INTERNATIONAL LITHIUM ASSOCIATION

PROJECT BLUE

Lithium 2040:

The element shaping our future

MAY 2025

About ILiA

ILiA is the global industry association for the lithium industry and represents the entire lithium value chain.

The Association was established in 2021 as an international not-for-profit industry association run by and for its members.

Our vision is to be the voice of the lithium industry, to promote ESG and sustainability and to be a global authority on lithium.

Learn more at www.lithium.org.

About Project Blue

Project Blue is a leading, global provider of market intelligence for more than 30 critical material supply chains.

We are trusted by organisations across industry, finance and government, to provide accurate data and analytics which enable strategic and investment decision-making.

Through regular market analysis and forecasts, bespoke consultancy services and global events, we support market participants across our industries with their operations.

Learn more at www.projectblue.com.

Authored by Project Blue's global lithium and lithium-ion battery research teams.

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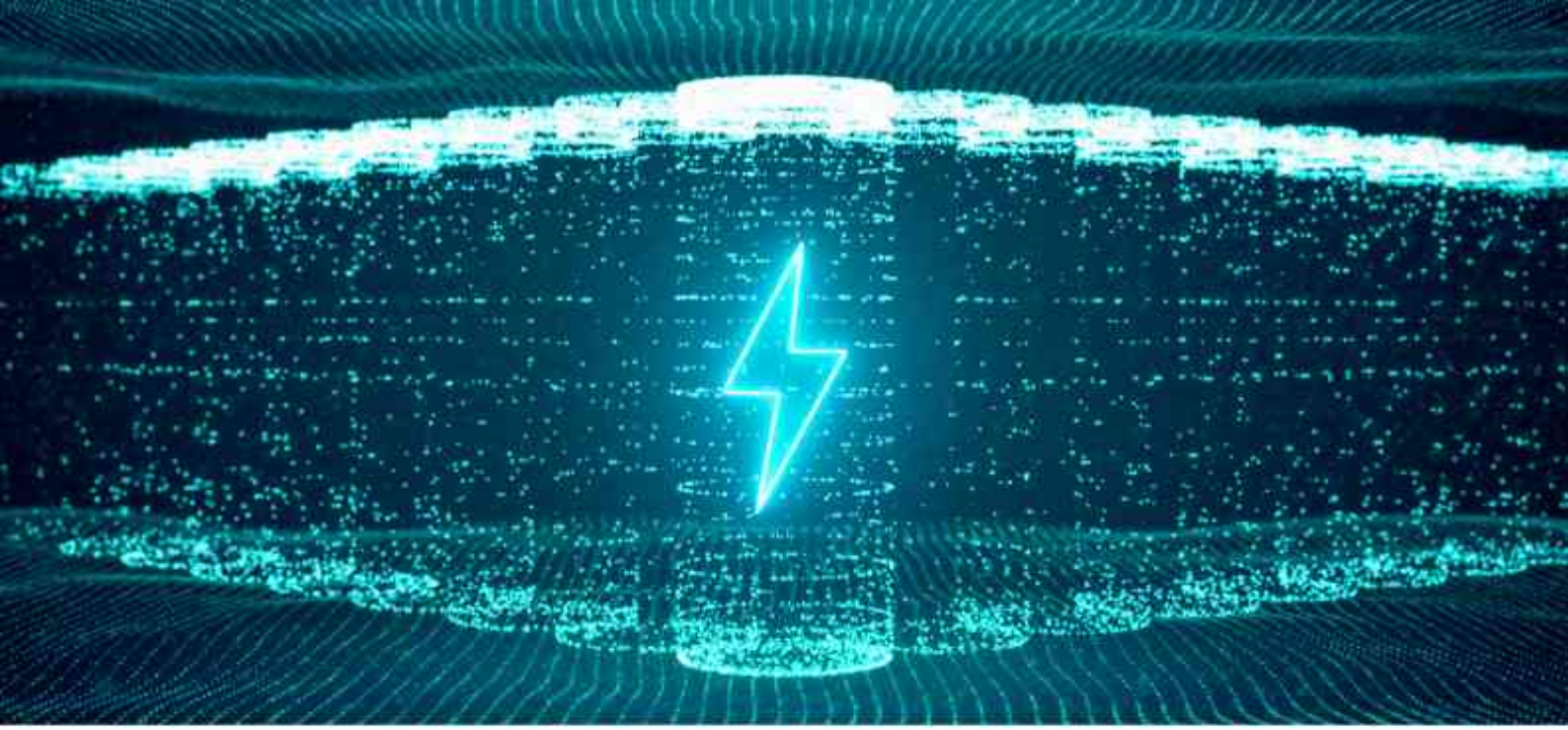
Table of contents

1. The evolution and essential nature of lithium



In 2010, lithium was a little-known material, primarily used in niche industrial applications like ceramics, glass and greases. Since then, the market has skyrocketed, expanding from 120,000 tonnes to 1,300,000 tonnes of lithium carbonate and equivalent products in 2025 - a tenfold increase powered by a seismic shift in the world's energy systems.

By 2040, lithium demand is forecast to triple from today's levels, making it one of the fastest-growing commodities of this, or any, generation.

Global demand is expected to grow from 1.3Mt LCE this year to between 3.6Mt and 5.2Mt LCE by 2040. At the heart of this growth is lithium's critical role in rechargeable lithium-ion batteries - powering electric vehicles (EVs), smartphones, laptops, and countless devices we rely on daily. Its importance to large-scale energy storage also makes it indispensable for integrating renewables into power grids, especially as electricity use climbs with rising populations and new uses like data centres.

What makes lithium especially resilient is its universal role in battery chemistries - every cathode formulation today contains it. As EVs, buses, and freight trucks become more common and battery factories scale at pace, lithium continues to cement its presence in the rhythm of modern life.

Pushing the frontier further, the pursuit of higher-performance batteries is ushering in a new era of lithium applications. Technologies like lithium-rich layered oxides (LLOs) and solid-state batteries are poised to become key breakthroughs in the battery innovation timeline through to 2040.

Asia leads global lithium consumption, both in first-use - where lithium enters the value chain at the cathode active materials (CAM) stage - and in end-use products. Over 90% of first-use lithium is consumed in Asia, with China accounting for the lion's share of this demand.

Yet as supply chains broaden globally, lithium use (and production) is expanding into new geographies. Major projects are underway in Europe and North America, with early momentum also visible in South America, the Middle East, and parts of Africa.

As global reliance on lithium accelerates, so too does awareness of its strategic importance. This changing landscape highlights lithium not only as a valuable mineral but as a cornerstone of the clean energy transition now reshaping the modern world.

"Lithium is the essential enabler of technologies driving a greener and more sustainable society - today and for generations to come. This report was commissioned to highlight lithium's strategic importance and the strong, long-term demand underpinning its global value."

Anand Sheth, Founding Chairman, ILiA

Glossary

Li	lithium
AAM	anode active material
Ah	ampere-hour
BEV	battery electric vehicle
BTM	behind-the-meter
CAGR	compounded annual growth rate
CAM	cathode active materials
CPCB	Central Pollution Control Board (India)
DOE	Department of Energy (USA)
EoL	end of life
EPA	Environmental Protection Agency (USA)
EPR	Extended Producer Responsibility
ESS	energy storage system
EV	electric vehicle
e-VTOL	electric vertical take-off and landing
FTM	front-of-the-meter
g	gram
GWh	gigawatt hour
ICE	internal combustion engine
IRA	Inflation Reduction Act (USA)
kt	thousand metric tonnes
kWh	kilowatt hour
LCE	lithium carbonate equivalent
LCO	lithium-cobalt-oxide
LEV	light electric vehicle
LFP	lithium-iron-phosphate
Li-ion	lithium-ion (battery)
LLO	lithium-rich layered oxides
LMFP	lithium-manganese-iron-phosphate
LMO	lithium-manganese-oxide
mAh	milliampere-hour
Mt	million metric tonnes
NCA	nickel-cobalt-aluminium
NCM	nickel-cobalt-manganese
NCMA	nickel-cobalt-manganese-aluminium
OEM	original equipment manufacturer (automotive)
PHEV	plug-in hybrid electric vehicle
py	per year
R&D	research & development
RMB	renminbi (CNY)
ROW	rest of world
SoH	state of health
SSB	solid-state battery

2. Introduction to lithium

Lithium (Li) is the lightest and least reactive of the alkali metals with an atomic weight of 6.94. The average crustal abundance of lithium is 0.002%, making it the 25th most common element of the Earth's crust.

Basic chemical information on lithium

GROUP	PERIOD	BLOCK	ATOMIC NUMBER
1	2	S	3
STATE AT 20°C	**ELECTRON CONFIGURATION**	**MELTING POINT**	**BOILING POINT**
Solid	$[He]2s^1$	180.5°C (356.9°F)	1,342°C (2,447.6°F)
DENSITY (G CM−3)	**RELATIVE ATOMIC MASS**	**KEY ISOTOPES**	**CAS NUMBER**
0.534	6.94	^7Li & ^6Li	7439-93-2

There are several naturally occurring lithium bearing minerals, though the most commercially significant minerals are spodumene and lepidolite, which are extracted at a number of mines globally. The most common forms of lithium in nature are lithium in solution contained within brines, within granitic pegmatites, lithium-bearing clays and within ocean water.

In its metallic form, lithium is a silvery white metal which oxidises readily in air, which means metallic lithium does not occur naturally.

List of major lithium minerals and Li contents

NAME	FORMULA	MAXIMUM Li_2O CONTENT (%)	TYPICAL Li_2O% OF ORES
Amblygonite	$(Li,Na)Al(PO_4)(F,OH)$	7.4	...
Bikitaite	$LiAlSi_2O_6H_2O$	7.3	...
Cookeite	$LiAl_4(AlSi_3O_{10})(OH)_8$	2.9	...
Eucryptite	$LiAlSiO_4$	11.8	4.5 - 6.5
Jadarite	$LiNaSiB_3O_7OH$	7.3	1.8 - 2.0
Lepidolite	$K(Li,Al)_3(Si,Al)_4O_{10}(OH,F)_2$	7.7	3.0 - 4.1
Montebrasite	$LiAl(PO_4)(OH,F)$	10.2	7.5 - 9.5
Petalite	$LiAl(Si_4O_{10})$	4.5	3.0 - 4.7
Spodumene	$LiAlSi_2O_6$	8.0	2.9 - 7.7
Zinnwaldite	$KLiFeAl(AlSi_3)O_{10}(OH,F)_2$	3.4	0.4 - 0.8

Source: Garrett 2004 – Handbook of lithium and natural calcium carbonate, webmineral.com, mindat.org

Lithium compounds, alloys and metal products are consumed in a wide range of end-use applications, from electronics and batteries to ceramics and steel products.

The physical properties of lithium make it a critical component of ceramics, glass, glass-ceramics, metallurgical, grease and many other applications. Lithium compounds are added to glass and ceramics products to better control thermal expansion and reduce internal stresses within the product. This is critically important for products which undergo significant temperature changes such as cookware and cooker tops and reduces risk of cracking and breakages caused by internal stresses.