

**15– 02 – 2023**

**News: Lithium discovery in Jammu and Kashmir**

- Recently, 5.9 million tonnes of inferred Lithium reserves were found in the Salal –Haimana area of Reasi district, Jammu & Kashmir, by the Geological Survey of India.
- The term ‘inferred’ refers to the ‘preliminary exploration stage’, the second of a four step process, according to the Mines and Minerals (Development and Exploration) Act 1957.

**Significance of the discovery**

- Lithium – ion batteries are used in wind turbines, solar panels, and electric vehicles, all of which are crucial in a green economy.
- A World Bank study suggests that the demand for critical metals such as lithium (Li) and cobalt is expected to rise by nearly 500% by 2050.
- While “the global electric vehicle market is projected to reach \$823.75 billion by 2030, registering a compounded annual growth rate (CAGR) of 18.2% from 2021 to 2030”.

- India's market is projected to register a CAGR of 23.76% by 2028. India is seeking to secure its critical mineral supplies and build self sufficiency in this sector.
- As India currently imports all of its Li from Australia and Argentina and 70% of its Li ion cell requirement from China and Hong Kong, the lithium reserves in J&K could boost the domestic battery manufacturing industry.
- If the perceived size of the mineral reserves in J&K is borne out by further exploration, India could jump ahead of China vis à vis its Li stockpile.
- The J&K reserves will also help advance the Indian government's ambitious plan of "30% EV penetration in private cars, 70% for commercial vehicles, and 80% for two and three wheelers by 2030 for the automobile industry."
- They will strengthen India's National Mission on Transformative Mobility and Battery Storage as well.

### **Environmental effects**

- The applications of Li in renewable energy infrastructure often obscure its significant environmental consequences.
- Extracting Li from hard rock mines, similar to what has already been proposed in J&K, entails open pit mining followed by roasting the ore using fossil fuels.

- Industry estimates suggest that this process consumes 170 cubic metres of water and releases 15 tonnes of CO<sub>2</sub> for every tonne of Li extracted.
- Open pit mining, refining, and waste disposal from these processes substantially degrade the environment, including depleting and contaminating waterways and groundwater, diminishing biodiversity, and releasing considerable air pollution.
- This said, the geological context of mining in J&K differs from Australia, which has the largest Li stock in hard rock mines, in one major way.
- In Australia, Li bearing pegmatite deposits are found in the ancient geological regions of Pilbara and Yilgarn cratons, whose continental rocks have been stable for over a billion years.
- The Himalaya on the other hand is the youngest mountain range in the world and is much more unstable (as evidenced by the ongoing tragedy in Joshimath). Incidents of land sinking have also been reported from a village in Doda district in Chenab valley, which extends to some parts of Reasi.
- In the densely populated context of India, the socio – environmental effects of mining are likely to be far worse than they have been in Australia and likely comparable to lithium extraction in South America.

## Lithium

- Lithium 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**.
- **Australia tops the production of Lithium** with 42000 tonnes followed by Chila, China and Argentina.
- **Lithium Triangle (Argentina, Bolivia and Chile) countries has 54% of the Lithium reserves** in the world.
- Chile individually holds the largest reserves of Lithium followed by Australia and Argentina.
- Recently, High-grade Lithium has been **discovered in Nigeria**.

### **Uses of Lithium**

- 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 in India

- India currently imports all its lithium needs.
- Recent surveys by the Atomic Minerals Directorate for Exploration and Research (AMD) have shown the presence of lithium resources in Mandya district, 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.
- Recently, 5.9 million tonnes of inferred Lithium reserves were found in the Salal –Haimana area of Reasi district, Jammu & Kashmir, by the Geological Survey of India.

## Lithium in Stars

- Recently, Scientists have found a clue to the mystery behind the high abundance of Lithium in some evolved stars.
- The mystery is the reason behind the high abundance of Lithium in stars, which according to predicted models must get destroyed in the hot plasma of the star.
- The research involved the investigation of lithium among red giants showed that just about 1% of sun-like red giants had a lithium-enriched surface.
- The research surveyed GALAH, a collection of about 500,000 stars named after a common Australian bird with well-determined physical and chemical properties, including lithium abundances.
- Regarding the reason for Lithium production, scientists have for the first time confirmed that all the lithium-rich stars are burning helium in their core.
- They speculated that lithium production is linked to the violent helium-core flash.
-