

The Path to Lithium Batteries: Friend or Foe?

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Fixing America's infrastructure (and many other countries') is high on the priority list of greenies and world leaders alike. Two solutions, smart grids and [electric cars](#), are championed by many as the future for energy delivery and transportation. Both are innovative. Both are said to tackle problems like climate change and efficiency - and both are dependent on one technology: energy storage, or what the general public call batteries. Conventional battery technology is made of stuff too heavy for use in transportation. Lithium batteries, being lighter and having a longer charge life, are seen as the greatest option. However, how closely have scientists, engineers, businesses and the government looked at the environmental impact of producing the batteries that are at the heart of running the nation on a new grid and with a new fleet of automobiles? Lithium is a key ingredient not only in car batteries, but also the batteries used in cell phones, computers and other electronic devices and energy storage for a smart grid. For all that they may do for society, we should not accept the technology until questions like what does it take to extract Lithium from nature, how toxic is Lithium and how toxic is the process to purify Lithium after extraction are answered. As well as what are the political implications of where it is located?

Research and Discovery

Looking into recent research and reports reveal the importance of considering such questions before large-scale production of electric cars or batteries for grid-source energy are aggressively pursued. For one, even

among those studying the impact of Lithium there is not always agreement.

A [recent study looked](#) in great detail at how Lithium is used to produce batteries, and the entire life cycle of the batteries. The findings were compared to the environmental impact of conventional internal combustion cars. The study measured environmental impact in a number of ways, including *global warming potential*, *cumulative energy demand*, an *Ecoindicator 99* and an *Abiotic Depletion Potential* that measures resource depletion. Interestingly, the study found that the environmental impact of Lithium was relatively small, but that other elements of these batteries have a higher impact. For example, lithium batteries take a tremendous amount of copper and aluminum to work properly. These metals are needed for the production of the anode & the cathode, cables and battery management systems. Copper and [aluminum have to be mined](#), processes and manufacturing which takes lots of energy, chemicals and water which add to their environmental burden.



[Photo credit: Doc Searls/Creative Commons](#) - Lithium Operation in Nevada

The study also found that the impact of battery-operated vehicles varies according to the source of the electricity used. In some states coal is the main source of electricity while in others it is hydroelectric power. Not surprisingly, there is a significant difference in environmental impact when the source of electricity is taken into account. Overall, the study concluded that battery-powered electric cars do have a lower impact on the environment than all but the most fuel-efficient diesel-run cars.

Countering View

However, a [2008 French study examines various factors](#) regarding Lithium extraction and production and comes to a different conclusion. First of all, this study emphasizes that there would be less Lithium available than previously estimated for the global electric car market. It also states the fact that some of the largest concentrations of Lithium in the world are found in some of the most beautiful and ecologically fragile places, such as The Salar de Uyuni in Bolivia. The authors note:

"It would be irresponsible to despoil these regions for a material which can only ever be produced in sufficient quantities to serve a niche market of luxury vehicles for the top end of the market. We live in an age of Environmental Responsibility where the folly of the last two hundred years of despoilment of the Earth's resources are clear to see. We cannot have "Green Cars" that have been produced at the expense of some of the world's last unspoiled and irreplaceable wilderness. We have a responsibility to rectify our errors and not fall into the same traps as in the past."



Photo Credit: [Juan Manurl Garcia](#)

The report estimates that there would be less Lithium available than previously estimated for the global electric car market, as demand is rising for competing markets, such as cellular telephones and other electronic devices. At the same time, due to a great concentration of Lithium found in Chile, Bolivia and Argentina (70% of the world's deposits), the United States and other developed countries needing the material will be subject to geopolitical forces similar to those they have already encountered from the member countries of OPEC. A [March 2010 article in The New Yorker](#) goes into great detail about the complex politics of Lithium in South America and its impact on the U.S. and other countries. Do we really want to move from international relations dependent on oil from the Middle East to international relations dependent on Lithium from South America?

Before We Take the Lithium Road

There are other battery technologies in development that perhaps present lesser environmental and political challenges, such as fuel cell batteries. Wouldn't it be prudent to assess which path, or paths, allows the greatest benefit for the country and the environment before moving ahead with mass production of a technology that may ultimately not be much better than what we already have?