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Domestic Exploration of Lithium

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Why in News

Recent surveys by the **Atomic Minerals Directorate for Exploration and Research** (AMD) have shown the presence of lithium resources in Mandya district, Karnataka.

AMD is the oldest unit of the **Department of Atomic Energy**.

Key Points

- **About Lithium:**
 - **Properties:**
 - It is a chemical element with the symbol **Li**.
 - It is a soft, silvery-white metal.
 - Under standard conditions, it is the **lightest metal** and **the lightest solid element**.
 - It is highly **reactive and flammable**, and must be stored in mineral oil.
 - It is **an alkali metal and a rare metal**.
 - The **alkali metals** consist of the chemical elements **lithium, sodium, potassium, rubidium, caesium, and francium**. Together with hydrogen **they constitute group 1**, which lies in the **s-block** of the periodic table.
 - **Rare Metals** (RM) include Niobium (Nb), Tantalum (Ta), Lithium (Li), Beryllium (Be), Cesium (Cs) etc. and **Rare Earths** (RE) include Lanthanum (La) to Lutetium (Lu) besides Scandium (Sc) and Yttrium (Y).

These **metals are strategic in nature** with wide application in the nuclear and other high tech industries such as electronics, telecommunication, information technology, space, defense etc.
 - **Uses:**
 - Lithium metal is used to make **useful alloys**.

For example, with lead to make '**white metal**' bearings for motor engines, with **aluminium to make aircraft parts**, and with **magnesium to make armour plates**.
 - In Thermonuclear reactions.
 - To make **electrochemical cells**. Lithium is an important component in **Electric Vehicles**, Laptops etc.
- **Lithium Resources in Karnataka:**

The survey shows presence of **1,600 tonnes of lithium resources** in the **igneous rocks** of the **Marlagalla-Allapatna** region of **Karnataka's Mandya district**.
- **Benefits of Domestic Exploration:**
 - **Reducing Import Bill:**

India currently imports all its lithium needs. Over 165 crore lithium batteries are estimated to have been imported into India between 2016-17 and 2019-20, at an estimated import bill of upwards of **USD 3.3 billion**.
 - **Reducing Overdependence on China:**

China is a major source of **lithium-ion energy storage products** being imported into the country.

- **Issues Associated with Domestic Exploration:**

- The new find is categorised as “**inferred**”.

The ‘**inferred**’ mineral resource is the part of a resource for which **quantity, grade and mineral content** are estimated only with a **low level of confidence** based on information gathered from locations such as **outcrops, trenches, pits, workings, and drill holes** that may be of limited or uncertain quality, and also of lower reliability.

- The lithium find is **comparatively small**, considering the size of the proven reserves in **Bolivia, Argentina, Australia, and China respectively**.
- India is seen as a **late mover in attempts to enter the lithium value chain**, coming at a time when **Electric Vehicles** are predicted to be a **sector ripe for disruption**.

2021 is likely to be a turning point for battery technology with several **potential improvements to the li-ion technology**, and alternatives to this tried-and-tested formulation in **advanced stages of commercialisation**.

- **Extraction Method:**

Lithium can be extracted in different ways, depending on the type of the deposit .

- **Solar evaporation** of large **brine pools**.

- A **brine pool** is a volume of brine collected in a seafloor depression.
- For example: Brines of **Sambhar and Pachpadra** in Rajasthan.

- **Hard-rock extraction of the ore** (a metal-bearing mineral).

For example: **rock mining at Mandya**.

- **Other Potential Sites:**

- The major **mica belts** in **Rajasthan, Bihar, and Andhra Pradesh**.
- **Pegmatite** (igneous rocks) belts in **Odisha and Chhattisgarh**.
- Brines of **Sambhar and Pachpadra** in Rajasthan, and **Rann of Kachchh** in Gujarat.

- **Other Government Initiative:**

India, through a newly state-owned company **Khanij Bidesh India Ltd**, had **signed an agreement with an Argentinian firm** to jointly prospect lithium in Argentina that has the **third largest reserves of the metal in the world**.

The company has a specific mandate **to acquire strategic mineral assets such as lithium and cobalt abroad**.

Source:IE