



## GSI Discovers Lithium Resources in J&K

**Prelims:** Geological Survey of India, Lithium reserves and its importance

**Mains:** Mineral & Energy Resources

### Why in News?

The [Geological Survey of India](#) has for the first-time established [Lithium](#) 'inferred' resources(G3) of 5.9 million tonnes in **Salal-Haimana area of the UT of Jammu & Kashmir**.

### What are Inferred Resources?

- The “inferred” mineral resource is a resource for which **quantity, grade and mineral content are estimated only with a low level of confidence.**
- It is 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 from geological evidence.
- It is based on the classification from **United Nations International Framework Classification for Reserves/Resources - Solid Fuels and Mineral Commodities of 1997 (UNFC-1997).**

### What is UNFC-1997?

- **UNFC-1997** is a system for the classification and reporting of reserves and resources of solid fuels and mineral commodities and provides a standardized, internationally recognized system for the reporting of reserves and resources.
  - It has been developed by **the UN Economic Commission for Europe.**
- It **promotes transparency and consistency in the reporting** of mineral and energy assets and ensures that geological, engineering, and economic information is used consistently.
  - It provides a **basis for comparing reserves and resources data** between countries and regions which is widely used by governments, industry, and financial institutions around the world.
- According to UNFC-1997, there are four stages of exploration for any mineral deposit:
  - **Reconnaissance (G4)**
  - **Preliminary exploration (G3)**
  - **General Exploration (G2)**
  - **Detailed Exploration (G1)**

### What is Lithium?

- **About:**
  - Lithium (Li), sometimes also referred as '**White gold**' due to its high demand for

rechargeable batteries, is a soft and silvery-white metal.

- **Extraction:**
  - Lithium can be extracted in different ways, depending on the type of the deposit — generally either through **solar evaporation of large brine pools**, or from **hard-rock extraction of the ore**.
- **Uses:**
  - Lithium is an important component of **electrochemical cells** used in batteries of EVs, Laptops, Mobiles etc.
  - It is also used in **thermonuclear reactions**.
  - **It is used to make alloys** with aluminium and magnesium, improving their strength and making them lighter.
    - **Magnesium-lithium alloy** - for **armour plating**.
    - **Aluminum-lithium alloys** - in **aircraft, bicycle frames and high-speed trains**.
- **Major Global Lithium Reserves:**
  - Chile > Australia > Argentina are top countries with Li reserves.
  - **Lithium Triangle: Chile, Argentina, Bolivia.**
- **Lithium Reserves in India:**
  - Preliminary survey showed estimated lithium reserves of 14,100 tonnes in a small patch of land surveyed in **Southern Karnataka's Mandya district**.
  - Other **potential sites:**
    - Mica belts in **Rajasthan, Bihar, Andhra Pradesh**.
    - Pegmatite belts in **Odisha and Chhattisgarh**.
    - **Rann of Kutch** in Gujrat.

## How India Currently Fulfills its Lithium Demand?

- India is currently **dependent on imports for lithium cells** and batteries. **Over 165 crore lithium batteries** are estimated to have been **imported into India between FY17 and FY20** at an estimated import bill of upwards of \$3.3 billion.
- The country's efforts to secure lithium sourcing agreements are seen as a move against imports from China, which is the major source of both raw materials and cells.
- India is perceived as a **late entrant into the lithium value chain**, entering at a time when the EV sector is expected to undergo significant disruption.
- **2023 is considered a turning point for battery technology**, with the potential for several improvements to the Li-ion technology.

## What is the Significance of Discovery?

- **Assistance in Achieving Targets:**
  - India has pledged to reduce its emissions towards **net zero by 2070**, which requires the availability of lithium as a critical component in electric vehicle (EV) batteries.
  - The **Central Electricity Authority of India** has **estimated that the country will need 27 GW of grid-scale battery energy storage systems by 2030**, which will require massive amounts of lithium.
- Addressing Global Shortages:
  - The **World Economic Forum (WEF)** has **warned of global lithium shortages** due to rising demand for EVs and rechargeable batteries, which is estimated to reach 2 billion by 2050.
  - The world's supply of lithium is under strain due to the **concentration of resources in a few locations** with 54% of the world's Lithium reserves are found in **Argentina, Bolivia and Chile**.
  - The **International Energy Agency (IEA)** **predicts** that the world could face **lithium shortages by 2025**.

## What is Geological Survey of India?

- Presently, GSI is an attached office to the **Ministry of Mines**. It was **set up in 1851 primarily to find coal deposits for the Railways**.

- Over the years, it has grown into a **repository of geo-science information** and also has attained the **status of a geo-scientific organization** of international repute.
- It is headquartered in **Kolkata** and has **six regional offices** located at Lucknow, Jaipur, Nagpur, Hyderabad, Shillong and Kolkata. Every state has a state unit.
- **Central Geological Programming Board (CGPB)** is an important platform of the Geological Survey of India (GSI) to facilitate discussion for synergy and to avoid duplication of work.

### UPSC Civil Services Examination, Previous Year Question (PYQ)

**Q. Which one of the following pairs of metals constitutes the lightest metal and the heaviest metal, respectively? (2008)**

- (a) Lithium and mercury
- (b) Lithium and osmium
- (c) Aluminium and osmium
- (d) Aluminium and mercury

**Ans: (b)**

**Exp:**

- Light metals are metals of low atomic weight while heavier elements generally have high atomic weight.
- Osmium is a hard metallic element which has the greatest density of all known elements. Osmium has an atomic weight of 190.2 u and its atomic number is 76.
- Lithium having an atomic number 3 and atomic weight of 6.941u is the lightest known metal.
- **Therefore, option (b) is the correct answer.**

**Source:IE**

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