

## All about Lithium Reserves

### Why in news?

**The Union Ministry of Mines has announced that lithium reserves had been found in Jammu and Kashmir, a first in the country.**

### Why is lithium so important?

*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.*

- Lithium is a key element for new technologies and finds its use in ceramics, glass, telecommunication and aerospace industries.
- It is used in [Lithium ion batteries](#), lubricating grease, high energy additive to rocket propellants, and optical modulators for mobile phones.
- Lithium is used in electric car batteries because of its lightness and energy density.
- It is also used as a convertor to tritium used as a raw material for thermonuclear reactions i.e. fusion.
- The thermonuclear application makes Lithium as **“Prescribed substance” under the Atomic Energy Act, 1962.**
- The process of lithium extraction is time-and infrastructure-intensive.

# LITHIUM

01

Third element in the periodic table

03

Lightest and the least dense metal

02

Grey, shiny, non-ferrous alkali metal

04

Dubbed as 'White Gold'

05

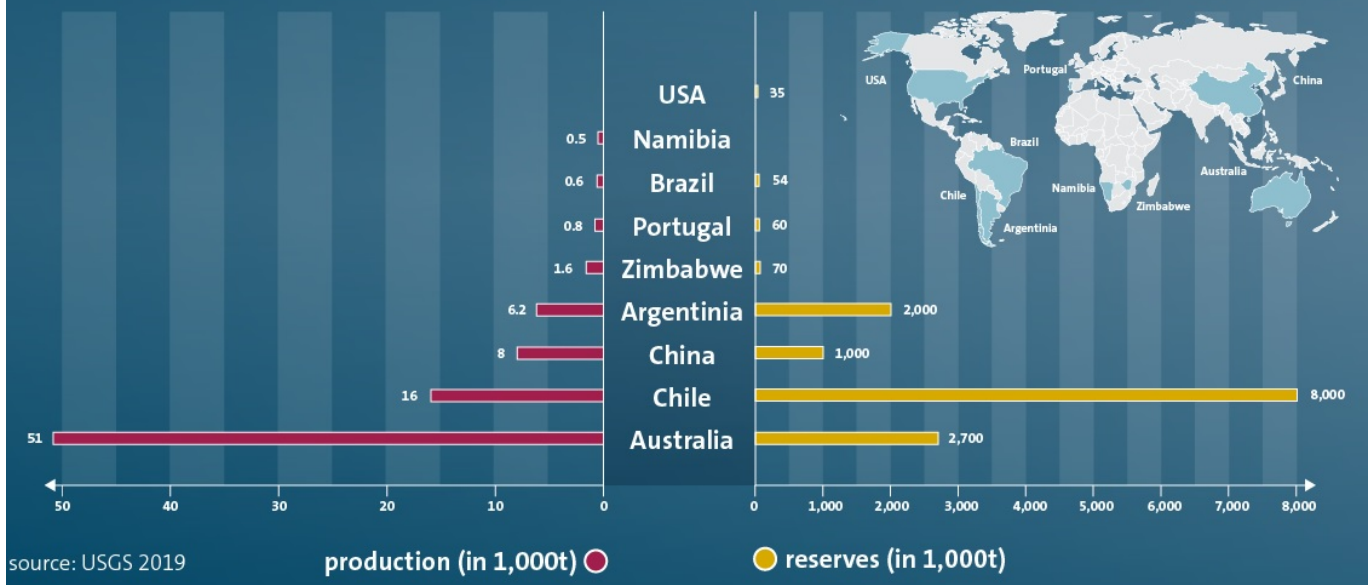
Highly reactive

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## Where are the world's lithium reserves?

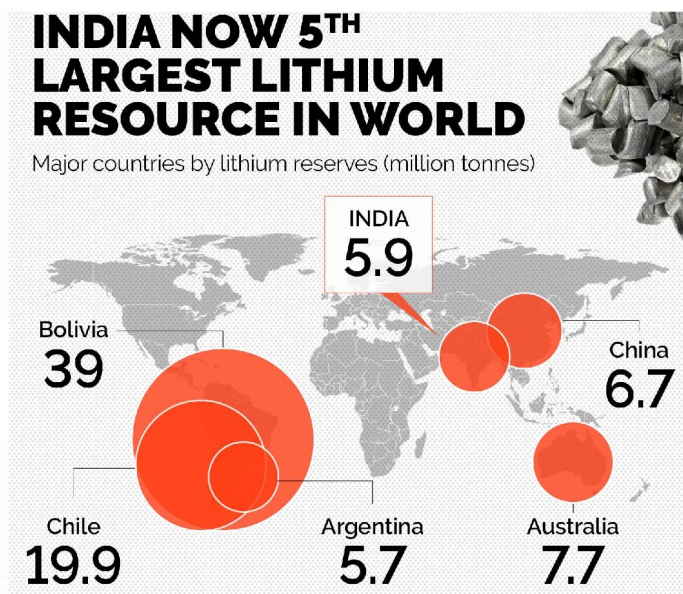
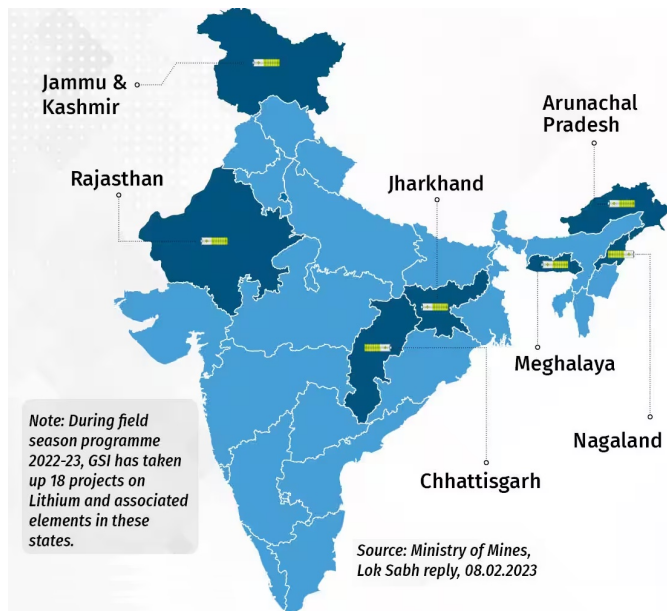
- **Sources** - Lithium is currently extracted from two main sources
  - Hard rock mines
  - As brine from salt flats and lake
- **Reserves** - According to the U.S. Geological Survey, at the start of 2022,
  - Identified lithium resources worldwide - 89 million tonnes
  - Mineable parts of the resources - 22 million tonnes
- In terms of reserves, **Chile**, Australia and Argentina top the chart.
- **Production** - In 2021, almost 90% of lithium mining happened in Chile, China, and Australia, with **Australia leading production**.

## Countries with major Lithium production and reserves



### What is the status of Lithium in India?

- Currently India is **fully import-dependent** when it comes to lithium.
- In 2021-22, **Hong Kong**, China and the US were the top three sources of India's lithium imports.
- According to the Ministry of Mines, the Geological Survey of India (GSI) has carried out 19 projects in the last five years on lithium and associated elements.
- The GSI has currently inferred that the deposits in Kashmir could hold around 5.9 million tonnes of lithium in the Salal-Haimana area of Reasi District in Jammu and Kashmir.
- This is the G3 level of surveying.
- As per the United Nations Framework Classification (UNFC),
  - **G4** - Basic, reconnaissance survey
  - **G3** - Preliminary exploration
  - **G2** - General exploration
  - **G1** - When quantities associated with a known deposit can be estimated with a high level of confidence



### Why is the discovery so significant?

- **Domestic battery manufacturing** - The lithium reserves in J&K could boost the domestic battery-manufacturing industry.
- **Improvement in rank** - If the perceived size of the mineral reserves in J&K is borne out by further exploration, India could jump ahead of China in its Li stockpile.
- **EV penetration** - 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.

*To reduce dependence on China, the Indian government is pushing for a 'Rare Earths Mission' to exploit the country's critical mineral reserves, which account for 6% of the world's [rare-earths' reserves](#).*

### What are the challenges associated with it?

- **Further exploration** - The GSI would have to conduct further exploration to determine if there are mineable reserves in the estimated resources in Jammu and Kashmir.
- Details about the accessibility and purity of the inferred resources would be of material importance.
- **Lack of technology** - At present, India also does not have lithium extraction technologies.
- **Geostrategic location** - J&K has been the site of historical cross-border tensions between India and Pakistan, domestic insurgency, and terrorism.
- **Environmental issues** - Extracting Li from hard rock mines entails open-pit-mining followed by roasting the ore using fossil fuels.
- The water consumption and CO<sub>2</sub> release during this process is enormous.
- These processes deplete and contaminate waterways and groundwater, diminishes

biodiversity, and causes air pollution.

- The Himalaya on the other hand is the youngest mountain range in the world and is much more unstable where incidents of land sinking have been reported from a village in Doda district in Chenab valley.

### What can we learn from South America?

- The '**lithium triangle**' of Bolivia, Chile, and Argentina contain roughly half the world's known Lithium.
- In Bolivia and Chile, Li extraction has been either in the hands of the state or requires mining companies to enter into a contract with state-owned companies.
- In 2022, Chilean regulators approved an updated compliance plan, in which Li miner proposed to work with both the regulator and local communities to address environmental infractions.
- In 2022, Mexican lawmakers introduced reforms to create a state-owned entity to extract, process and sell Li and outlaw all direct private investment and production in the Li sector.

### What safeguards does India's mining sector have?

- **Involvement of local communities** - State government officials in J&K have said plans for Li exploration will involve local communities, who will be prioritised for jobs in exploration and mine development.
- **DMF** - In 2015, Lok Sabha amended the Mines and Minerals (Development and Regulation) Act 1957 to establish the '**District Mineral Foundation**' (**DMF**).
- It is a non-profit statutory trust for every Indian district affected by mining-related operations that should work for the interest and benefit of persons, and areas affected by mining-related operations.
- In practice, the DMFs have become sites of centralised bureaucratic control, without meaningful public participation or accountability.

*In 2019, the Nobel Prize in Chemistry was given to John B. Goodenough, M. Stanley Whittingham and Akira Yoshino for their contributions to the development of the lithium-ion battery.*

### References

1. [The Hindu | New findings of Lithium from Jammu and Kashmir](#)
2. [The Hindu | Social and environmental risks in lithium discovery](#)
3. [Moneycontrol | India's maiden lithium find](#)
4. [Volkswagen | Lithium Reserves](#)



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