
 - Metals to alloys, and alloys to finished REPMs.
- **Support achieving Net-zero Target** - The scheme will ensure a secure supply chain for national industries and contribute towards achieving the country's Net Zero 2070 targets.
- **Significance** - By strengthening indigenous manufacturing capabilities, it will contribute to reducing carbon emissions and lowering dependence on crude oil imports, further enhancing the nation's energy security.

Rare Earth Permanent Magnets

- Rare-earth permanent magnets are the ***strongest type of permanent magnets*** available, made from alloys of rare-earth elements.
- They produce significantly ***stronger magnetic fields than traditional magnets*** like ceramic or alnico, allowing for the creation of smaller, lighter, and more efficient motors and devices.
- **Types and Composition** - The two main types of rare earth magnets are:
 - **Neodymium (NdFeB) Magnets** - Composed primarily of neodymium, iron, and boron, these are the most common and powerful type of rare earth magnets.
 - They are generally more affordable but are brittle and prone to corrosion, so they are typically coated or plated (e.g., with nickel or zinc) for protection.
 - **Samarium-Cobalt (SmCo) Magnets** - These magnets are made from an alloy of samarium and cobalt.
 - While not as strong as neodymium magnets, they offer superior resistance to high temperatures and corrosion.
- **Key Properties**
- **High Strength** - They have a very high magnetic field strength (remanence) and energy product compared to other magnets.
- **High Coercivity** - They possess a high resistance to being demagnetized by external magnetic fields or everyday handling.
- **Power-to-Weight Ratio** - Their strength-to-size ratio allows for much smaller and lighter magnets for a given application, which is crucial for modern technology.
- **Common Applications**
 - Electric Vehicles (EVs) and Wind Turbines
 - Consumer Electronics
 - Utilized in Magnetic Resonance Imaging (MRI) machines.
 - Employed in magnetic separators, motors for cordless tools, and robotic arms.

Reference

[The Hindu | Rare Earth Permanent Magnets \(REPM\)](#)



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