The Basics: Lithium

What is Lithium? Lithium is an element that is used today primarily in the lithium-ion batteries considered essential for electric vehicles and electronic devices. It is mainly sourced from ores and brines, and up to this point the U.S. has relied on imports from Chile, Bolivia, and Argentina to meet its demands. In response to the transition away from gas-fired engines and toward the adoption of clean energy technologies, the demand for lithium is expected to triple over the next several decades, putting a drain on current sources. Some predict a shortage by 2025 unless production can be increased [World Nuclear Association, 2022].

In response, the U.S. government is asking that all our lithium needs be met domestically by 2030. In April 2024, a research team at the University of Pittsburgh published a study claiming that up to 40% of the country's lithium needs could be met through the extraction of lithium from wastewater produced from the fracking operations in the Marcellus Shale [University of Pittsburgh, 2024]. Spokespeople for the Marcellus responded to this news with enthusiasm since this finding provides an ostensible further reason to continue fracking operations in Pennsylvania.

Environmental and Safety Issues: Despite the fact that the Pennsylvania fracked gas industry is enthusiastic about "mining" their waste water to keep fracking economically viable and make money from their troublesome radioactive, toxic liquid waste, researchers are exploring alternatives. A recent Lawrence Berkeley National Laboratory report estimated that lithium reserves in the geothermal reservoirs of the Salton Sea area of California could power 375 million electric vehicles, essentially making the US self-sufficient for lithium [Desert Sun 2023]. Also, developers of the Thacker Pass lithium mine in Nevada believe the lithium stored underground there could meet US demand [E&E News, 2023]. However, although these lithium stores appear to bypass the problems associated with prolonging the fracked gas industry and radioactive waste disposal associated with fracking brine, both of these projects present their own serious environmental, resource use, and community challenges [ICN, 2021; Desert Sun 2023; E&E News, 2023; Earthworks, 2023]. Alternatives to lithium appear to present the best option for a cleaner path forward. Engineers are already developing alternative battery chemistries that could alleviate our need for lithium altogether. Batteries using the much more abundant element sodium, for example, could replace many uses of lithium batteries and solid-state batteries could also expand our array of battery technologies, further reducing our need for lithium [BBC, 2024].

Lithium extraction from fracking wastewater:

- Will perpetuate the fracking industry in Pennsylvania, requiring ongoing drilling of new wells to replace older, less productive ones [Inside Climate News, 2024].

- Will produce untold amounts of radioactive wastewater that, under current conditions, will be handled and disposed of unsafely (including being dumped into Pennsylvania's waterways or used for road spreading), causing harm to both workers and environment [Inside Climate News, 2024].

- Will further deplete precious natural resources, requiring around 500,000 gallons of water to extract one tonne of lithium [Popular Mechanics, 2024].

- Will perpetuate dependence on lithium ion batteries, which, if damaged, can present a fire and/or explosion hazard, at a time when greener alternatives, including sodium ion or solid state batteries, are being investigated as possible solutions [Android Authority, 2024].

The bottom line: Lithium extraction from Marcellus wastewater is not a green solution.

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