The paradox of lithium in the race toward net-zero emissions

January 19 2023, by Marco Tedesco

Mining for lithium — an essential element to power the clean energy transition — can have negative impacts on the environment. Credit: TomTooM03

The race toward net-zero emissions depends heavily on lithium—to power electric vehicles, to store wind and solar power.

This element of the periodic table is one of the main protagonists of the economic and infrastructural transformation that we are experiencing today. Our dependence on lithium recalls that of oil and coal that transformed our society in the past. At the time, however, the long-term effects of burning fossil fuels were unknown, whereas today, we know of the highly negative aspects of lithium extraction on the environment.

With this knowledge should come responsibility—towards the environment and future generations. We must not fall into the same traps from which we are trying to free ourselves.

Together with the powerful "curative" and "palliative" qualities of lithium on the effects of climate change, it is necessary to consider the potential "side effects" and communicate them in transparent manner. These side effects include: use of large quantities of water and related pollution; potential increase in carbon dioxide emissions; production of large quantities of mineral waste; increased respiratory problems; alteration of the hydrological cycle.

Obviously the economic interests at stake are enormous. Australia, Chile and China produce 90% of the world's lithium. The global lithium market rapidly approaching $8 billion.

A paradox, therefore, can arise between "clean" revolution and "dirty" lithium mines: it is true that electrifying cars and other aspects of our society favors the reduction of carbon dioxide emissions. However, after we consider the cost of emissions associated with extracting lithium, the transition may not be as efficient as we believe, especially when miners are not using clean energy.

Let us consider, for example, electric cars. To give an idea of this effect, producing a battery weighing 1,100 pounds emits over 70% more carbon dioxide than producing a conventional car in Germany, according to research by the automotive consultancy Berylls Strategy Advisors.

Furthermore, lithium mining requires a lot of water. To extract one ton of lithium requires about 500,000 liters of water, and can result in the poisoning of reservoirs and related health problems.

What to do, then? To begin with, we should invest in alternative solutions to lithium batteries. At the same time, recycling and increasing the lifetime of these batteries would reduce the need to mine huge quantities of the precious material. This effort should be accompanied by launching lithium mining operations with strict environmental laws and regulations, and investing in advanced mining methods capable of extracting lithium from seawater.

Remediating and reducing the impact of lithium mining is essential to be able to call the steps we are taking towards a new world "progress." Otherwise, we are just going in circles.

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