



## Bottled Lightning: Superbatteries, Electric Cars, and the New Lithium Economy

By Seth Fletcher

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### **Bottled Lightning: Superbatteries, Electric Cars, and the New Lithium Economy** By Seth Fletcher

The sleek electronic tools that have become so ubiquitous—laptops, iPods, eReaders, and smart phones—are all powered by lithium batteries. Chances are you've got some lithium on your person right now. But aside from powering a mobile twenty first-century lifestyle, the third element on the periodic table may also hold the key to an environmentally sustainable, oil-independent future. From electric cars to a "smart" power grid that can actually store electricity, letting us harness the powers of the sun and the wind and use them when we need them, lithium—a metal half as dense as water, created in the first minutes after the Big Bang and found primarily in some of the most uninhabitable places on earth—is the key to setting us on a path toward a low-carbon energy future. It's also shifting the geopolitical chessboard in profound ways.

In *Bottled Lightning*, the science reporter Seth Fletcher takes us on a fascinating journey, from the salt flats of Bolivia to the labs of MIT and Stanford, from the turmoil at GM to cutting-edge lithium-ion battery start-ups, introducing us to the key players and ideas in an industry with the power to reshape the world. Lithium is the thread that ties together many key stories of our time: the environmental movement; the American auto industry, staking its revival on the electrification of cars and trucks; the struggle between first-world countries in need of natural resources and the impoverished countries where those resources are found; and the overwhelming popularity of the portable, Internet-connected gadgets that are changing the way we communicate. With nearly limitless possibilities, the promise of lithium offers new hope to a foundering American economy desperately searching for a green-tech boom to revive it.

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### Editorial Review

From Publishers Weekly

Electric cars are real—see the Tesla Roadster, Chevy Volt, and hybrids like the Nissan Leaf and Toyota Prius—but the drive to create safe, lightweight, and long-lasting batteries to power them has been anything but smooth. Faced with political, technological, and management obstacles, battery technology still lags. In the mid-1800s Fletcher says, clean, cheap lead-acid batteries were developed that by the early 20th century were preferred for use in automobiles over "unreliable, complicated, loud, and dirty" gasoline-powered cars—until it came time to refuel. Thomas Edison tried to invent a safe, longer-duration battery, even experimenting with small amounts of lithium, but then Charles Kettering patented an automatic starter for gas engines, and the battle was lost. Smog and 1970s gas shortages revived interest in electric cars—and lithium batteries. But obstacles remain: Bolivia, Chile, and China have less than optimal political leadership and minimal infrastructure to safely mine and process the poisonous ore. More importantly, many technical challenges must be overcome before electric cars and buses become everyday modes of transportation. But Fletcher remains optimistic. He balances science and history with a closeup look at business practices and priorities, providing lucid and thorough coverage of a timely topic. (May)

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### Review

“Fletcher makes a good case that the electric-car trend may soon be able to shed its dubious reputation as a public-private hybrid and roll under its own power.” —Ronald Bailey, *The Wall Street Journal*

“There’s never a dull page as Mr. Fletcher slaloms through the science, the business deals and the political pitfalls.” —Don Sherman, *The New York Times*

“*Bottled Lightning* is a gripping introduction to this sophisticated technology and its place in our society.” —Bruno Scrosati, *Nature*

“A well-written, smart and—when Fletcher gets rolling in the last quarter of the book—rollicking story.” —Steve LeVine, *Foreign Policy*

“[Fletcher] follows lithium from the South American salt flats where most lithium minerals are mined to the labs of General Motors, tracing its journey from obscure metal to one of the most sought-after resources on earth—and perhaps the centerpiece of the automotive future.” —*Discover*

“Fletcher captivantly explains just how significant lithium may become in satisfying the industrial world’s insatiable energy needs and, ultimately, reducing its dependence on oil . . . An informative and timely read.” —Carl Hays, *Booklist*

“[Fletcher] provides an entertaining, surprisingly eventful history of human efforts to harness energy in the form of battery power . . . A fine, readable work of popular science.” —*Kirkus Reviews*

“Balances science and history with a closeup look at business practices and priorities, providing lucid and thorough coverage of a timely topic.” —*Publishers Weekly*

“*Bottled Lightning* jumpstarts the electric-car story with one of the key players of the story—batteries—and does it brilliantly. The more you know, the more you’re ready.” —Chris Paine, director, *Revenge of the Electric Car* and *Who Killed the Electric Car?*

“To move from our present energy predicament the most vexing challenge is transportation—in short, to find a convenient, safe, portable energy source that packs as much energy per kilogram as does gasoline. Electric batteries have tantalized car builders since the 19th century, but still they seem to be just down the road a bit. In *Bottled Lightning*, Seth Fletcher enlists chemists, geologists, business investors, and automotive engineers to tell an engrossing and important story of how we got to where we are. This book can help us get to where we need to go.” —Rush Holt, U.S. House of Representatives

“An engaging read detailing the intrigue surrounding the birth and development of modern lithium-ion batteries. Fletcher intersperses the story of the science, business and politics of batteries with colorful quotes from some of the eminent personalities in the field.” —Gerbrand Ceder, professor of materials science and engineering, Massachusetts Institute of Technology

About the Author

Seth Fletcher is a senior editor at *Popular Science* magazine. His writing has also appeared in *Men’s Journal*, *Outside*, *Salon*, and other publications. He lives in Brooklyn.

## Users Review

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