

# Lithium - Top Strategic Issues for 2019

## The New “Urban Lithosphere”

Much like the composition of the Earth’s bedrock, lithium compounds are present in every-day objects and also form the foundation of our growing urban landscape. The number of household devices and items that contain lithium may be surprising, here we identify just a few of the common lithium-bearing items that you may find in a home. Note, all estimates are for the average single device or item only. Assumptions on the number of devices and items fluctuate between urban environments.



Hover over a circle to see how many grams of Lithium it contains



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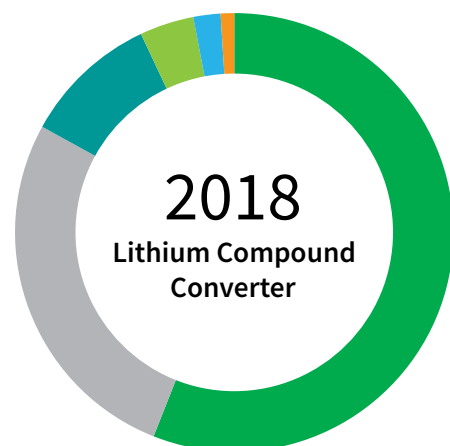


Click on each year to see the growth of Lithium production

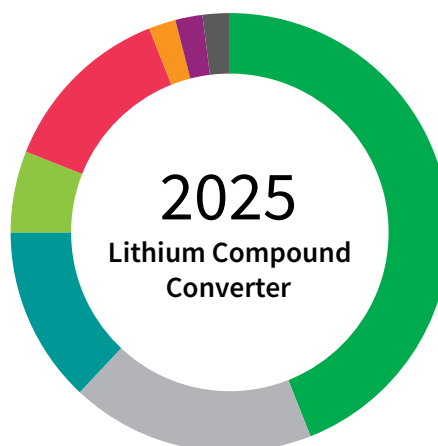
## Challenges for expansions and for junior producers to enter the lithium market

- Securing adequate funding, financing, partnerships, and offtake agreements, especially if there is a fear of oversupply and falling lithium compound prices
- Each reserve has a unique chemistry, which requires specific processing and purification of the lithium into battery-grade lithium compounds
- Lithium extraction processes are capital intensive to varying degrees depending on technology employed. Skilled labor and process expertise are needed to and process lithium
- There are many barriers to entry including government bureaucracy, royalty costs, environmental stewardship, community engagement, and sustainability

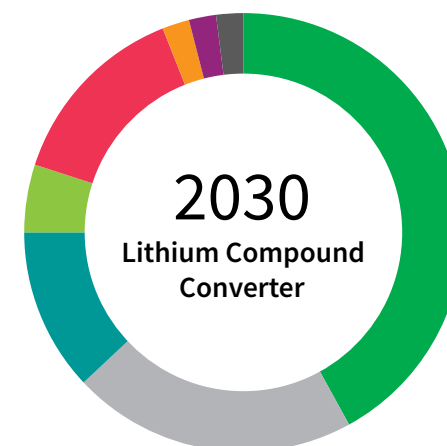
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China	56%
Chile	27%
Argentina	10%
USA	4%
Russia	2%
Other	1%



China	44%
Chile	18%
Argentina	13%
USA	6%
Australia	13%
Other	2%
Canada	2%
South Korea	2%



China	42%
Chile	21%
Argentina	12%
USA	5%
Australia	14%
Other	2%
Canada	2%
South Korea	2%

## A changing landscape for production of lithium compounds

- Production shifting from lithium carbonate to lithium hydroxide
- Conversion to lithium compounds at the extraction site
- China's desire to lower dependence on spodumene imports
- Other countries' desire to lower their dependence on Chinese conversion plants
- Government initiatives to secure sources of critical compounds

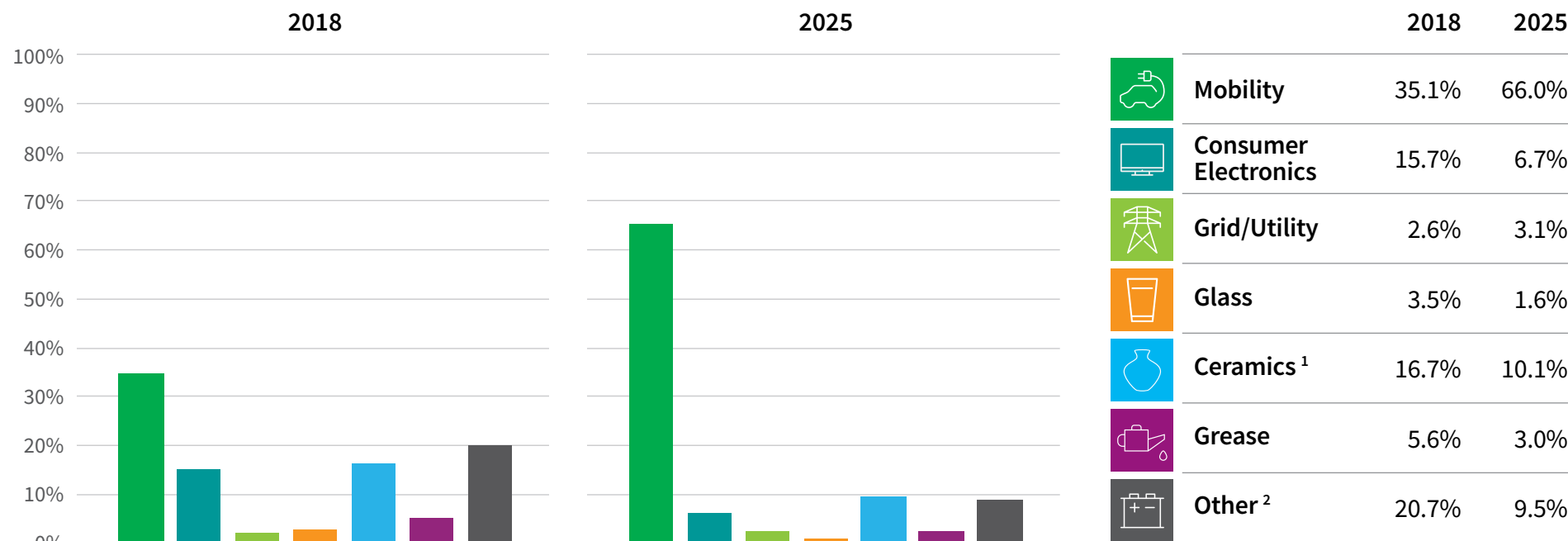
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## An Evolution in Global Demand

Several barriers must be resolved to realize such an evolution in global demand. As demand lithium compounds continues to grow, one trend is for certain: A dramatic evolution from previously fragmented to increasingly concentrated end-use applications. This shift is largely due to the rapidly developing e-mobility market that encompasses the full xEV spectrum, from pure battery electric vehicles to mild hybrid electric vehicles, in both light and heavy-duty markets.

- Supply chain: Ensure man-made bottlenecks are avoided
- Infrastructure: Parallel roll-out of charging stations to service growing fleets
- xEV to ICE parity: Equitable margin generation for the OEM

## Demand by End-use Sector (%)



<sup>1</sup> Ceramics: includes (1) fully cry stalline ceramics and (2) part-cry stalline glass-ceramics.

<sup>2</sup> Other: includes applications <5%

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The market for lithium compounds is rapidly evolving; price direction is driven by the balance between supply and demand. However, lithium compounds remain specialty chemicals today and lack the price transparency of commodities. Without market transparency to provide a neutral indicator of market dynamics, price can be influenced by a single party's perception of balance.

Rapid demand growth necessitates new capacity. Capital commitment decisions are difficult with price volatility and uncertainties associated with incomplete information. We provide a neutral long-term perspective that facilitates smart business and capital investment decisions in a complex, volatile market.

The IHS Markit **Global Lithium and Battery Materials Service** is an integrated solution for the lithium and battery materials industry and associated downstream applications based on our world leading coverage of energy, chemicals, and the automotive sectors. The Lithium and Battery Materials monthly market analysis includes supply/demand balances, price indices, global trade outlooks, forecasts, and insight into the current market situation.

