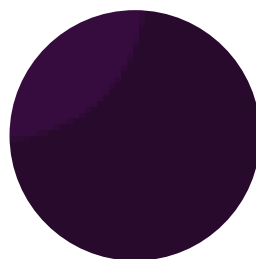
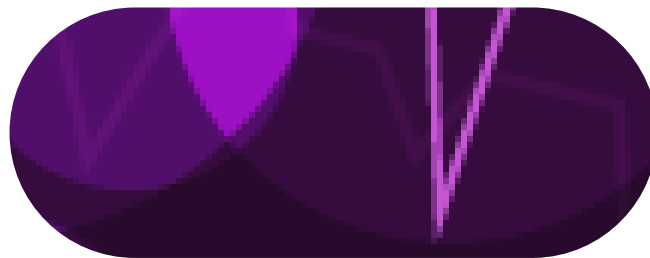
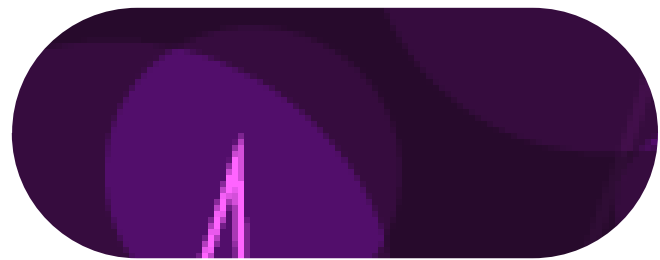
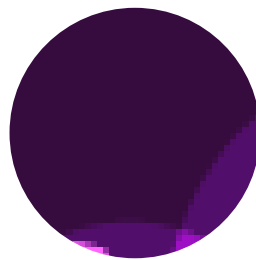


# The EV Revolution: How the Game Has Changed for India

September 2023



## Electric Vehicle: Decoding the Future

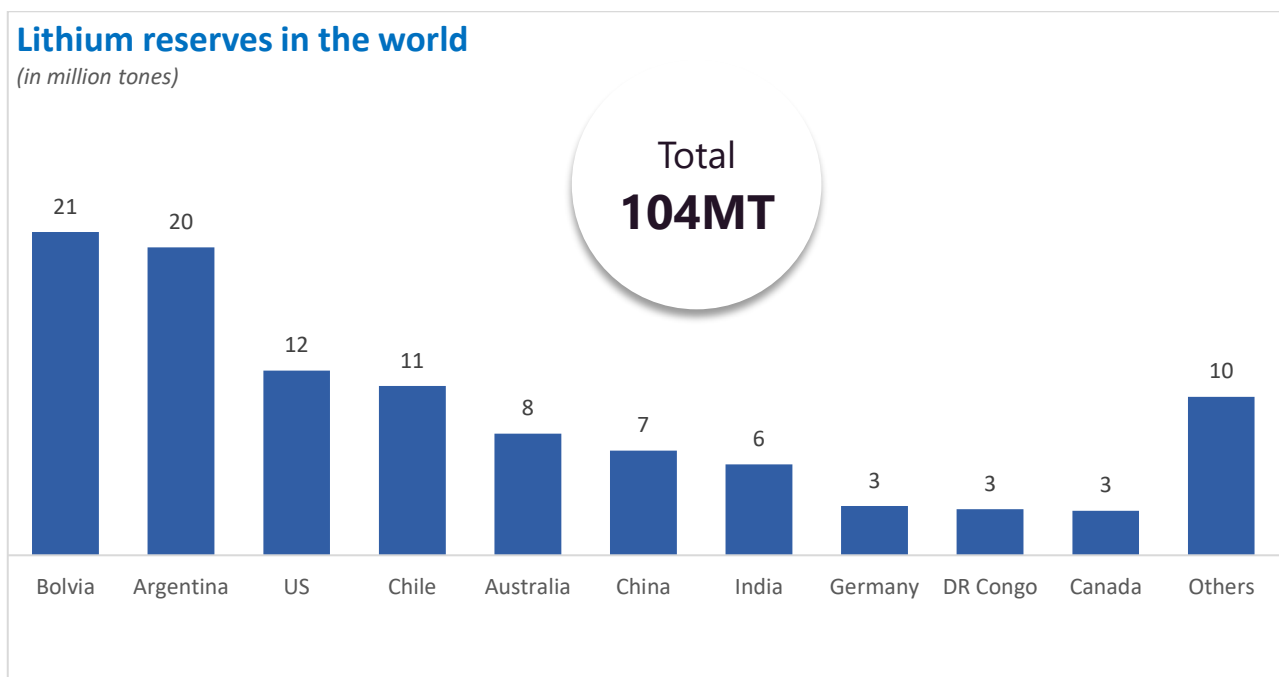
Electrical Vehicles have created a frenzy amidst financial experts as they are hailed as the next industry disruptor. Almost all the governments now have zero emissions targets set for their countries and are thus throwing their weight behind EVs. This support has launched a global rush into EV investments. As per data from the EV Volumes sales database, global sales of EVs increased by 55%, reaching a total of 10.5 million in 2022 from 2021. It also predicts global sales to increase by 36% in 2023 over 2022 to more than 14 million vehicles. By the end of 2023, it expects 40 million EVs to be on the world’s roads, with 73% of these being battery vehicles.

India is at the forefront of this revolution and one of the fastest growing markets in this industry with sales growth of 223% in 2022 as compared to 2021. According to Bain & Company, EV is poised to create a \$100 billion opportunity in India by 2030. It takes centre-stage with various strategic initiatives such as FAME India and PLI schemes. EV batteries powered by lithium play a key role in this industry. While lithium availability is not an immediate issue; it is bound to be an avenue for thought considering its mandatory use, limited availability and costly extraction. India is seeing potential to get over this issue as well.

## The Discovery and India’s Position

In February 2023; The Geological Survey of India announced that it discovered 5.9 million tons of lithium resources in the mountainous Salal-Haimana area of the Reasi district in Jammu and Kashmir. This presents a transformative opportunity for the country's EV and green energy sectors. The discovery, when looked as per the current prices<sup>1</sup>, amounts to the whopping amount of approximately US\$ 35 trillion. This amount is more than enough to meet the country’s domestic demand.

It is also confirmed that the metal quality is around 500 parts per million (ppm) which is considered high quality as compared to the normal 200ppm found in other countries. The key thing to note here is that these are not proven resources. Once proven, this will put India among the top 10 producers.

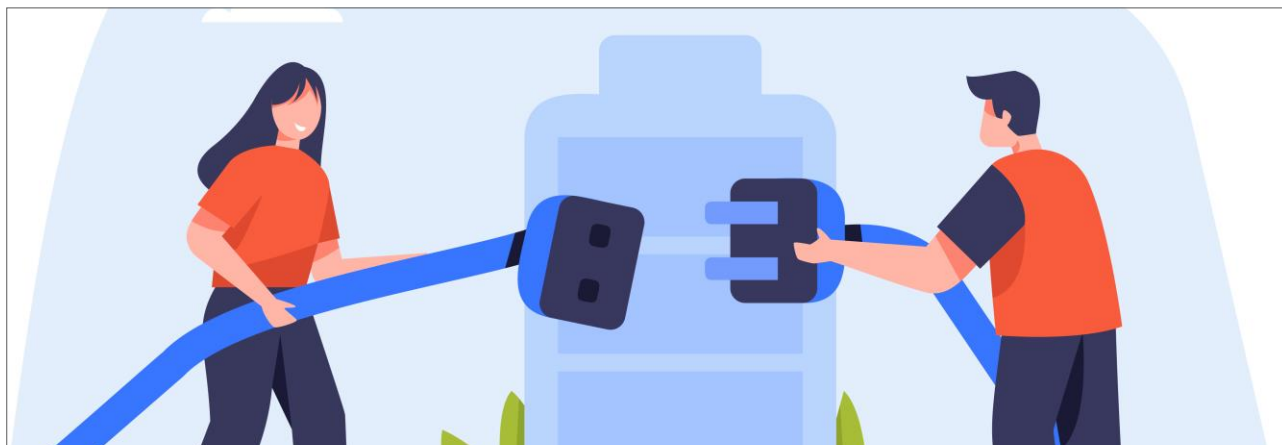


Source: US Geological Survey





<sup>1</sup>Prices as of 27 June 2023

Lithium is currently used for developing ceramics, specialty chemicals, glass, cell phone batteries, automotive batteries and others in the important industry portfolio of defence, aviation and energy. India currently imports all its lithium requirements; however, this discovery could help us in becoming self-sufficient.

In global terms as well, the International Energy Agency forecasts that production will need to increase over forty-fold to put the world on a path to net-zero CO2 emissions by 2070.



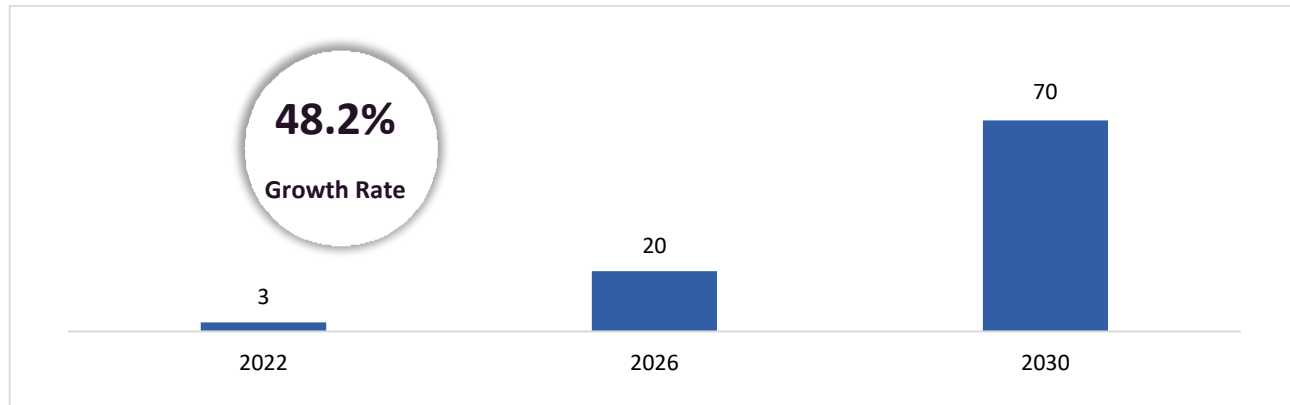
### Game Changing Prospects for India

 <p><b>Energy Security</b></p>	<ul style="list-style-type: none"> <li>• The reserves secure the critical mineral’s supplies for India and helps it in being self-sufficient in terms of energy.</li> <li>• India has a net-zero carbon emission target that it needs to achieve by 2070, which can only be achieved by accelerating green transportation and green energy adoption.</li> </ul>
 <p><b>Import Cut</b></p>	<ul style="list-style-type: none"> <li>• Currently India is dependent on imports for all its lithium needs.</li> <li>• As per the data from Ministry of Commerce, India imported lithium and lithium-ion worth INR 18,673 crores.</li> <li>• The current find would help in reducing India’s import bill and trade deficit to a great extent.</li> </ul>
 <p><b>Battery Recycling</b></p>	<ul style="list-style-type: none"> <li>• The discovery allows India to also get into the recycling of end-of-life lithium batteries.</li> <li>• Industry experts believe that in the next two years, 90 per cent of the lithium mined today will end up in the lithium-ion batteries used in EVs.</li> </ul>
 <p><b>End China Dominance</b></p>	<ul style="list-style-type: none"> <li>• China has a geopolitical domination on the lithium value-chain as more than half of the lithium is processed there, even when the largest mines are in Argentina, Bolivia, and Chile</li> <li>• Countries like the US, EU and even India wants to break China’s stronghold.</li> <li>• The US has even come up with an Inflation Reduction Act for EV subsidies to OEMs who prove that the batteries or the EV is not coming from China.</li> </ul>

## Lithium & the EV Revolution

The key use of lithium is for making automotive batteries. This is also the field where India expects the highest growth and advantage from lithium discovery.

India's lithium-ion battery market was valued at \$4.3 billion in 2022 and is estimated to reach \$25.3 billion by 2031 at a CAGR of 22.1% as per Astute Analytica. The popularity of electric cars and surge in demand for electronic devices such as laptops, tablets, and smartwatches are pushing the growth of lithium batteries in India. India's lithium-ion battery demand (in GWh) has been showcased below (Source: Arthur D Little)



India's EV market is also a high growth market. As per a study by Bain & Company, 35%–40% of all vehicles sold in India by 2030 will be EVs. The current data from Vahan Dashboard also supports this claim. It states that in April 2023, more than 1.1 million new EVs, including 2-wheelers, 3-wheelers, and 4-wheelers, were registered in India. In terms of type of vehicles, Bain & Company states that the market is expected to see 40%–45% EV adoption for 2-wheelers and 15%–20% for 4-wheelers passenger vehicles (PVs) by 2030.

Another opportunity that India's market offers is of battery recycling and reuse. McKinsey research has found that the existing battery waste materials can generate value of about US\$ 4800-5200 per ton. The recycling volume from these batteries is projected to reach 128 GWh by 2030, of which almost 59 GWh will be from the EV segment.

## Key Players Expected to Benefit from the Discovery

The good part about discovering a metal reserve is that not only the miners, but the whole ecosystem right from the miners to end-product sellers, would benefit from it. We, thus, need to focus on how this discovery will shape the entire EV market in India.

### Mining & Refining Companies

The mining and refining companies will obviously benefit from the discovery. Both mining and refining can be done by a single company or by different ones. Public sector companies would dominate here since lithium falls under the restricted list of the Department of Atomic Energy that forbids private players from mining or producing them. Key companies set to benefit are [National Aluminum Company Ltd \(NALCO\)](#), [Mineral Exploration and Consultancy Ltd](#), and [Hindustan Copper Ltd](#).

### Refined Lithium Buyers

Second would be the refined Lithium buyers. These are basically companies that make Lithium-ion cells that are used in EV batteries. In India, [HEG](#), [Himadri Specialty Chemical](#), and [Graphite India Limited](#) would be the supplier to Indian cell makers.

### Battery Manufacturers

For battery making, currently all the EV battery makers in India rely on mostly Chinese firms for the Lithium-ion cells. Indian government is now offering incentives worth around Rs 18,100 crore under its Production Linked Incentive (PLI) Scheme for Advanced Chemistry Cell (ACC) Battery Storage to build a battery manufacturing ecosystem with a capacity of up to 50 GWh. The winners of this scheme are [Reliance New Energy](#), [Rajesh Exports](#), and [Ola Electric Mobility](#). Recently, [Neogen Chemicals](#) also started manufacturing electrolytes for lithium-ion batteries. Key battery manufacturers in India include [Amara Raja Batteries](#) and [Exide Industries](#). Amara Raja has announced plans to invest over \$1.1 billion in Telangana for phased manufacturing of Li-ion

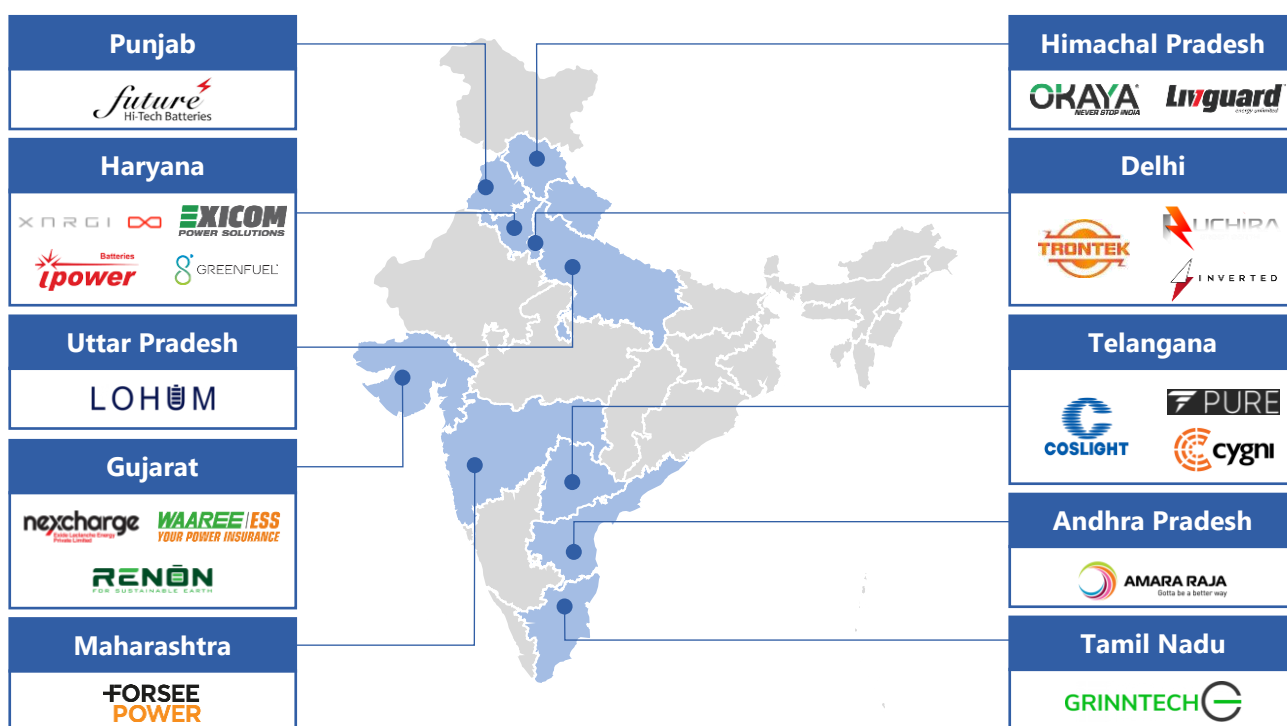
batteries. Exide aims to invest \$730 million to establish a 12 GWh lithium-ion cell manufacturing unit in Karnataka. [Lucas TVS](#) and [24M Technologies](#) are also collaborating to establish a 10GWh giga lithium-ion battery factory near Chennai with an investment of \$300 million.

**Battery Assembly and Other Spare Parts**

Key players in the battery assembly area are Ola Electric Mobility and [Aether Energy](#), a subsidiary of Hero MotoCorp. Other key components are the parts used along with the battery like the motor, power train, electronics, and the control systems. Big names present here are [ABB](#) and [Bosch](#), but it cannot be considered a major part of its business. Indian players in this field are very small in comparison. Some prominent names include [GoGoA1](#), [Compag Automation Systems](#), [C Electric Automotive Drives](#), [ElecNovo](#) and others

**EV Software**

Another important part of EV is software. Presently, [Tata Elxsi](#) and [KPIT Technologies](#) are the most well-known names in this space. Other than these [Mahindra Electric](#) is using Dassault’s ‘Simulia’ software and [Hyundai](#) offers Bluelink for its e-vehicles.



Source: JMK Research & Analytics and General Web Search

**EV Manufacturers**

Finally, all of these culminate into EV manufacturers. Among the biggest names here, [Tata Motors](#) is the clear leader. The company has a roadmap to develop EVs in almost every segment and is has also signed a MoU with the Gujarat state government to construct a \$1.6 billion EV battery plant in Sanand, Gujarat. [Bajaj Auto](#) has announced the creation of a separate EV division and invested around Rs10 billion into this. [JSW Group](#) is also rumored to enter EV space through acquisition, possibly of [MG Motor India](#). [Maruti Suzuki](#) is also ready to introduce a range of electric and hybrid vehicles.

Considering the EV ecosystem in India is at a nascent stage, there are also several small firms that are doing commendable work. Below are names of few companies that have outshone in their fields.

[Olectra Greentech](#) is an EV bus maker and EV boom in public transport has just begun. [Sona Comstar](#), an automotive systems & components manufacturer has more than 60% of its order book is from EV firms. [IBM Auto](#) has set up EV charging stations and has entered the EV bus segment. [Kabra ExtrusionTechnik](#) has a

battery division, Battrix, that provides cell packs and smart battery management systems. Other key names are [Log9 Materials](#), [Aponyx](#), [Exalta](#), [Renon](#), [Pravaig](#), [Etrio Automobiles](#), [Cygni Energy](#), and others

### Battery Recycling

The last and a very important part of the ecosystem is battery recycling. Industry experts believe that in the next two years, 90% of the lithium mined today will end up in the lithium-ion batteries used in EVs. Recycling end-of-life lithium batteries is important ecologically as well. Companies such as [Gravita India](#), [Attero Recycling](#), and [Metastable Materials](#) are key players in this field

## Conclusion

Lithium can be called as the battery of Indian economy in today's scenario and there could be no better time for this discovery than now. This has suddenly put India among the top lithium reserve holders. Although the mining and actual use of this lithium would take another 7-8 years to happen, it is still good news for the economy. Other hurdles such as Jammu and Kashmir being an eco-sensitive and politically sensitive region can pose threats to the mining industry. However, the initiatives by the Government of India and the enthusiasm shown by big as well as small players in the industry is sure to bring change to the EV ecosystem in Indian context.

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